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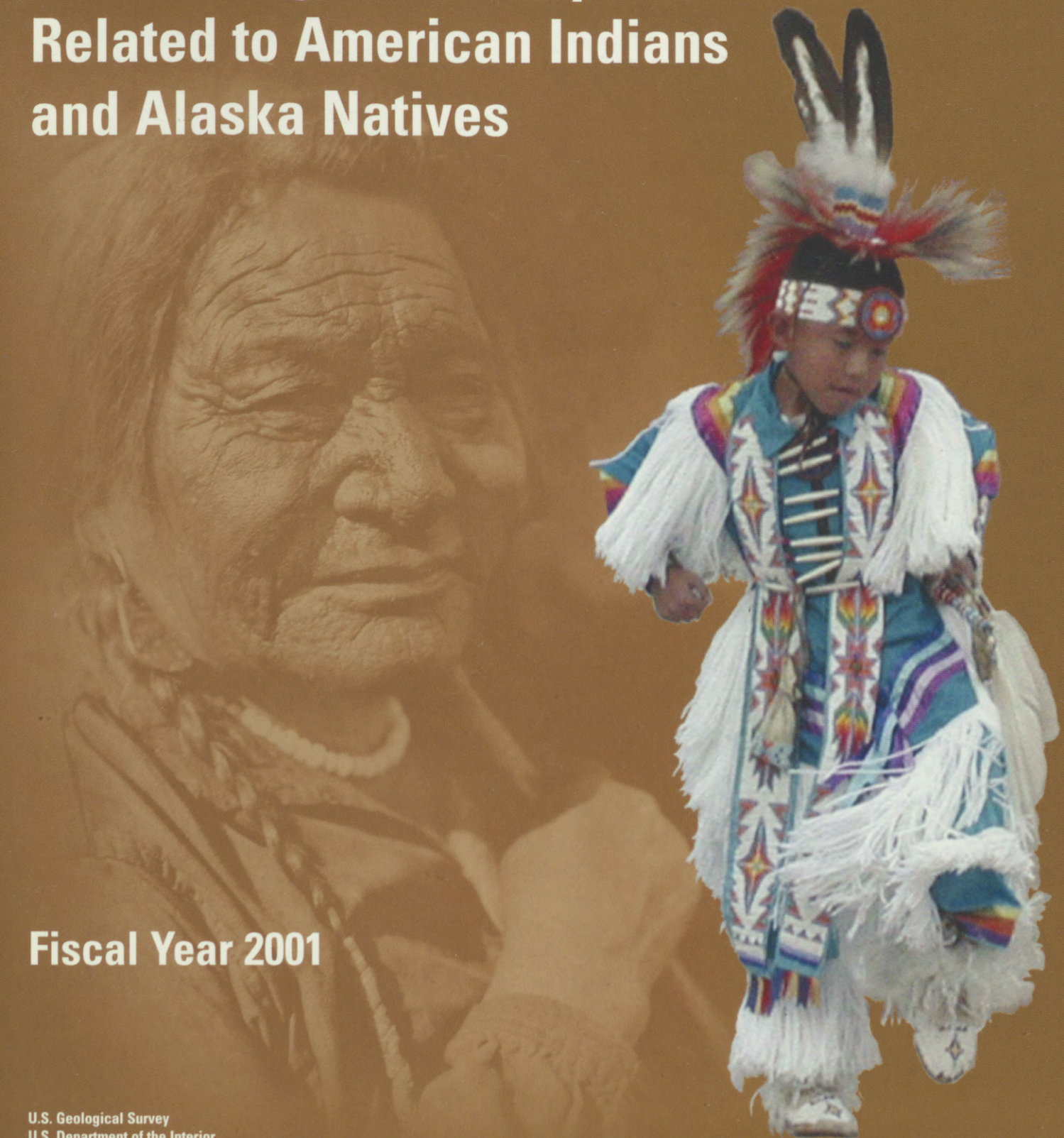
U.S. Geological Survey Activities Related to American Indians and Alaska Natives



Fiscal Year 2001

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

Front cover: Sepia image of Calf Child, Blackfeet Nation, courtesy of the National Anthropological Archives, Smithsonian Institution/76-15171. Photographer not recorded, however E.S. Curtis claimed copyright in 1927. Full color image of Eldon Owens, Navajo Nation, dancing at Tribal Land and People Summit, an event sponsored by the Southwest Strategy, August 2001. Photographer: Elaine Padovani, USGS

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

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

Fiscal Year 2001

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Contents

This report is organized in the following manner: East to west, north to south. General information is followed by information on work in the northeastern United States; information about Alaska is at the end of each section. To find a particular Tribal reference, or State, use the indexes on pages iv through xiii.

List of Tribes or Tribal Governments Mentioned in the Report

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

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

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State Listing

Introduction

Introduction

U.S. Geological Survey Activities Related to American Indians and Alaska Natives Fiscal Year 2001

Introduction

Information is a resource that can help Native American governments and their people. The U.S. Geological Survey (USGS) makes available technical expertise, reports, and other impartial information sources that can benefit Native Americans interested in subsistence issues, water, land use, and the health of many parts of the environment.

The USGS works in cooperation with American Indian and Alaska Native governments, conducting research on water and mineral resources, animals and plants of environmental, economic, or subsistence importance, natural hazards, and geologic resources. Digital data on cartography, mineral resources, stream flow, biota, and other topics are available to American Indian and Alaska Native individuals and institutions. The USGS recognizes the need to learn from and share knowledge with Native peoples. This report describes most of the activities that the USGS conducted with American Indian and Alaska Native governments, educational institutions, and individuals during Federal fiscal year 2001. Some of these USGS activities were carried out in concert with the Bureau of Indian Affairs (BIA). Others were conducted by Tribes and the USGS.

In 2001, the USGS began examining its activities related to American Indians and Alaska Natives to determine how it can better serve these customers within its mandates. A growing number of Tribal governments, educational institutions, and other Tribal organizations have begun using geographic information systems and other digital technologies in recent years. As Tribes become more interested in and more adept at managing digital information, they are seeking relevant data from the USGS more frequently. Using digital technologies provides Tribal governments with additional means of managing lands and resources for the benefit of current and future generations. The USGS recognizes the need to make its information available to Tribal governments, and to work with those governments and other institutions to advance data management capabilities.

The USGS is responding to this need by increasing the transfer of scientific information to American Indian and Alaska Native governments and by training employees of those governments to conduct and improve scientific studies. The USGS is also encouraging American Indians and Alaska Natives to pursue careers in science, and seeking ways to hire Indian and Native students. By identifying, improving, and disseminating information about available hiring mechanisms, the USGS is working to make hiring such students easier, and therefore more likely, for USGS managers.

The U.S. Geological Survey is the Federal science bureau within the Department of the Interior (DOI). The USGS is non-regulatory and is not a significant manager of Federal or Trust lands or assets. However, there are two types of USGS activities that do involve American Indians, Alaska Natives, and their lands.

The first type of activity is the course of formal studies, conducted through existing USGS programs, that involves collection of specific types of data as well as investigative and research projects. These projects typically last 2 or 3 years, although a few are parts of longer-term activities. Some projects are funded through cooperative agreements, from monies provided to the USGS by individual Tribal governments or by the 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 USGS routinely works with its sister bureaus in the Department of the Interior to provide the scientific information and expertise needed to meet the Department's science priorities. Within this context, the USGS and the BIA are cooperating to use USGS information resources to benefit American Indian and Alaska Native peoples and their lands.

The second type of USGS 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, that result from one or more USGS employees identifying and responding to an observed need. In these activities, USGS employees help fulfill a mission of the USGS-to make science relevant-while helping their fellow citizens. USGS employees have also taken the initiative in assisting American Indians and Alaska Natives through participation in several organizations that were created to foster awareness 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, 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. Furthermore, the USGS has instituted a regional organizational structure, with Western, Central, and Eastern Regions. The regions work in concert with specific scientific disciplines to conduct the scientific mission of the USGS. The regional structure is intended to bring us closer to our customers; we hope that Native Americans and Alaska Natives will use the contacts listed at the end of this report.

How to use this report: In the following pages, diverse USGS activities related to American Indians and Native Alaskans are grouped into several categories. If you find an interesting activity that you think might be appropriate to undertake in your area, contact the person(s) listed to learn how the activity was carried out. Ask for suggestions as to who in the USGS could assist you in setting up a similar activity in your area. If in doubt as to how to proceed, contact the USGS employees listed on the back cover. Within the USGS, this report will help staff develop outreach, educational, and program documents for future use. It is hoped that USGS employees, American Indians, and Alaska Natives will adapt these activities in new settings and will use the USGS contacts to expand the relevance of the USGS to more Americans.

This document was compiled by Sue Marcus in cooperation with:
- Tom Zembrzuski, Water Resources Discipline American Indian/Alaska Native Liaison
- Sharon Swanson, Geologic Discipline American Indian/Alaska Native Liaison
- Bonnie Gallahan, Geographic Information Discipline American Indian/Alaska Native Liaison
- Lynne Sendejo, Office of Equal Opportunity American Indian/Alaska Native Liaison
- Hardy Pearce, Biological Resources Discipline American Indian/Alaska Native Liaison
- Gayle Sisler, Eastern Region American Indian/Alaska Native Liaison
- Gene Napier, Central Region and Geography Discipline American Indian/Alaska Native Liaison
- Elaine Padovani, Western Region American Indian/Alaska Native Liaison
- Sharon Cline designed the cover and created the graphic layout of the report.

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

Contact information is also provided on the inside of the back cover of this report. A general point of contact is Susan Marcus, Director's Office, phone-703-648-4437; e-mail-smarcus@usgs.gov

Highlights of Fiscal Year 2001

Highlights of Fiscal Year 2001

USGS National Wildlife Health Center (NWHC) distributes *Wildlife Health Alerts* to Federal and State natural resource and conservation agencies, including the Bureau of Indian Affairs. *Wildlife Health Alerts* provide and promote an exchange of information on important threats to wildlife health. They are issued for specific wildlife diseases, not for human health issues. During FY2001, *Wildlife Health Alerts* were issued on the threat of foot-and-mouth disease to wildlife and on the role of wild birds in the rapid spread of West Nile virus throughout the eastern United States. A complete list of *Wildlife Health Alerts* and copies of each are available at www.nwhc.usgs.gov. Tribal governments are encouraged to contact the USGS to be added to the automated announcement list. Contact: Paul Slota, 608-270-2420, paul_slota@usgs.gov

Southwest Strategy. The USGS is an active partner in the Southwest Strategy, (SWS). SWS is an intergovernmental process that provides a forum for diverse entities to collaborate and resolve natural resource conservation, management and community development issues affecting Arizona and New Mexico. Through cooperative planning and improved decision-making, SWS strives to maintain, restore, and enhance the cultural, economic, and environmental quality of life for the people of Arizona and New Mexico. SWS brings together Federal, Tribal, State, and local governments, as well as private landowners and other stakeholders, in a problem solving process. A key accomplishment in FY2001 was the coordination and implementation of National Fire Plan activities. Other ongoing collaborative activities include noxious weed management, rangeland monitoring, scientific information exchange, sustainable land use, threatened and endangered species management, Tribal-Federal Government-to-Government Relations, U.S./Mexico relations, and water issues. The USGS sponsors and chairs the Southwest Strategy's Scientific Information Work Group; the work group has developed a database containing information acquired from research and natural resource, social, and economic data that is critical to natural resource management in the Arizona and New Mexico. The database will be available over the Internet in late 2002. The SWS will sponsor a Tribal Gathering in April 2002 focusing on cultural resources, economic development, and natural resources. The Gathering will provide an opportunity for new collaborations to develop meaningful products. Contact. Elaine Padovani, 520-670-5506, epadovan@usgs.gov

Human Health and Contamination in the Penobscot River. The Bureau of Indian Affairs brought together agencies including the U.S. Geological Survey (USGS), the Environmental Protection Agency (EPA), and the University of Maine Water Research Institute (WRI) to collect information regarding the occurrence, distribution, and ecological and human health risks associated with dioxins, furans, and PCBs in fish and sediment in the Penobscot River. The study area encompasses the Penobscot River main channel from the Milford Dam impoundment in Old Town to Grindstone, Maine. Concentrations of dioxins and furans in the riverbed sediment have been quantified to a limited degree through a 1995 sampling study by the Penobscot Nation's Department of Natural Resources. In addition, the Maine Department of Environmental Protection maintains several fish sampling stations in the study area as part of their statewide dioxin-monitoring program. During 2000 and 2001, the USGS Maine Water Resources District conducted a field program that included a geophysical survey of sediments in the riverbed to identify areas of fine-grain sediment deposition, and the subsequent collection of fish tissues and fine-grained surficial sediment samples. These samples were analyzed for dioxins, furans, and PCBs at the University of Maine WRI. EPA risk assessors will use the collected data to assess human health and ecological risk. Contact: Robert Lent, 207-622-8201, rmlent@usgs.gov

Tribal Fisheries Restoration and Enhancement. The USGS Great Lakes Science Center's Tunison Laboratory of Aquatic Science continued to provide assistance Tribes in restoring and enhancing their fisheries. In 2001, Tunison staff stocked 300 catchable rainbow trout and 150 adult Atlantic salmon (reared at the Tunison facility) in waters of the Onondaga Nation. USGS scientists continued assisting the St. Regis Mohawk Tribe by examining the feasibility of restoring Atlantic salmon is St. Lawrence River tributaries. Salmon restoration activities included stocking 13,000 salmon fry in tributaries of the St. Regis, Salmon, and Little Salmon rivers and assessing survival through the fall. Survival rates ranged from 4.5 to 18.6 percent in the three rivers. Over-winter survival of salmon stocked in 1999 was documented in 2000 and 2001. In addition, the Environmental Division of The St. Regis Mohawk Tribe and USGS are cooperating in a pilot project that focuses on the American eel population in the St. Lawrence River. The project involves field collection of American eels, ecological assessments, and laboratory analysis of eel health and life history of this population. Contact: James H. Johnson, 607-753-9391, james_h_johnson@usgs.gov

Restoring the Ecosystem of Miccosukee Tribal Lands in South Florida. The South Florida Ecosystem Restoration Task Force-a Federal, State of Florida, and Tribal task force chaired by the Secretary of the Interior-coordinates activities relevant to Greater Everglades Ecosystem Restoration with all Federal and State agencies, and

Tribes in South Florida. The USGS has assisted by coordinating access to lands of the Miccosukee Tribe of Indians of Florida for surveying and mapping purposes. The USGS has been involved in the Everglades Ecosystem Restoration Project for several years and has built a cooperative relationship with the Miccosukee to allow privately contracted surveying companies to enter Tribal lands for the purpose of determining local land elevations that will be used in water flow studies. USGS Contact: Greg Desmond, 703-648-4728, GDesmond@usgs.gov; Miccosukee Tribal Contact: Terry Rice, 305-348-3095.

In-situ Determination of Depth and Temperature Selection by Great Lake Fishes. Lake trout have been tagged with archival (data recording) temperature tags in an effort to determine daily and seasonal water temperature preferences. In cooperation with biologists from the Chippewa Ottawa Resource Authority (CORA), the first tagging phase began in 1998 and continued in the fall of 1999. A manuscript is in preparation that describes temperatures occupied by strains of lake trout from fall 1998 through fall 2000. Seneca Lake (New York) strain lake trout occupied significantly lower temperatures in summer 1999 than lake trout of Great Lakes origin. Encouraged by the success of this project, the USGS Great Lakes Science Center assisted the Great Lakes Indian Fish & Wildlife Commission in implanting archival tags that record both depth and temperature in lean lake trout in Lake Superior in 2001 and will be cooperating with CORA in implanting the same type of tags in lake whitefish in Lake Huron in 2002-2003. Funding is provided by USGS and the U.S. Fish and Wildlife Service (USFWS). The results of the study will benefit management and restoration programs in Tribal agencies, eight States, several Canadian provinces, and other Federal agencies throughout the Great Lakes basin. Contact: Roger Bergstedt, 989-734-4768, roger_bergstedt@usgs.gov

Mapping Bottom Substrates in the Detour Area of Northern Lake Huron. The USGS Great Lakes Science Center's Lake Superior Biological Station is conducting a benthic mapping survey of nearshore habitats in the Detour region of Lake Huron for the Chippewa Ottawa Resource Authority (CORA). Detailed data on depths and bottom substrate composition provided in GIS (Geographic Information System) mapping format will be used by CORA to better understand the relationships between nearshore habitat and spawning and rearing of lake whitefish and other commercially important food fish. This work is part of an ongoing inventory of nearshore aquatic habitats within the 1836-ceded territorial waters of lakes Superior, Huron, and Michigan. Previous mapping for CORA was conducted by the Center in Whitefish Bay of Lake Superior in 1998. Since five Tribes in the upper Great Lakes region were given fishing rights within the 1836-ceded territorial waters, CORA has sought to protect these areas for sustainable commercial fisheries. CORA is particularly interested in nearshore habitats that are used for spawning and rearing by lake whitefish. Increasing development of shorelines for vacation homes and resorts potentially will have deleterious effects on the quality of nearshore spawning and rearing habitats. Understanding the relationship between habitat and the success of whitefish spawning and recruitment will provide Tribal natural resource managers with information needed to protect and enhance these areas for sustainable fisheries. Contact: Owen Gorman, 715-682-6163, owen_gorman@usgs.gov

Juvenile Lake Trout Assessment in Keweenaw Bay. The USGS Great Lakes Science Center's Lake Superior Biological Station is cooperating with the Keweenaw Bay Indian Community in rehabilitating lake trout stocks in Lake Superior. The Community is concerned with low abundance of juvenile lake trout in lower Keweenaw Bay, so a management plan was developed to restore that stock. The USGS cooperated with the Community to: 1) evaluate the relative contribution of stocked lake trout to the juvenile population in lower Keweenaw Bay; 2) report biological statistics of stocked lake trout captured in the bay; and 3) compare fish community composition in the area stocked with composition in nearby Lake Superior lake trout fishery management units. Prey fish abundance and biomass were also estimated in the bay using a bottom trawl. The Community's Natural Resources Department is evaluating the effectiveness of their trout stocking program in the light of data collected and by USGS staff. The effectiveness of the management strategies employed is being evaluated based on the technical assistance provided by the USGS to the Community. Contact: Owen Gorman, 715-682-6163, owen_gorman@usgs.gov

Biological Information for Committees of the Great Lakes Fishery Commission. The Great Lakes Fishery Commission has established inter-agency committees to coordinate fishery resource management in individual lakes. The USGS Great Lakes Science Center and American Indian groups, such as the Chippewa Ottawa Resource Authority and the Great Lakes Indian Fish & Wildlife Commission, are represented on the committees for lakes Superior, Michigan, and Huron. To assist Tribal and State fishery management agencies in assessing the success of fish restoration efforts, USGS and Tribal scientists report annually on the status of lake trout rehabilitation and important prey fishes in lakes Superior, Michigan, and Huron. In addition, for the Lake Superior Committee, USGS provided data and technical assistance. The USGS submitted a report that described the status and trends of important Lake Superior prey fishes. That report will assist fishery management agencies in describing progress toward attaining fish community objectives and restoration of native species. A Lake Superior walleye rehabilitation plan was coordinated, facilitated, and edited by a USGS scientist, and the Lake Superior Committee approved that

plan. The plan describes issues, goals, and strategies that will guide rehabilitation of walleye populations and habitats managed cooperatively by agencies including the Red Cliff Tribe, Bad River Band of Lake Superior Chippewa Indians, Keweenaw Bay Indian Community, Bay Mills Indian Community, Chippewa Ottawa Resource Authority, and the Great Lakes Indian Fish & Wildlife Commission. For the Lake Huron Committee, a USGS scientist presented a synthesis paper on prey fish population status and trends as part of a State of Lake Huron symposium. This information is critically important to Tribal fishery management activities in the 1836 Tribal-ceded waters of northern Lake Huron. In 2001, USGS scientists from the Center and the Geologic Discipline began a project for the Lake Michigan Committee that includes bottom-mapping 1836 Tribal-ceded waters in northern Lake Michigan. This project will provide information on fish spawning and nursery habitat for Tribal and State fishery management agencies. Contact: John E. Gannon, 734-214-7237, john_e_gannon@usgs.gov

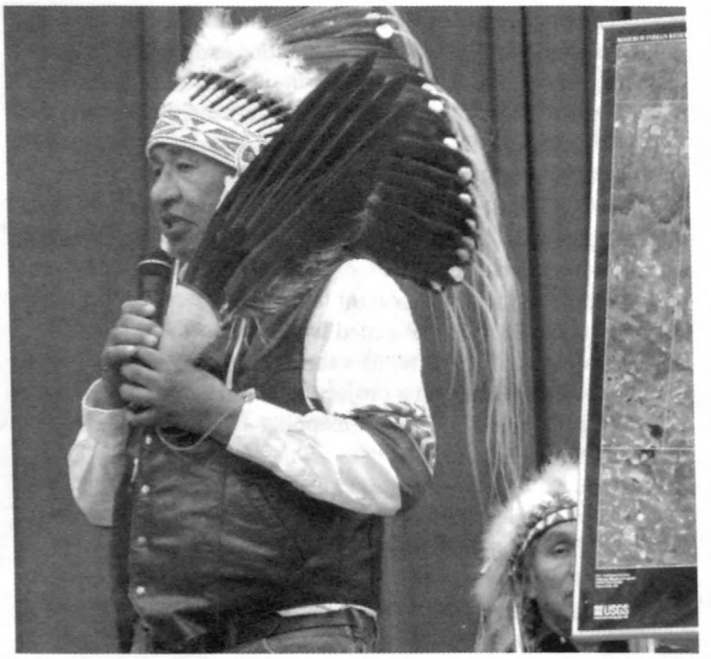
Lake Sturgeon Enhancement in Menominee Waters. The USGS participated in a Menominee Reservation Lake Sturgeon Enhancement Committee meeting, in March 2001, concerning ongoing efforts to re-establish lake sturgeon in waters on the Menominee Reservation. The Committee is comprised of personnel from the Menominee Indian Tribe of Wisconsin, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, and U.S. Geological Survey. The discussions included: movement and habitat of radio-tagged adult lake sturgeon in the Wolf River; fish passage issues related to dams on the Wolf River; movement and habitat issues; success of stocking of juvenile and fingerling lake sturgeon in Reservation impoundments; and future committee direction and tasks. USGS personnel began implementing some of the Committee's priorities by constructing and beginning testing of a prototype spiral fish ladder to assess passage efficiency for lake sturgeon and riverine fishes. The fish ladder project is supported by the Great Lakes Fishery Trust. In another part of the sturgeon restoration effort, USGS staffed transferred two hundred, 3.5-pound lake sturgeon to the Fish and Wildlife Service's Genoa (Wisconsin) National Fish Hatchery for stocking Legend Lake on Menominee lands. The Genoa hatchery raises and stocks lake sturgeon annually for restoration. It also supplies eggs of the same strain to the USGS to be reared for fishery research and, when hatched, the surplus is used for stocking. Contact (coordination): Brent Knights, 608-781-6221, brent_knights@usgs.gov; Contact (fish ladder): Boyd Kynard, 413-863-3807, kynard@usgs.gov; Contact (stocking): Lynn Lee, 608-781-6249, lee@usgs.gov

Contamination Report Published for Pawnee Tribal Trust Land. The Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), and U.S. Environmental Protection Agency (EPA) share responsibility for oversight of petroleum production by private companies on Indian trust land. The BLM found evidence of contamination of both soils and water by brines in Payne County on land held in trust for the Pawnee Nation. The USGS identified the current extent and nature of surface and water contamination. The USGS also investigated the possible contamination of the shallowest freshwater aquifer, the Ada aquifer. Based on these investigations, the USGS published a report titled, "Saline contamination of soil and water on Pawnee Tribal trust land, eastern Payne County, Oklahoma," by Donna Runkle, Marvin M. Abbott, and Jeffrey E. Lucius. The data and interpretations provided by the USGS will be used by resource managers to stem further contamination and to determine mitigation strategies. Contact: Marvin M. Abbott, 405-810-4411, mmabbott@usgs.gov

Developing a Curriculum for Ute and Navajo Students. Soil crusts are important features of arid and semiarid ecosystems throughout the Southwest. In addition to stabilizing surfaces and increasing water absorption, living organisms in soil crusts contribute nitrogen and organic matter to ecosystems, functions that are especially important in desert ecosystems. As is the case with the general public, many Native Americans are not consciously aware of the relationship of soil crust to the an ecosystem. In addition, soil crusts on lands of the Ute Mountain Ute Tribe and the Navajo Nation have suffered significant damage from grazing animals. USGS scientists are developing a curriculum that integrates biological and earth sciences for Ute and Navajo grade school students. The curriculum will focus on teaching students about biological soil crusts and the crucial roles they play in the ecosystems of the Four Corners region. Government scientists hope to pass along the knowledge that is being gained through USGS research on soil crusts to the next generation of land stewards. The curriculum being prepared for Indian students will engage them in the workings of basic scientific concepts. Through this study of biology and earth science as it relates to their local environment, students will be encouraged to further their education in these disciplines and to consider careers in resource management. This project aims to inspire students to bring their expertise to the community as resource managers, ranchers, and better-informed community members. In 2001, scientists at the Canyonlands Field Station taught elementary school students from part of the Navajo Nation about the importance of biological soil crusts, provided lesson plans and follow-up assignments to teachers, and are currently developing a school curriculum on biological soil crusts for 4th grade science classes. Contact: Jayne Belnap, 435-719-2333, jayne_belnap@usgs.gov; Tim Graham, 435-719-2339; tim_graham@usgs.gov

Yupiit Students Assist in Biological Research. USGS scientists in Alaska are continuing to enhance communication between government researchers and Alaska Natives. To demonstrate the

kind of research being conducted, USGS recruited 14 Yupiit students to assist in a waterfowl study on the Yukon-Kuskokwim Delta in Alaska. The students captured geese and swans and fitted them with leg bands and neck collars. Movements of these waterfowl are being monitored as part of a large study to determine annual survival rates, migration pathways, and important staging and winter habitats. The year 2001 marks the 16th consecutive year of involvement by Alaska Native students from the Native village of Chevak in this important project; more than 160 Yupiit youth have participated in this program since 1986. This effort supports a regional need for information on the population biology of a species of interest to indigenous people, wildlife enthusiasts, and sport hunters. Contact: Craig Ely, USGS Alaska Biological Science Center, 907-786-3512, craig_ely@usgs.gov



Albert White Hat, Sr. explains the significance of the ceremony and the relationship between Sinte Gleska University and the U.S. Geological Survey during the signing of a Memorandum of Understanding. The ceremony was hosted by and held at the university.

USGS Director Chip Groat, speaking before officials of Sinte Gleska University and USGS at a ceremony to sign a Memorandum of Understanding between the two organizations.

Educational Activities

Educational Activities

National Indian Education Association. The National Indian Education Association held its annual conference in Billings, Montana in October 2001. USGS participation included a booth, staffed by employees from the EROS Data Center and the Northern Rocky Mountain Science Center. For the first time, USGS Rocky Mountain Mapping Center staff presented a workshop on using geographic information systems technology in the classroom, showing how this technique can make a variety of subjects, including history, geography, economics, and science, more relevant to Native students. Contact (exhibit): Eugene Napier, 605-594-6088, enapier@usgs.gov; Contact (workshop): Joseph Kerski, 303-202-4315, jjkerski@usgs.gov

American Indian Science & Engineering Society. The American Indian Science & Engineering Society (AISES) celebrated its 22nd National Conference in Portland, Oregon in November 2000. The USGS had a recruitment booth at the AISES career fair (supported by the USGS Geography discipline and Office of Personnel), where there were approximately 2,200 Native students, educators, and professionals from the United States and Canada. In conjunction with the AISES conference, the USGS participated in the AISES Government Relations Council to share knowledge of and seek new opportunities for Federal interactions with AISES. Native scientists with the USGS Geology discipline, who are active AISES professional members, helped staff the USGS career fair booth with other local and regional USGS employees. The USGS used this opportunity to provide information about hiring opportunities and educator materials, as well as information on the USGS mission to the attendees. A USGS scientist also participated in a concurrent session on professional development for Native students. Contact: Maria Montour 303-236-2787, mmontour@usgs.gov

National Oceanic and Atmospheric Administration (NOAA) Coastal GIS and Metadata Training for American Indians. NOAA and the USGS, through its support of the Federal Geographic Data Committee (FGDC), presented an annual training session on GIS/metadata and coastal issues for American Indians at the NOAA Coastal Services Center in Charleston, South Carolina. Topics included the National Spatial Data Infrastructure, water quality, and flora and fauna monitoring. The training session helped assure Tribal investment in data collection and maintenance and provided Tribal access to public data catalogs and clearinghouses. The course accommodates 20 Native students at each annual session. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Water Technician Training Course. The Bureau of Indian Affairs sponsored its annual Water Technician Training Course with sessions at New Mexico State University in Las Cruces, New Mexico, and at Central Washington University in Ellensburg, Washington. Tribal representatives from throughout Indian Country participated in the course. USGS Water Resources personnel from the New Mexico and Washington District Offices taught a module titled, "Introduction to Hydrologic Data Collection Techniques." Instruction included classroom and field activities on ground-water concepts and data collection, surface-water data collection, and water-quality data collection. Contact: Edward (Nick) Nickerson (New Mexico), 505-646-7618, nickerso@usgs.gov; Robert Kimbrough (Washington), 253-428-3600 ext.2608, rakimbro@usgs.gov

Tribal personnel are trained by USGS hydrologists as part of the BIA Water Technician Training Program, held at Central Washington University, Ellensburg, Washington. Photographer: David E. Click.

National States GIS Council (NSGIC). In cooperation with the Federal Geographic Data Committee, the National States GIS Council will plan and develop regional Tribal-State workshops with National Aeronautics and Space Administration, the Intertribal GIS Council (IGC), and other Tribal entities. The workshops will teach GIS and metadata usage for the governing bodies to use in their planning processes. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Introduction to GIS Courses for American Indians with the U.S. Fish and Wildlife Service (FWS). The FWS and the USGS, through its support of the Federal Geographic Data Committee (FGDC), continue offering training sessions, approximately quarterly, to

introduce American Indian students to the uses of GIS. The Native American students include Tribal, State, and Federal employees. Topics of the sessions include the National Spatial Data Infrastructure, various spatial data themes and layers, constructing queries, and cartographic principles. The sessions offer best practices used and describe the effect of scale on mapped data. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Wetland Restoration and Invasive Nonindigenous Fishes, Big Cypress Seminole Reservation. Drainage and other manipulations have degraded wetland ecosystems on the Big Cypress Seminole Reservation, allowing invasive (non-indigenous) fishes to become dominant. Degradation of wetland and fish communities is a problem throughout the greater Everglades ecosystem, and development of management solutions is of interest not only to the Seminole Tribe of Florida, but also to a wide range of land and resource managers. In a cooperative effort involving the USGS Florida Caribbean Science Center, the Seminole Tribe of Florida, and Florida Atlantic University, studies are underway to assess the efficacy of various restoration strategies in eliminating invaders and bringing back native fish assemblages. Scientists are conducting regular surveys of fish assemblages in degraded and restored wetlands on the Reservation, and will be testing the effects of various management actions on changes in the relative abundance of invasive and native species. Field work began in June 2001 and is expected to continue through 2002. USGS Contact: William F. Loftus, 305-242-7835, bill_loftus@usgs.gov; Seminole Contact: William A. Dunston, Seminole Tribe of Florida, 863-983-2157

Wetland Ecology Workshop. USGS personnel provided wetland ecology training to representatives of the Spirit Lake Nation, the Turtle Mountain Band of Chippewa Indians, and the Sisseton-Wahpeton Sioux Tribe in May 2001. The five-day workshop featured a combination of classroom, laboratory, and field exercises. Some of the topics covered included an introduction to geographical information systems (GIS) and the National Wetlands Inventory, the wetland continuum concept, wetland stressors, floristic quality assessment, wetland birds, wetland invertebrates and amphibians, laboratory and field techniques used in wetland ecology studies, and designing a wetland monitoring project. Participants left the workshop with a draft wetland monitoring plan they had tailored to fit the unique circumstances and needs of their individual Tribe. USGS cooperation and technical assistance continue to be available to the Tribes as they work to refine and implement wetland monitoring projects on Tribal lands. Contact: Ned H. Euliss Jr., 701-253-5564, ned_euliss@usgs.gov

Sinte Gleska University/U. S. Geological Survey (USGS) Memorandum of Understanding. The Rosebud Sioux Tribe's Sinte Gleska University (SGU) and the USGS have completed the first year of a multi-year partnership agreement. The partners are working together to conduct programs and activities that enhance the capabilities of SGU to improve educational opportunities, contribute positively to the Rosebud Sioux Tribe, and enhance SGU and USGS programs. During the first year of the agreement, USGS transferred 26 surplus computers and related equipment to SGU and an intern from SGU conducted prairie dog and sage research to benefit both the Rosebud Tribe and USGS. SGU made USGS aware of virtual reality research that led to the development of the GeoWall technology. SGU and USGS participated in many professional conferences as partners and sponsored a National States GIS Council Workshop. SGU leaders are interested in expanding Tribal colleges' access to and use of USGS digital imagery archives. SGU and USGS are planning a conference of Tribal college representatives to support and implement this concept. A Leadership Council of SGU and USGS staff has been established to guide and oversee implementation of the memorandum of understanding. USGS Contact: Eugene Napier, 605-594-6088, enapier@usgs.gov; Sinte Gleska Contact: James Rattling Leaf, 605-856-4262, jamesrl@sinte.edu

Flandreau Indian School Partnership. Flandreau Indian School (FIS) is funded through the BIA. The school boards and educates 350 students in grades 9-12 from Tribes west of the Mississippi. The school was established in 1871 and is 30 miles north of Sioux Falls, South Dakota. The FIS and the USGS' EROS Data Center (EDC) created a formal partnership in 1998. Under the agreement, the USGS/EDC provides the school with resources to improve the quality of education in earth and physical sciences, mathematics, and computer science. During the year, 35 teachers came to EDC for teacher in-service training and students toured the facility to learn about technologies and how they are used in daily life. The USGS also supported the school by transferring surplus equipment and providing technical assistance to the computer staff at the school. The school superintendent met with EDC representatives to plan new activities for the partnership. Contact: Eugene Napier, 605-594-6088, enapier@usgs.gov

Model Institutions of Excellence (MIE) Advisory Board. Oglala Lakota College (OLC) is an accredited institution offering baccalaureate and master's degrees on the Pine Ridge Reservation of the Oglala Sioux Tribe. It is a member of the Oyate Consortium, a group of five colleges and universities in the Dakotas that share educational goals, some faculty and staff, and technologies. OLC has about 1,400 students enrolled in courses at nine locations on the Pine Ridge Reservation. The USGS a is member of the OLC advisory board to their National Science Foundation's Model Institutions of Excellence (MIE) program. The goal of the MIE program is to develop curricula and encourage Native American students in math, science, engineering, and

technology at the undergraduate and master's levels. The USGS helps OLC develop strategies that will attract students to these courses and encourage them to focus on graduation and graduate studies. Offering students the option of staying on the Reservation while continuing their formal education makes it likely that more students will chose to stay in college. Once students complete their formal education, they may apply the skills learned on the Reservation to enhance Native American economic development, health, and culture. Contact: Daniel Fitzpatrick, 605-355-4560x220, djfitzpa@usgs.gov

Lights May Disrupt Beneficial Insects. The USGS Northern Prairie Wildlife Research Center, in cooperation with the Nebraska Game and Parks Commission, the University of Nebraska at Lincoln and Kearney, and the U.S. Forest Service, supported research by a teacher at Little Wound High School, in Kyle, South Dakota. The teacher employed two Native American students to trap carrion beetles. The sampling took place on the Pine Ridge Reservation of the Oglala Sioux Tribe and was conducted by Oglala Tribal members. Carrion beetles, including the Federally-protected American burying beetle, are an important group of insect recyclers. Based on the sampling, the investigators demonstrated a significant reduction in numbers and kinds of carrion beetles beneath mercury vapor yard lights. This is the first study to demonstrate an effect of light on this insect group and after a second year of data are collected, a manuscript will be prepared. These data will be presented at the 2002 meeting of the North Central Branch of the Entomological Society of America by one of the Native Americans involved in the study. Beyond the immediate outcome of hands-on field experience, one of the students developed a beetle taxonomy exercise for use in the high school classroom. Contact: W. Wyatt Hoback, 308 865-8602, hobackww@unk.edu; Terry L. Shaffer, 701-253-5522, terry_shaffer@usgs.gov

Native Students Hired by the Upper Midwest Environmental Science Center. A Native American student from the Prairie Band of Potowatomi Nation was hired by the USGS Upper Midwest Environmental Science Center in mid-September 2001. The student was hired as an intern through Western Wisconsin Technical College in La Crosse, Wisconsin, to help with graphics and assist with care of animals used in school interaction. In addition, a Native American of the Minnesota Chippewa Tribe was hired as an Administrative Operations Assistant in June 2001. Contact: Linda M. Ott, 608-781-6264, Linda_Ott@usgs.gov

Coordinating with Haskell Indian Nations University. The USGS established and maintained a GIS lab at Haskell Indian Nations University (Haskell) and has employees who have taught or assisted in many classes over the last decade. The USGS, through the Kansas Water Resources District Office, provides advice to Haskell on Natural Resources curriculum issues as a member of Haskell's Natural Resources Advisory Board. Representatives of the USGS visited Haskell as part of a broad effort to encourage natural science education and increase personnel diversity within the USGS. The USGS recruitment team and the Kansas District have participated in Haskell's career fairs. Several Haskell students have been hired for student positions by the Kansas District and USGS/EROS Data Center. A USGS field office is maintained on the Haskell Campus. Contact: Walt Aucott, 785-832-3505, waucott@usgs.gov; Maria Montour, 303-236-2787, mmontour@usgs.gov or Eugene Napier, 605-594-6088, enapier@usgs.gov

Science Career Opportunities for Native Americans. The USGS Northern Rocky Mountain Science Center in Montana launched a series of presentations to Native American students on "Science as a Career" in FY2001. They included five presentations at the Northern Cheyenne Tribal School in Busby, Montana, and a presentation to American Indian students in the Montana State University-Bozeman Native American Studies Unit - "Gear Up Program." This program helps Native American middle school students understand the benefits of staying in school and going to college. The USGS Center plans to continue outreach efforts to Native American students and teachers in FY2002, and to develop internet-based natural science information and associated learning tools for use by Native American schools through distance learning in conjunction with Montana State University. Contact: David Madril, 406-994-4293, dcmadril@usgs.gov

Coal, Health, and the Navajo Nation. Domestic use of coal for heating and cooking has led to human health problems in many parts of the world. USGS geologists have documented the effects on health of domestic coal use as well as environmental concerns of industrial coal use in foreign countries. Many families on the Navajo Nation use coal domestically, and live near and may work in coal mines and coal-burning power plants. USGS scientists are interested in collaborating on an epidemiological study of the Navajo Nation to examine those health effects. The primary issue is assessing the health impacts of residential coal combustion on Navajo lands. A secondary issue is the environmental impact of coal-burning power plants near the reservation. As part of their project development, USGS scientists presented several workshops at the Navajo Nation's Diné College and for the Navajo Nation's Uranium Education Program. These activities were well received and a team of local geologists, atmospheric scientists, and epidemiologists are working with the USGS on the project. The USGS is preparing a proposal to the Indian Research Council to obtain permission for the study of the Shiprock area. Contact: Bob Finkelman, 703-648-6412, rbf@usgs.gov

Satellite Imagery Enhances Native American Curriculum. USGS satellite imagery and aerial photography will be used by Native

American students at the Native American Agriscience Research and Development Center, Santa Fe, New Mexico, to study past and present impacts of the Cochiti Dam on their cultures and economies. The satellite images and aerial photos provide an overview, historical perspective, and foundation for curriculum development combining Native American traditions and USGS technology. Contact: Eugene Napier, 605-594-6088, enapier@usgs.gov

Educational Outreach to Navajo Children. The USGS Flagstaff Field Center provided several educational presentations on geology to schools and organizations serving primarily Navajo children. "What Good Are Rocks?", an explanation of how rocks and minerals are used in toothpaste, building materials, and other aspects of daily life, was presented to students from Dowa Yalanne Elementary School in Zuni, New Mexico. Students from Tonalea Day School and Dowa Yalanne Elementary School toured the astrogeology research facilities at the USGS Flagstaff Field Center. Solar system activities and materials were presented at a NASA/JPL community science night designed to introduce Native American students and their families to the wonders of science. The USGS also provided educational materials, curriculum enhancements, and posters to Shonto Preparatory School. Contact: Sue Priest, 928-556-7148, spriest@usgs.gov

Southwest Indian Polytechnic Institute (SIPI). Southwestern Indian Polytechnic Institute (SIPI) and the USGS, through its support of the Federal Geographic Data Committee (FGDC) are conducting quarterly satellite broadcasts from SIPI for participating Tribal colleges and universities. The broadcasts entitled "GIS in Indian Country," have been popular with students and faculty. They provide a good connection to the Indian community, a means of including field work in the curriculum, and an excellent school-to-career opportunity. The facilities at SIPI's Distance Learning Center continue to improve, allowing the camera to focus on maps, documents, and computer displays as well as the presenter. These broadcasts are dedicated to promoting Tribal self-sufficiency by improving management of geographic information and building intertribal communication networks. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Explorer's Club-Outdoor Science Education Outreach On San Diego County Reservations. A retired USGS scientist has channeled her enthusiasm for earth science education into an outreach project for Indian Tribes in southern California. Working in partnership with the Tribes, the USGS, San Diego State University, the University of California at San Diego, and the San Diego Science Alliance, she has expanded a series of successful outdoor science activities originally developed under USGS auspices into a set of "Explorer's Club" programs for children age 6 to 12. The format of each program can be adapted to suit the needs of the Education Director of each Tribe. Tribal elders participate as program instructors. Most Tribes use education funding to pay for lunches, and a van and driver. The monthly programs include activities such as panning for gold and magnetite, discovering where rocks come from, investigating what people add to local waterways, and climbing a local landscape feature. To date, children from the Campo Band of Kumeyaay Indians, the Jamul Band of Mission Indians, and the La Jolla Tribe have participated in the programs. USGS employees donated personal funds for individual science kits (pen, notebook, magnifying lens, magic marker, ruler, magnet, eye dropper, glass vial), fanny packs, and water bottles for program participants. Contact: Eleanora I. (Norrie) Robbins, 619-303-9095, norrierobbins@cox.net

Bird Diseases. Patterns and trends in the occurrence of wildlife diseases are often indicators of environmental quality. The types, distribution, and frequency of diseases impacting bird populations are continually changing. USGS scientists are studying an emerging neurologic disease, avian vacuolar myelinopathy, that is infecting bald eagles and coots in the southeastern United States. Two field installations are cooperating in studying the problem. The National Wildlife Health Center (NWHC) funded research conducted by a Native American student (Washoe-Paiute) in a degree program at Cornell University. Using wild coots and game farm mallads to monitor the disease in North Carolina lakes, the student compared food habits of affected birds and birds without the disease. The student's research is closely coordinated with other investigations being conducted by NWHC scientists. This work will further efforts to identify the source and causes of avian vacuolar myelinopathy. Contact: New York Cooperative Fish and Wildlife Research Unit, 607-255-2836, ram26@cornell.edu; Tonie Rocke, 608-270-2451, tonie_rocke@usgs.gov

Alaska Native Internship Program. The USGS collaborates with other Department of the Interior bureaus in Alaska and the University of Alaska Anchorage to maintain the "Internship for Native Student Training and Education Program" (INSTEP) for Alaska Natives. The program gives interns six college credits and 10 weeks of work experience in DOI bureaus. The USGS hosted two interns during the summer of 2001. Contact: Gordon Nelson, 907-786-7100, glnelson@usgs.gov

Marine Science Opportunities. The USGS Glacier Bay Field Station promoted a member of the Sitka Tribe of Alaska, who had been a student employee of the USGS since 1998, into the Student Career Education Program. She is an intern in marine biology pursuing her final year of undergraduate education, which will be followed by a master's degree program in marine biology. This student has been assisting scientists who are performing oceanographic research and mapping the ocean floor. She has also been learning spatial analysis and the use of geographic information systems. Contact: USGS Alaska Biological Science Center, 907-786-3512, philip_hooge@usgs.gov

Resource and Environmental Activities

Resource Activities

Real-Time, Water-Quality and Quantity Data-Collection Network for the Maliseet Indians. The USGS Maine Water Resources District is working closely with the Houlton Band of the Maliseet Indians to develop a real-time data-collection and data-dissemination network on the Meduxnekeag River in northeastern Maine. The Meduxnekeag River is an integral cultural resource for the Maliseet Indians as well as an important source of irrigation water for farmers in the predominantly agricultural watershed. In particular, the Tribe is concerned about the quality of the water and riparian plants that are harvested on the riverbanks. Point and non-point inputs of nutrients to the river appear to be contributing to algal blooms that have degraded the quality of the river, adversely affecting the habitat for aquatic and riparian organisms. The Maine District is working on behalf of the Malliseet Indians to identify funding for the proposed work. Contact: Robert Lent, 207-622-8201, rmlent@usgs.gov

Support for Passamaquoddy Water Management Plan. The USGS Maine Water Resources District is working with the Passamaquoddy Indians to collect real-time streamflow information critical to the development of a water management plan for Tribal land in southeastern Maine. The watershed includes important blueberry barrens and Atlantic Salmon habitat. Careful stewardship of the land requires accurate streamflow information. The USGS operated two streamflow gages in FY2000-01 and is committed to long-term operation of one gage. Contact: Robert Lent, 207-622-8201, rmlent@usgs.gov

Environmental Database for the Penobscot Nation. As part of the contaminant study of the Penobscot River, the USGS Maine Water Resources District has developed an environmental database for use by the Penobscot Nation's Department of Natural Resources (PIN DNR). The PIN DNR conducts a variety of ongoing biological and water-chemistry studies on Tribal lands and the Penobscot River. The database will provide a systematic method of data storage, enabling the PIN DNR to consolidate their existing data and manage new data as they are collected. The database is capable of storing data on a variety of sample media and constituents. The database's open-ended design allows for future modification and additions as new constituents, agencies, and study areas are included in future studies. Contact: Robert Lent, 207-622-8201, rmlent@usgs.gov

Tuscarora Nation. The Director of the Tuscarora Nation's Environmental Program met with representatives of the USGS New York Water Resources District in June 2001. The U.S. Environmental Protection Agency's Region 2 had suggested the meeting to help the Tuscarora Nation resolve concerns about their water sources. The Nation is interested in creating a database or geographic information system to assist them in making water use and management decisions. USGS provided reports on the Lockport Dolomite and suggested several contacts. Contact: Bill Kappel, 607-266-0217 ext.3013, wkappel@usgs.gov

Ecosystem Reconstruction and Effects of Past Ecosystem Perturbations in Lac Courte Oreilles. The purpose of this study was to reconstruct the Musky Bay ecosystem history and an additional site within Lac Courte Oreilles. The project was completed in FY2001 within the lands of the Lac Courte Oreilles Band of Lake Superior Chippewa Indians. The project emphasized the possible effects of cranberry farming and shoreline development using the sediment record. Studies focused on the nutrient history (input and burial rates) that reflects management practices and possible watershed degradation. The modeled nutrient history was interpreted in concert with reconstructed algal (mainly diatom) communities preserved in the sediments. Another objective of the project was to search for possible cranberry farming signatures including sulfur, uranium, and potassium associated with fertilizers, and copper associated with pesticides. Biogenic silica profiles provided complimentary data for algal community reconstructions. The sediment record likely preserves observable trends in nutrient biogeochemical cycling and ecosystem character over the last few hundred years, a timeframe that includes a background period and the period of cranberry farming. A report of project results is being prepared. Contact: Faith Fitzpatrick, 608-821-3818, fafitzpa@usgs.gov

Menominee Water-Quality Monitoring. A network of water-quality monitoring stations is being established through a cooperative project between the Menominee Indian Tribe of Wisconsin and the USGS Wisconsin Water Resources District. The network, to extend throughout the Menominee lands, will provide data for characterizing existing water-quality conditions, developing water-quality and watershed-management plans, and helping conserve and protect ambient conditions and ecosystems of the Menominee lands. Specifically, this project will determine the physical properties and concentrations of chemical constituents in water-column samples of all major streams on the Reservation. It will also quantify and characterize benthic invertebrate communities at the selected sample sites as an additional indicator of water-quality and environmental conditions. The study includes water-quality and biological sampling for invertebrate community evaluation of 10 streams within the

Reservation tributary to the Wolf River, and at two sites on the Wolf River. USGS Contact: Herb Garn, 608-821-3828, hsgarn@usgs.gov Menominee Contact: Doug Cox, 715-799-4937, dcox@itol.com

Ground-water and Water Quality of Lakes and Springs on Lands of the Grand Portage Band of Lake Superior Chippewa. The USGS Minnesota Water District Office is delineating the direction of ground-water flow and assessing the water quality of selected lakes and springs on lands of the Grand Portage Band of Lake Superior Chippewa. The Grand Portage Band will use the information to help them evaluate potential harmful effects of development on Tribal water resources. The ground-water flow direction will be used to determine recharge and discharge areas. Land uses may particularly affect recharge areas.
Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov

Water Resources Investigation for the Prairie Island Indian Community. The Prairie Island Indian Community asked the USGS Minnesota Water District Office to define the wellhead protection areas of their municipal wells. The USGS study uses two dimensional ground-water flow models, aquifer tests and continuous stage recorders on the Mississippi River. The Community is located adjacent to the River. These investigations are expected to be completed in FY2002.
Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov

Potential Waste Site for the Spirit Lake Nation. The Spirit Lake Nation and the Indian Health Service have asked USGS hydrologists to provide hydrogeologic information that documents the geologic sediments in an 80-acre area being evaluated as a possible waste transfer and disposal site. USGS will also construct monitoring wells and document the background water-quality at a site-specific area. The study results will provide information for the Spirit Lake Nation and the Indian Health Service to use in planning and managing waste handling facilities and in protecting and monitoring the environment. Contact:
Douglas G. Emerson, 701-250-7402, demerson@usgs.gov

Lake Traverse Reservation Pesticide Management Plan Support. The U.S. Geological Survey, in cooperation with the U.S. Environmental Protection Agency, is compiling and analyzing data to provide background material for a Pesticide Management Plan for the Sisseton-Wahpeton Sioux Tribe. Numeric and geospatial datasets include: pesticide concentrations in ground- and surface- water, soils information, topographic data, geohydrologic features, land cover and use, and pesticide use in the area. The Sisseton-Wahpeton Sioux Tribe will use the assembled information to develop a Pesticide Management Plan for their lands. Contact:
Ryan Thompson, 605-352-4241 ext.225,
rcthomps@usgs.gov

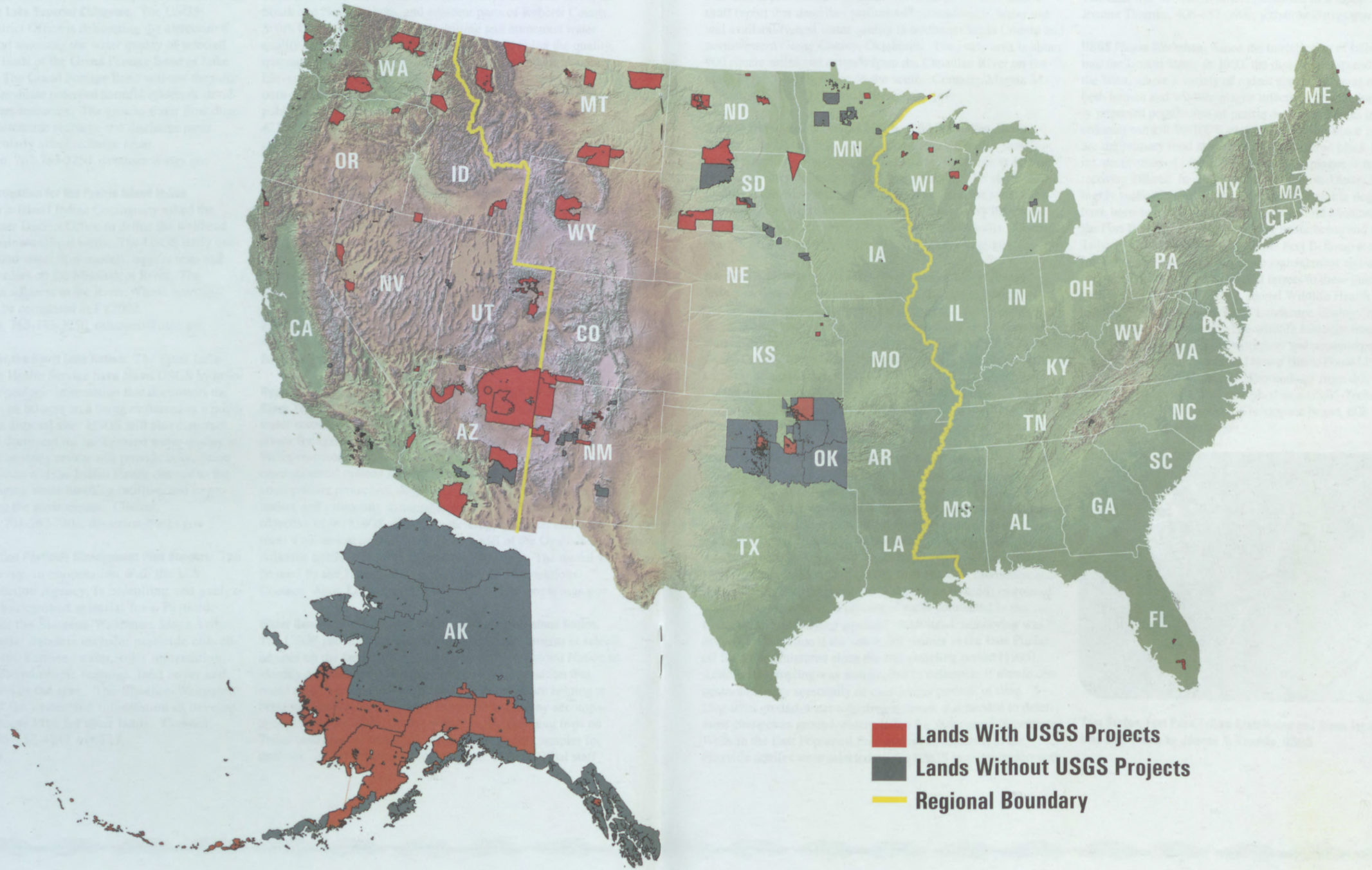
Water Resources of the Lake Traverse Reservation. The U.S. Geological Survey, in cooperation with the Sisseton-Wahpeton Sioux Tribe, South Dakota Geological Survey, and Roberts County, completed an investigation that describes and quantifies the water resources of the area within the 1867 boundary of the Lake Traverse Reservation (Sisseton-Wahpeton Sioux Tribe) in South and North Dakota, and adjacent parts of Roberts County, South Dakota. Six years of test drilling and numerous water quality samples were completed to aid in describing the quality, quantity, and availability of surface and ground water resources. Eleven aquifers, six named outwash groups, and many isolated outwash bodies were mapped. Results of the investigations were published as Water Resource Investigation Report (WRIR) 01-4219. Contact: Ryan Thompson, 605-352-4241x225, rcthomps@usgs.gov

Flandreau Water Supply Assessment. USGS hydrologists compiled and summarized water-quality data in order to describe a water source for the Flandreau Santee Sioux Tribe and the Bureau of Indian Affairs' Flandreau Indian School. USGS employees also collected water samples from selected ground- and surface-water sites relevant to an aquifer that is a possible Tribal water source. The samples were analyzed for many compounds including emerging contaminants. The USGS studies found little evidence of widespread water-quality problems in the aquifer, which has been used to supply past and local water needs. The USGS reported these results to the Tribe and the BIA. Contact:
Bryan Schaap, 605-352-4241 ext.226, bdschaap@usgs.gov

Hydrogeology of the Ogallala and Arikaree Aquifers for the Rosebud Sioux Tribe. The Ogallala and Arikaree aquifers are important water resources for the Rosebud Sioux Tribe and are used extensively for agricultural, municipal, and domestic water supplies. Water-resource tools are needed to evaluate management and environmental options such for issues such as planning for source-water protection, describing potential impacts of contamination, and estimating sustainable aquifer withdrawals. The objective of the USGS study is to develop, calibrate, and document a numerical ground-water flow model of the Ogallala and Arikaree aquifers underlying the Rosebud lands. The model will be used by the Tribe to test various hydrologic conditions.
Contact: Andy Long, 605-355-4560 ext.237, ajlong@usgs.gov

Water Quality on Lands of the Prairie Band of Potawatomi Nation. The USGS provides periodic water-quality assessments at selected sites on the lands of the Prairie Band of Potawatomi Nation to identify and monitor potential sources of contamination that could cause human-health concerns. Tribal staff are helping to build self-sufficiency, in cooperation with USGS, by accompanying USGS personnel during water-quality sampling trips on Tribal lands and by helping to collect and process samples for analysis. As part of the training program, several Tribal staff

U.S. Geological Survey Fiscal Year 2001 Activities on American Indians/Alaska Native Lands



members attended a water-quality sampling course at the USGS National Training Center in Denver. Contact: Heather Ross, 785-832-3575, hross@usgs.gov

Overview of Water Resources for the Wichita and Affiliated Tribes. The USGS provided the Wichita and Affiliated Tribes with a draft report that describes surface and ground water, water use and availability, and water quality in northern Caddo County and northwestern Grady County, Oklahoma. The study area is about 900 square miles and extends from the Canadian River on the north to the Washita River on the south. Contact: Marvin M. Abbott, 405-810-4411, mmabbott@usgs.gov

Surface-Water Quality and the Effects of Oil Production, Osage Nation. The USGS provided the Osage Nation with a draft report describing water-quality and stream discharge at 140 surface-water sites on lands of the Osage Nation. The study also identified the oil wells that are upgradient from the sampling sites using a digital elevation model. Water-quality data were compared to oil-well information for upgradient wells. Contact: Marvin M. Abbott, 405-810-4411, mmabbott@usgs.gov

Availability of Water in Arkansas River Alluvial Aquifer, Osage Nation. A new cooperative project with the Osage Nation will use drilling, litho-stratigraphic and hydrologic analyses, and water-quality sampling to evaluate the quantity and quality of water in alluvial and terrace aquifers along the Arkansas River in Osage County. Two Native American student hydrologists will carry out the project under USGS supervision as part of their Masters of Science program requirements for Oklahoma State University. Contact: Marvin M. Abbott, 405-810-4411, mmabbott@usgs.gov

Ground-Water-Quality Monitoring for the Fort Peck Assiniboine and Sioux Tribes. Recent studies by the USGS in cooperation with the Fort Peck Assiniboine and Sioux Tribes identified two significant ground-water-quality problems: saline-water contamination and large nitrate concentrations in ground- water. Several studies identified more than 12 square miles of saline-water contamination in the East Poplar oil field. Another study found that nitrate concentrations were greater than the U.S. Environmental Protection Agency drinking water standard (10 mg/l) in ground water from more than 50 percent of wells completed in the Flaxville and underlying aquifers. Additional monitoring was needed to determine if the salt water plumes in the East Poplar oil field have migrated since the last sampling period (1993). Additional sampling was also needed to determine if nitrate concentrations vary seasonally or over longer periods of time. A long-term ground-water-sampling network was needed to determine changes in ground-water quality for these areas of concern. Wells in the East Poplar oil field and wells screened in the Flaxville aquifer were selected by the USGS in consultation with the Fort Peck Tribes for additional monitoring over a 3-year period. Wells selected in the East Poplar oil field were sampled annually to detect plume migration. Wells selected in the Flaxville and underlying aquifers were sampled quarterly to determine seasonal and temporal trends in nitrate concentrations. The data will be compiled and published in a report. Contact: Joanna Thamke, 406-457-5900, jothamke@usgs.gov

USGS Plague Workshop. Since the introduction of bubonic plague into the United States in 1900, the disease has spread throughout the West, where a variety of rodent species serve as reservoirs for both human and wildlife plague infection. Plague has significantly impacted populations of prairie dogs. Outbreaks in prairie dog colonies can kill 90-100% of the population. Since prairie dogs are the primary food source of the endangered black-footed ferret, decimation of prairie dog colonies by plague is hampering recovery efforts. In addition, the black-footed ferret itself can be highly susceptible to plague. Black-tailed prairie dog populations have been severely impacted in north-central Montana, including the Fort Belknap Reservation of the Assiniboine and Gros Ventre Tribes. A wildlife biologist with the Fort Belknap Reservation has been active in regional plague management and in planning for reintroduction of black-footed ferrets to these lands. In September 2000, the USGS National Wildlife Health Center sponsored a workshop entitled "Landscape Ecology of Plague in the American Southwest". The wildlife biologist from Fort Belknap participated in the workshop and presented a key paper entitled "Plague Management During Black-Footed Ferret Reintroductions in Montana." Proceedings from this workshop is being prepared and are be published as a USGS Technical Report Series in FY2002. Contact: Christopher Brand, 608-270-2440, christopher_brand@usgs.gov

Tom Stafne, Fort Peck Tribes Assiniboine and Sioux intern, digitizing land-use. Photo by Joanna N. Thamke, USGS

Water Resource Studies for the Crow Tribe. The Crow Tribe of Indians is concerned about the availability and quality of water for domestic and other uses by Tribal members. Both ground-water and surface-water studies were conducted by USGS to provide information for Tribal decisions. Ground-water along the Little Bighorn River may be an important future water resource for the Crow Tribe, but little detailed information is available describing this resource. The USGS is completing a study that used existing data and new, field-collected information to evaluate the availability and quality of water in the alluvial and terrace deposits along the river. The potential availability of water from underlying bedrock aquifers was also described. To promote understanding of surface water conditions, USGS collected water-quality samples six times per year from three sites along the Little Bighorn River, Crow Indian Reservation, between May 1993 and September 2001. These data were collected to provide stream water-quality information to the Crow Tribe. These data may be used by the Crow Tribe to determine if a large, confined animal-feeding operation is affecting stream-water quality. Water samples were analyzed for major ions, nutrients, and trace elements; results were published in the annual USGS water-data reports for Montana. Contact: Lori Tuck, 406-457-5900, ltuck@usgs.gov

Hydraulic Characteristics and Flood-Limit Delineation of the Jocko River on Part of the Flathead Reservation. The objective of this cooperative project is to delineate the flood limits and hydraulic floodway for 100- and 500-year events for a 20-mile reach of the Jocko River from near Arlee, Montana, to the river's mouth near Dixon on the Flathead Reservation of the Confederated Salish and Kootanai Tribes. USGS hydrologists surveyed channel-geometry (cross-section) data for the Jocko River and are using the data in a hydraulic model to calculate water-surface profiles and other hydraulic parameters such as flow area, conveyance, flow widths, mean flow depths, and velocities. The hydraulic data will be used to delineate the flood plain and floodway. The 100-year flood is commonly used as a regulatory flood for flood-plain management and flood insurance purposes. Adoption of flood-plain management regulations for the Jocko River would enable land-use and fishery managers for the Salish and Kootenai Tribes to better plan and guide future development to minimize riverine impacts and would also enable citizens to purchase subsidized flood insurance. The hydraulic analyses will be completed in 2002. Contact: Charles Parrett, 406-457-5928, cparrett@usgs.gov

The Effects of Sediments on Life in the Wind River. The Eastern Shoshone Tribe and the Northern Arapaho Tribe of the Wind River Reservation are concerned about the effects of sediment, and sediment releases, related to the Wind River Diversion Dam. Several times during each irrigation season, the gates of the Wind River Diversion Dam are opened to flush out accumulated sediment deposits in the dam pool. Although these brief pulses do not release new sediment to the river, the magnitude and timing of the events concern the Tribal water resources managers. The released sediment is deposited in settings like pools and backwaters, where it may become a stressor to benthic fauna and downstream fish communities. The USGS is working on a study of the effects of Diversion Dam releases on pools and benthic biological communities in the Wind River. The objectives of the proposed study are to document any difference in the patterns of pool sedimentation of the Wind River upstream and downstream from this dam, monitor suspended-sediment transport downstream from the diversion dam, and compare the benthic invertebrate and algal communities upstream and downstream from the diversion dam. The spatial and temporal patterns of effects on aquatic habitat and fauna caused by sediment releases from the diversion dam will provide an improved understanding for diversion-dam management broadly applicable to many similarly regulated gravel-bed streams. An additional benefit of the study will be the dataset developed as part of the project as currently there are limited physical-habitat and benthic-invertebrate data currently available for the Wind River. Contact: Thomas Quinn, 307-778-2931 ext.2748, tlquinn@usgs.gov

Water-quality for the Southern Ute Indian Tribe. The Southern Ute Indian Tribe has rights to 1/6 of the storage capacity of the Vallecito Reservoir and has supported USGS water quality work there. The Vallecito Dam and Reservoir were constructed to furnish supplemental water to about 54,000 acres. The Vallecito Dam prevents the flooding of crops, farmland, and structures along the Vallecito River during spring runoff by storing the floodwater for controlled releases to benefit irrigation. The Southern Ute Tribe is supporting a USGS study that is characterizing current water-quality conditions in the Vallecito Reservoir watershed over five years beginning in 2000. These data will be used to establish a baseline of major ions, metals, nutrients, and dissolved oxygen concentrations in reservoir inflows, in the reservoir itself, and in the reservoir outflow. Current conditions will form the baseline for comparisons with later years, to assess the affects of future population growth and land-use changes on reservoir water quality. Monitoring is planned to continue for 10 to 20 years after the initial 5-year characterization of existing water-quality conditions to determine water-quality trends. Contact: Tony Ranalli, 303-236-4882 ext.313, tranalli@usgs.gov

Geohydrologic and Water-Quality Assessment for the Pueblo of San Ildefonso. On behalf of the Pueblo of San Ildefonso, USGS hydrologists are studying the Pueblo's surface- and ground-water quality and will provide data on the geohydrology and water quality to the Pueblo staff. The study will determine the water-quality characteristics of water resources on the Pueblo and the environmental impacts to the geohydrologic system from inter-

nal and external sources. The scientific information from this study will be used by the Pueblo's Department of Environmental and Cultural Preservation to prepare future health risk assessments and, potentially, for establishing the Pueblo's water-quality standards. Pueblo staff are participating in the study by working with USGS personnel collecting surface-water, ground-water, and water-quality data, and learning basic interpretation of water-quality data. Contact: Dale Rankin, 505-830-7965, drrankin@usgs.gov

Geologic Framework of Rio Grande Basins, New Mexico. The USGS is conducting geologic and geophysical studies to provide a framework for understanding aquifers in several critical ground-water basins along the Rio Grande, which extends from Colorado to Mexico. The current focus of this project is the Española ground-water basin in the greater Santa Fe, New Mexico, region, which includes lands belonging to the Pueblos of Cochiti, Nambe, Pojoaque, Tesuque, San Ildefonso, San Juan, and Santa Clara. A major project goal is to develop a three-dimensional geologic model of the ground-water basin that will eventually improve the understanding of ground-water flow and resources. The project includes: geologic mapping in cooperation with the New Mexico Bureau of Geology and Mineral Resources and the University of New Mexico; geophysical mapping of the subsurface in cooperation with Los Alamos National Laboratory and the Summer of Applied Geophysics Experience educational program; investigations into how faults affect the aquifer system; and studies of geologic history to predict the distribution of underground aquifers. Geologic and geophysical maps of Pueblo areas provide information that aids in ground-water protection, and assessment of water and other natural resources. Related geologic and geophysical mapping efforts from a previous project in the Middle Rio Grande basin cover portions of the Pueblos of Isleta, Sandia, Santa Ana, San Felipe, Santo Domingo, and Zia. Most products of that phase of the work are completed or in the final compilation stages. Contact: Mark Hudson, 303-236-7446, mhudson@usgs.gov; Tien Grauch, 303-236-1393, tien@usgs.gov

Geo-Ecological Studies of Land Use, Climate Change, and Landscape Vulnerability on the Navajo Nation. Work is underway to examine the history of land-use impacts in the ecologically sensitive Hopi Buttes region, Navajo Nation, and the relations between human health and water quality in an environment with known uranium and arsenic contamination. Collaboration with offices and people of the Navajo Nation is crucial to the project, with the ultimate goal of providing information for education and community-based land-use planning. Research on separate aspects of the ecosystem includes bedrock geology, surficial processes, soil and water quality, plant ecology, as well as the history of human habitation. Geologic controls on water quality are being examined to outline areas where good quality water can be found. Changes in surface stability and erosion and arroyo development are being examined with the aid of existing photographic records. Regional work on sand dune stability encompasses eolian deposits within the entire Navajo Nation. Recent drought years have resulted in reactivation of sand dunes, threatening agriculture and grazing, destroying one home and threatening others. The distribution of eolian deposits is being mapped and classified according to the amount and type of stabilizing vegetation. Dunes that are mostly active are closely associated with Russian Thistle (tumbleweeds), an invasive annual that requires minimal moisture to germinate. The relationship between dune mobility and vegetation may be altered due to the recent appearance of this plant, as it dies off and becomes detached during dry, windy periods. Vegetation mapping, repeat photography, and consultations with Navajo plant experts are providing information on conditions that promote the spread of invasive species. USGS scientists met with Northern Arizona University scientists and independent researchers in June 2001 to discuss collaborative work on this project. They visited several locations on the Navajo Nation and discussed the interrelationship of water quality, topography, invasive plant species, and current and historic land use. In 2002, USGS scientists will collect widespread plant distribution data that will be used to develop a preliminary map linking the geomorphology and substrate of the area with plant distribution. Contact: Margaret Hiza Redsteer (project leader), 928-556-7366, mhiza@usgs.gov; Kathryn Thomas (vegetation studies), 520-556-7466 ext.235, Kathryn_a_Thomas@usgs.gov
Website for this project:
http://climchange.cr.usgs.gov/hopibuttes/

Members of the Navajo Nation draw water from Lokasaad Spring, which is also a sampling site for studies of rock and water geochemistry. Photo by Margaret Hiza Redsteer.

Black Mesa Monitoring Program. The N aquifer is the major source of water for the 5,400-square-mile Black Mesa area of Northern Arizona. The Black Mesa monitoring program is designed to document long-term effects of ground-water pumping from the N aquifer by industrial and municipal users. The USGS is monitoring ground-water levels, changes in water quality and quantity, and summarizing ground-water usage for the Black Mesa area on an annual basis in cooperation with the Hopi Tribe, the Navajo Nation, the Bureau of Indian Affairs, the State of Arizona, and Peabody Coal Company. A ground-water flow model is currently being evaluated for use in making predictions of ground-water change in the N aquifer as development continues on Hopi and Navajo lands. Contact: Blakemore E. Thomas, 928-556-7255, bthomas@usgs.gov

Geochemical Analysis of Ground-Water Ages, Recharge Rates, and Hydraulic Conductivity of the D Aquifer, Black Mesa. The N aquifer is the most heavily used aquifer for water supply in the Black Mesa area of northern Arizona by both the Hopi Tribe and the Navajo Nation. Concern exists that increasing withdrawals of water from the N aquifer to slurry coal will cause excessive declines in water levels or will cause poor-quality water from the overlying D aquifer to infiltrate the N aquifer. (The D aquifer overlies the N aquifer in the Black Mesa area.) The USGS is characterizing the ground-water geochemistry of the D aquifer through the use of naturally occurring inorganic constituents and stable and radioisotope. Differences in geochemical signatures between the D and N aquifers will help determine whether leakage is occurring to the N aquifer from the overlying D aquifer as a result of pumping ground water from the N aquifer. D aquifer geochemistry will also be used to estimate ground-waters age and recharge regimes in comparison to the N aquifer. Water users in the Black Mesa area, including the Hopi and Navajo, will use the information from this study to make informed decisions on how best to manage available water resources. Contact: Margot Truini, 520-556-7352, mtruini@usgs.gov

Inventory of Vascular Plants and Vertebrate Animals. In collaboration with the Navajo Nation, Ute Mountain Ute, and Southern Ute Tribes, USGS scientists from the Colorado Plateau Field Station initiated a comprehensive inventory of vascular plants and vertebrate animals in ten National Parks and National Monuments within and adjacent to Navajo and Ute Tribal lands. The purpose of the inventory is to document overall species diversity, collect data on distribution and abundance of rare species, and identify non-native, weedy species. Canyon de Chelly National Monument, Hubbell Trading Post National Historic Site, and Navajo National Monument include lands of the Navajo Nation. At these areas, USGS scientists are working cooperatively with Navajo Nation Fish and Wildlife Service biologists on field surveys. Likewise, surveys at Mesa Verde National Park and Yucca House National Monument will provide information of interest to neighboring Ute tribal lands. The project employs students of the Haskell Indian Nations College in fieldwork for the study, providing the students with hands-on experience in field research and technologies such as geographic information systems. Contact: Charles Drost, 928-566-7466 ext.233, charles_drost@usgs.gov

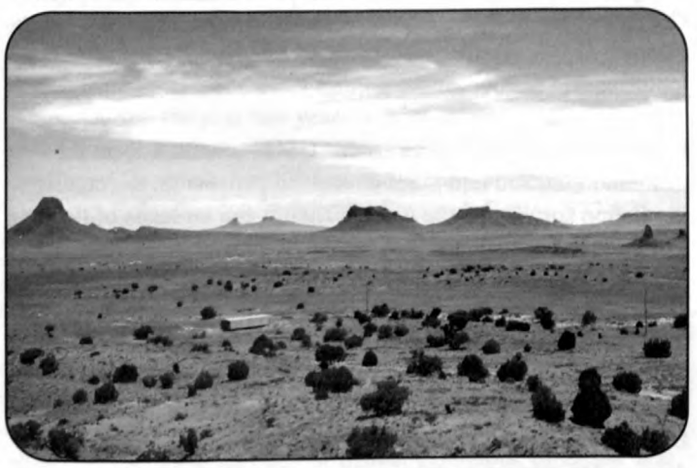
Aquifer Sensitivity on Navajo Nation Lands and Ground-Water Vulnerability to Pesticide Contamination on the Navajo Indian Irrigation Project. This study is determining the sensitivity of aquifers to impacts from activities occurring on the overlying land surface, and estimating the effects of irrigated agriculture and attendant pesticide use on ground water underlying the Navajo Indian Irrigation Project. GIS coverages that describe recharge areas, areas of unconsolidated deposits, soil hydrologic group, topography, and precipitation have been developed. The aquifer sensitivity assessment consisted of combining these coverages and interpreting the resulting coverage. The assessment of ground-water vulnerability to pesticide contamination on the Navajo Indian Irrigation Project consisted of combining the results of the aquifer sensitivity assessment with pesticide leachability ratings for each pesticide used during 2000. Leachability ratings were estimated on a field-by-field basis. Contact: Paul Blanchard, 505-830-7947, pblanch@usgs.gov

Investigations of Wildlife Mortality Events. The USGS National Wildlife Health Center in Madison, Wisconsin has responsibility for disease prevention, detection, and control in free-ranging wildlife. Species under Federal stewardship, such as migratory birds, endangered species and animals on Federal lands, are the focus of field investigations, diagnostic work, and research. Avian, mammalian, and amphibian wildlife carcasses from all over the country are submitted to the Center for diagnostic evaluation. When a wildlife mortality event is reported, potential responses include on-site assistance to contain the outbreak, diagnostic services to determine the cause, and research to further understand the ecology of the disease. Services are available to bureaus within the Department of the Interior and to Tribal organizations. During FY2001, the (non-USGS) Veterinarian of Record submitted two carcasses, a prairie falcon and a peregrine falcon, for the Navajo Nation Zoological and Botanical Park in Arizona. Both birds apparently died of emaciation. Contact: Scott Wright, National Wildlife Health Center, 608-270-2460, swright@usgs.gov

USGS Science Assists Navajo and Hopi Nations. USGS scientists met with Northern Arizona University scientists and independent researchers in June 2001 to discuss collaborative work on a project entitled: "Geo-Ecologically Based Study of Historic and Prehistoric Land Use in the Arid Region of Hopi Buttes, Navajo and Hopi Reservations, Arizona." They visited several locations on the reservation and discussed the interrelations of water quali-

ty, topography, invasive plant species, and current and historic land use. In 2002, USGS scientists will collect widespread plant distribution data that will be used to develop a preliminary map linking the geomorphology and substrate of the area with plant distribution. Contact: Kathryn Thomas, 520-556-7466 ext.235, Kathryn_a_Thomas@usgs.gov
Website for this project:
http://climchange.cr.usgs.gov/hopibuttes/

Climate Change and Land-Use Impacts, Navajo Nation and Hopi Tribe. Sand dunes on the Navajo Nation in Arizona are being examined as indicators of climate change and the potential movement of sand dunes is being determined. This project, begun in Federal fiscal year 2000, consists of mapping sand dune deposits and classifying them according to stability, based on the degree and type of vegetation holding them in place, and on regional meteorological information. The mobility of sand dunes is important for determining potential impacts of sand encroachment on grazing and farming resources, native plants, and infrastructure. A USGS scientist was invited to speak at the Navajo Nation's Shiprock Chapter GIS Conference and to participate in the Navajo EPA's strategic planning session. These projects emphasize outreach with the Native community, including the coordination of training sessions in image processing and acquisition of Landsat 7 imagery on the Navajo and Hopi lands. Contact: Margaret Hiza Redsteer, 928-556-7366, mhiza@usgs.gov



Tsezhin Bii' - The name of this area in the Navajo language means "within black rocks". This butte dotted landscape of the Navajo Nation formed from volcanic activity 7 million years ago. Photo by George Breit, USGS.

Vegetation Surveys on Navajo Nation Lands. USGS scientists from the Colorado Plateau Field Station received permission to conduct vegetation surveys on the Navajo Nation for the Southwest Regional Gap Analysis Program in Arizona. Data collection began during the summer of 2001. The Navajo Nation will be involved in the land cover mapping process by reviewing the draft map and will be given products. Contact: Kathryn Thomas, 928-556-7466 ext.235, kathryn_thomas@usgs.gov

Terrestrial Monitoring. The Grand Canyon Monitoring and Research Center is leading a project in Grand Canyon National Park to monitor and evaluate the effects of water releases from Glen Canyon Dam on terrestrial resources. The Hopi Tribe, Hualapai Tribe, and the Southern Paiute Consortium participated in a project by providing Tribal input to USGS biologists and participating in monitoring activities. FY2001 was the first year of the project, which is planned to continue for three years. In FY2003, the Navajo Nation and the Pueblo of Zuni are scheduled to begin participating in the project. Contact: Ruth Lambert, 928-556-7285, rlambert@usgs.gov

Geoenvironmental Effects of Glen Canyon Dam. The environment in Grand Canyon has been affected by Glen Canyon Dam. The USGS is collaborating with other researchers to provide information for policy decisions concerning the management of water flow from Glen Canyon Dam. Under the post-dam flow regime, which limits floods and impounds sediment, sandbars have degraded, campsites and riparian habitat have been lost, and species have become endangered. Congress passed the Grand Canyon Protection Act, requiring the Bureau of Reclamation to alter discharge from the dam to enhance the environment downstream in Grand Canyon National Park. Representatives of seven Tribes or Pueblos (Havasupai, Hopi, Hualapai, Navajo, San Juan Southern Paiute, Southern Paiute, and Zuni) are among more than two dozen stakeholders who participate in the Adaptive Management Program or regularly receive reports on the progress of this project from USGS Coastal and Marine Team and the Grand Canyon Monitoring and Research Center. The USGS has provided marine survey technology including side-scan sonar, rotating sonar, seismic reflection profiling, and underwater video equipment. USGS scientists are interpreting sedimentary structures to provide explanations for sediment transport, particularly for use in determining sediment transport prior to the dam, and developing new approaches to sediment-transport modeling. Contact: David Rubin, 831-459-3156, drubin@usgs.gov

Parasites of Native and Non-native Fishes in the Lower Little Colorado River. Scientists from the USGS National Wildlife Health Center studied parasites in fishes in the lower 21 km of the Little Colorado River, Grand Canyon, Arizona, an area administered by the Navajo Natural Heritage Program (Navajo Nation) and National Park Service (Grand Canyon National Park). Fish populations were sampled by the USGS in FY2000 and FY2001. In FY2001, a total of 1,235 fish representing

seven species (all four native and seven non-native species) were captured and examined for internal parasites. Results from both years indicate that between 50-60 per cent of the endangered humpback chub (Gila cypha) were infected with the Asian tapeworm (Bothriocephalus acheilognathi). Such infections can cause disease and retard growth. The disease could be severe enough to cause mortality. A reduced growth rate could increase the time that fish are susceptible to predation and also cause the fish to be small when they enter the mainstem of the Colorado River during monsoon season. Smaller fish do not survive as well as larger fish in the cold waters of the mainstem. In addition, zooplankton (critical to tapeworm transmission) were collected, identified, and counted. Temperature was monitored in various tributaries of the Little Colorado River to evaluate environmental conditions involved in the transmission of the tapeworm. Laboratory infections of bony-tailed chub, a surrogate for the endangered humpback chub, were initiated in FY 2001. These experiments are designed to assess the impact of the Asian tapeworm on fish growth, body condition, and ability to withstand thermal stress. These studies will provide managers with results to evaluate the effects of management options for water flow and temperature of the Glen Canyon Dam and, consequently, on the dispersal of this parasite and its impact on native fishes. Contact: Rebecca Cole, 608-270-2468, rebecca_cole@usgs.gov

Verde River Headwaters Aquifer Framework Study. The objectives of this project are to collect geophysical and geochemical data that will delineate major flow paths, determine rates of travel, and accurately measure relative source contributions from Big and Little Chino Basins to perennial springs in the Upper Verde River. The springs provide water for downstream water users (including the Yavapai-Prescott Indian Tribe in Verde Valley) and sustain riparian habitat for abundant wildlife, including several native fish species such as the threatened spikedace minnow (Medafulgida). This project is funded by the Arizona Water Protection Fund, which is administered by the Arizona Department of Water Resources. The project has three technical components. First, the latest advancements in airborne geophysics will be used to identify subsurface features that serve as conduits or obstacles to ground-water movement. Second, water chemistry, including isotopes, will be used to determine major ground-water flow paths and to determine the age and travel time of ground water. Third, project personnel will conduct a tracer dilution study to determine the contribution of base flow from multiple spring networks in the upper Verde River. The product of this study will be technically reliable information on ground-water flow paths, ground-water travel times, and relative contributions from different aquifer sources. Study results are needed by ground-water modelers and water resource managers in the Prescott Active Management Area, Yavapai County, and the Verde River Watershed. Contact: Laurie Wirt, 303-236-2492, lwirt@usgs.gov

Hydrogeologic Study of the Upper and Middle Verde River Watershed, Arizona. The population of Yavapai County, Arizona, is growing rapidly, resulting in an increased demand on water resources in the upper and middle Verde River watershed. The watershed contains a thriving riparian zone and is the primary water supply for the county, as well as for large populations further downstream, including the Yavapai-Prescott Indian Tribe and the Fort McDowell Yavapai Nation. The hydrogeologic system in the watershed has not been comprehensively studied, and the effects of historic and present development on regional water resources are poorly understood. Beginning in 2001, this study was funded by the Yavapai County Water Advisory Committee (YCWAC) to improve hydrologic and geologic information. This 3-year effort will use geophysical and geologic methods to better define the geometry of and internal structures in the basins and the composition and architecture of the basin fill. As part of the study, USGS personnel will establish and operate a microgravity network to measure changes in ground-water storage. Precipitation and stream-flow data will also be collected from new rain gages and a new stream gage on a tributary to Big Chino Wash. USGS scientists will collect and analyze ground-water samples to help delineate ground-water flow paths, and conduct surface resistivity surveys to delineate the thickness and extent of alluvial sediments in selected reaches of the Verde River. All of these investigations will produce data that can be directly used in the regional hydrogeologic investigation and will provide parameters for the conceptual model of the system. Contact: Victoria Langenheim, 650-329-5313; zulanger@usgs.gov; John Hoffman, 520-670-6671 ext.265, jphoffma@usgs.gov

Vegetation Surveys on Native Lands. USGS scientists from the Colorado Plateau Field Station received permission to conduct vegetation surveys on the Navajo Nation and on lands of the Colorado River Indian Tribes for the Southwest Regional Gap Analysis Program. Data collection began in 2001. All Tribal governments will be involved in the land cover mapping process by reviewing the draft map and will be given results and products of the project. Additionally, presentations on the Gap Analysis Program were made to Tohono O'odham Nation Districts to inform them of the project and possible uses of the data, and to request permission to conduct vegetation surveys on lands of the Tohono O'odham Nation. Contact: Kathryn Thomas, 928-556-7466 ext.235, kathryn_a_thomas@usgs.gov

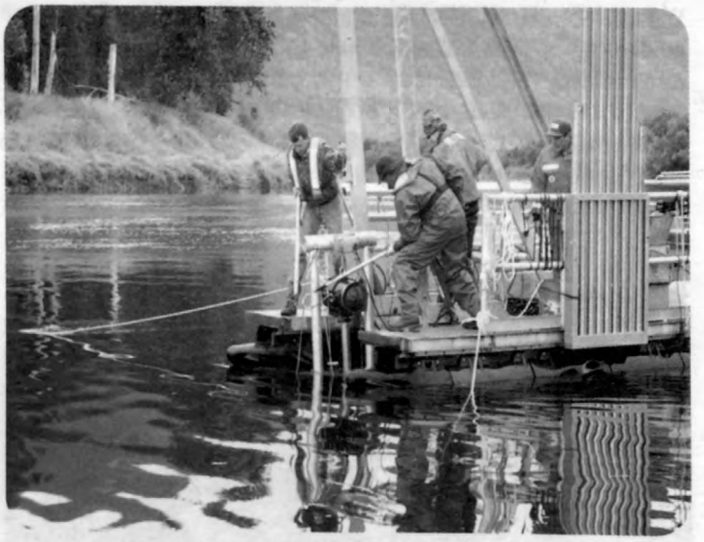
Invasive and Exotic Plant Species on Navajo and Hopi Lands. In cooperation with the Hopi Tribe and the Navajo Nation, USGS scientists collected information about invasive and exotic plant species for the Southwest Exotic Plant Mapping Project regional database. Contact: Kathryn Thomas, 928-556-7466 ext.235, kathryn_a_thomas@usgs.gov

Navajo Nation Siting a Solar Power Grid. The USGS Eastern Region Earth Science Information Center (ESIC) staff provided map and digital data research services for the Navajo Nation to assist in site location of a solar power grid. A Navajo representative visited the ESIC and researched and purchased USGS map products. ESIC staff also provided the client with information on USGS digital products and assistance with web research on energy and power infrastructure data. Contact: Steve Shivers, 703-648-5921, spshivers@usgs.gov

Vegetation and Animal Population Monitoring Program at 'Ahakhav Preserve. The USGS Colorado Plateau Field Station is providing assistance to the Colorado River Indian Tribes (CRIT) in a vegetation and animal population monitoring program to assess the progress and success of riparian restoration projects on the 'Ahakhav Tribal Preserve belonging to the CRIT near Parker, Arizona. This work has included overall design of the monitoring protocols for vegetation, amphibians, reptiles, and mammals, as well as assistance on preliminary fieldwork for the monitoring. Contact: Charles Drost, 928-566-7466 ext.233, charles_drost@usgs.gov

Mining Contamination. Parts of the South Fork of the Coeur d'Alene River in Idaho have been contaminated by historic mining activity. The USGS participated in the Coeur d'Alene Natural Resource Damage Assessment to ascertain the extent of injury. Of particular importance was documenting any injury to water, soil, or biological resources associated with ecosystems on lands of the Coeur d'Alene Tribe. Scientists studied contamination from metals and other mining wastes released from the mine. During the past two years, USGS scientists have participated as expert witnesses and witnesses of fact in the court proceedings. Decisions for this case are currently pending. Contact: Columbia Environmental Research Center, 573-875-5399, michael_mac@usgs.gov

White Sturgeon Habitat Simulations to Assess the Feasibility of Enhancing Spawning Substrate in the Kootenai River. In 1999, the USGS, in cooperation with the Kootenai Tribe of Idaho, began examining Kootenai River white sturgeon spawning substrate habitat. The Kootenai River Sub-Basin is an international watershed that encompasses parts of British Columbia, Montana, and Idaho. The Kootenai River is the second largest tributary to the Columbia River. During the last 80 years, the hydraulic, sediment transport, and substrate characteristics of the Kootenai River have been altered as a result of the construction of Libby Dam, dike construction, and wetlands drainage. The operation of Libby Dam has altered the river ecosystem, resulting in the decline of many resident fish populations including the Kootenai River white sturgeon (listed as an endangered species in 1994). One limitation to white sturgeon spawning success may be the change from the natural fluctuations in flow and sedimentation in sturgeon spawning areas resulting from the operation of the dam. To aid in white sturgeon recovery efforts, the USGS has been conducting studies to characterize bed-sediment conditions in the Kootenai River, including 30 kilometers of seismic sub bottom profiles in the spawning reach and beyond, and in 3.5-meter long cores of river bottom sediments at 30 locations in the spawning reach. These data were integrated with data defining pre- and post-dam water-surface and riverbed elevations and the river's sediment load to develop a conceptual model describing the sedimentation history of the spawning substrate habitat. The integrated analysis helped characterize how sedimentation processes in the river have changed over time and whether changes have affected the quality of the habitat area as it relates to spawning conditions. The USGS plans to measure the bathymetry, streamflow, sediment load, and bedforms of the Kootenai River, and develop state-of-the-art digital models to simulate streamflow and sediment transport. The sediment transport model will simulate conditions in the spawning reach located near Bonners Ferry, Idaho. The transport model will be developed as a tool to evaluate sedimentation characteristics under various flow regimes and the feasibility of various recovery actions on improving substrate conditions in sturgeon spawning areas. Contact: Gary Barton, 253-428-3600 ext.2613, gbarton@usgs.gov



Employees of the USGS and the Kootenai Tribe of Idaho work together to investigate means of improving the quality of the white sturgeon spawning habitat in the Kootenai River. Photo by Mark Hardy

Western U.S. Phosphate and the Shoshone-Bannock Tribes. The eastern half of the Fort Hall Reservation, home of the Shoshone-Bannock Tribes and part of the Southeast Idaho Phosphate Resource Area in the Western Phosphate Field, is included in the

study area of the USGS project "Geologic and Geoenvironmental Studies of the Western Phosphate Field." Although the project was initially focused on evaluating the resource potential of the region, research efforts have been extended to include multidisciplinary geoenvironmental studies of selenium and other potentially toxic elements. Selenium, an element released from phosphate waste piles, has had a detrimental effect on local livestock. The study area includes the Gay Mine, one of the largest open-pit mines in southeastern Idaho. The mine was operated by commercial entities on the Shoshone-Bannock lands from 1946 to 1993. The site now consists of numerous mine pits, waste dumps, and mill shale piles spread over an area of nearly 25 square miles. After initial contacts and meetings with the Bureau of Indian Affairs (BIA) and the Tribal Land Use Committee, USGS staff visited the Gay Mine site, and conducted geologic mapping to support resource estimates for the Chesterfield Quadrangle. Samples were also collected for chemical and petrographic analysis. In fiscal years 2000 and 2001, both the BIA and the USGS have been participants in regular meetings of the Interagency Area-Wide Technical Group and the Selenium Working Group Advisory Committee. Contact: James R. Hein, 650-329-5287, jhein@usgs.gov

Golden Eagle Studies in Idaho. USGS staff from the Snake River Field Station have been cooperating with the U.S. Fish and Wildlife Service (USFWS) and indirectly with Tribes regarding golden eagles. The USFWS implements the Federal Indian trust responsibility for contacts with Tribes involving protected species and the taking of those species by Native Americans for ceremonial uses. Contact by USGS staff with the Hopi Tribe and Navajo Nation was limited by legal circumstances. Contact: Mark Fuller, 208-426-4115, mark_fuller @usgs.gov

Willow Flycatcher. Scientists from the USGS Colorado Plateau Field Station have assisted with willow flycatcher subspecies determination in collaboration with the Northern Ute Indian Tribe. Contact: Mark Sogge, 928-556-7466 ext.232, mark_k_sogge@usgs.gov

Salmonoid Genetics. Biologists at the USGS Alaska Biological Science Center are researching the genetic population structure of Lahontan cutthroat trout, in collaboration with U.S. Fish and Wildlife Service. The scientists are examining the genetics of Snake River steelhead for the State of Idaho. Results of this research will have significant implications for Tribes that comprise the Nevada Indian Fish Commission and other Tribes in the interior of the Great Basin. Research results are being prepared for publication and presentation. Contact: Alaska Biological Science Center, 907-786-3512, jennifer_nielsen@usgs.gov

Cui-ui in Pyramid Lake, Nevada. The cui-ui is an endangered fish of the sucker family that is found only in Pyramid Lake, Nevada. The Pyramid Lake Paiute Indians and other Northern Paiutes historically relied upon annual spawning runs of cui-ui for food. Since the Tribe controls use of Pyramid Lake and fully supports efforts to restore the cui-ui population, the Tribal Council has passed resolutions prohibiting harvest of cui-ui by non-Indians and Tribal members. The USGS is continuing studies of the population dynamics and reports results to the Tribal Chairman. Adult cui-ui are netted at the south end of Pyramid Lake in the spring and are marked to determine the mortality rate. Fish are recaptured in the fall at selected stations around the lake to determine juvenile population size and estimate mortality over the summer. Contact: Western Fisheries Research Center, 702-784-5451, gary_scoppettone@usgs.gov

Golden Eagle with chick. Photo by Mike Collopy, USGS

Research biologists retrieving a trap net at Pyramid Lake. Photographer: Gary Scoppettone.

Fallon Basalt Aquifer. The Fallon Paiute Shoshone Tribe, the U.S. Navy, the Bureau of Reclamation, and the Nevada Division of Water Resources are cooperating with the USGS on a study to better define sources of water to, controls on, and the quality of water in the Fallon Basalt Aquifer. This aquifer is the sole source of drinking water for the Fallon Paiute Shoshone Tribe, the City of Fallon, and the Fallon Naval Air Station. The Fallon Tribe is contributing data and funding to the project and is providing access to Tribal lands for this study. Phase II of the project involves developing geochemical and numerical ground-water flow models, attempting to define the transmissivity of the aquifer, determining the hydraulic conductivity, and assessing the potential for in situ treatment of arsenic concentrations (which currently exceed drinking water standards) in the basalt. Contact: Douglas Maurer, 775-887-7631, dkmaurer@usgs.gov

Infectious Hematopoietic Necrosis Virus. In the final year of a multi-year project, research scientists at the USGS Western Fisheries Research Center are assisting fisheries managers at the Northwest Indian Fisheries Commission and the Columbia River Inter-Tribal Fish Commission in identifying specific strains of infectious hematopoietic necrosis virus (IHNV) affecting fish in Pacific Northwest hatcheries. During 2001, additional isolates of IHNV were provided by Tribal biologists and analyzed by USGS scientists to determine important features of the epidemiology of the virus in the Pacific Northwest. The final results, now including more than 300 isolates of the virus, have been presented to managers in regional meetings and presented in 2 peer-reviewed manuscripts on isolates of regional significance (Alaska and the Washington State coast). The integrated data set including all the isolates from throughout the geographic range of the virus in North America is the subject of a large manuscript in final preparation. This manuscript acknowledges the assistance of Tribal biologists. The study has received continued support from Tribal entities and the results will be incorporated into hatchery management plans and used in salmon restoration activities proposed by Tribes in the Pacific Northwest. Contact: Western Fisheries Research Center, 206-526-6282, frank_shipley@usgs.gov

Exotic Virus Affects Salmon. The Northwest Indian Fisheries Commission, in collaboration with the Washington Department of Fish and Wildlife and the U.S. Fish and Wildlife Service, is supporting research at the USGS Western Fisheries Research Center on the effects of an exotic virus on Pacific salmon. The virus, infectious salmon anemia virus, causes significant mortality in Atlantic salmon reared in aquaculture in Europe and on the Atlantic coast of Canada. There is substantial concern that, if introduced to the west coast, the virus would have a devastating effect on wild and cultured Pacific salmon. Preliminary work, conducted with the assistance of Tribal fish health biologists, indicates that Pacific salmon are more resistant to the effects of the virus than are Atlantic salmon. These findings have been communicated to Tribal and other fisheries managers in the Pacific Northwest. The Western Fisheries Research Center houses a state-of-the-art Biosafety Laboratory in which this work can be safely carried out. Contact: Western Fisheries Research Center, 206-526-6282, frank_shipley@usgs.gov

Trace Metal Concentrations in Sediments along Lake Roosevelt. The Confederated Tribes of the Colville Reservation are concerned about the potential threat to human health of trace metals in exposed lake-bottom sediment. These sediments can become airborne during high winds and ingested by people. Lake Roosevelt is a 125 mile-long reservoir in eastern Washington State that extends from Grand Coulee Dam to near the Canadian border where the Columbia River is free flowing. During periods when the water level of the reservoir is in drawdown, large areas of contaminated sediment are exposed. Upon drying, the fine-grained portion of these sediments becomes airborne during frequent wind storms. The USGS conducted a study to determine the concentrations of trace metals in the fine-grained sediment exposed during the spring 2001 drawdown. The results of the study will be published in an interpretive report. Plans were also made to conduct an air-monitoring study where trace metal concentrations of air samples will be measured. Contact: Sue Kahle, 253-428-3600 ext.2616, sckahle@usgs.gov

Nooksack River Basin Hydrologic Data. The USGS prepared an administrative report for the Bureau of Indian Affairs summarizing hydrologic data collected in the Nooksack River Basin in Washington State during 1998-2000. The report includes the results of streamflow measurements obtained at numerous sites in the basin and daily mean discharges for six continuous-recording streamflow gages for water years 1999-2000. Contact: Robert Kimbrough, 253-428-3600 ext. 2608, rakimbro@usgs.gov

Support for a Ground-Water Model of the Swinomish Indian Reservation. The Swinomish Indian Tribal Community (SITC) is interested in protecting the water resources of its reservation for the beneficial uses of the members of the Tribe. Concerns have arisen that pumping of ground water has resulted in depleted stream flows and has caused seawater intrusion into parts of the reservation. There is also concern that a landfill may be contaminating the ground-water system. The USGS recently completed a study to provide updated stream flow and ground-water-quality data to the SITC. The Tribe is constructing a model of the ground-water system. The U.S. Environmental Protection Agency supported the USGS technical assistance. The USGS involvement in this project was completed in FY01. Contact: Brian Drost, 253-428-3600 ext.2642, bwdrost@usgs.gov

Water Resources of The Tulalip Tribes. Future increases in population and development of lands of The Tulalip Tribes and neigh-

boring areas would lead to increased pumping of ground water both on and off the Native lands. Increased pumpage may decrease baseflows of streams and could affect fish-rearing operations in the Tulalip Creek watershed. The USGS is evaluating the current ground-water and surface-water resources of The Tulalip Tribes by computing a water budget and mapping the hydrogeologic system. An estimate of future ground-water use also will be made. Contact: Lonna Frans, 253-428-3600 ext.2694, lmfrans@usgs

Otoliths.gif: Otolith: ear stone or ear bone of a fish (salmon, in this photo) made from calcium carbonate. The fish uses the otolith for maintaining balance while swimming. Biologists can determine a fish's age counting the number of rings, similar to using tree rings to determine a tree's age. Otolith growth patterns can also be used to determine residence times of juvenile salmon in fresh water and estuarine habitats.

Salmon Life History. USGS fishery biologists are continuing to assist the Skagit System Tribal Cooperative in studying the life history of chinook salmon in the Skagit River, Washington. The study is funded by Seattle City Light and the USGS, and investigates the importance of intertidal estuarine habitats in the life cycle of chinook salmon. The length of time spent in this ecosystem is determined, and the daily growth of juvenile chinook salmon measured by studying the changes in "ear stone" (otolith) microstructure. The USGS provides the Cooperative with laboratory space, access to specialized equipment, supervision, and technical assistance in conducting the study. Contact: Western Fisheries Research Center, 206-526-6282, frank_shipley@usgs.gov

Restoration of the Elwha River Ecosystem. Scientists from the USGS Forest and Rangeland Ecosystem Science Center are providing technical advice to the National Park Service (NPS) and the Lower Elwha Tribal Community of the Lower Elwha Reservation on restoration of the Elwha River ecosystem. As part of this project the USGS will conduct a workshop for NPS and Tribal employees to determine research issues associated with dam removal. Restoration of anadromous fisheries is a priority for Tribes on the Olympic Peninsula. Contact: Edward Schreiner, 360-565-3044, ed_schreiner@nps.gov

Concentrations of Dissolved Oxygen in the Lower Puyallup and White Rivers. The Puyallup Tribe of Indians is concerned that wasteload allocations for biochemical oxygen demand and ammonia based on a modeling study conducted in the early 1990s will not protect the quality of water in the lower Puyallup and White Rivers. The USGS, in cooperation with the Tribe and the Washington State Department of Ecology, monitored concentrations of dissolved oxygen in the river during August and September 2001. Using the data, the USGS will publish a report analyzing factors that affect concentrations of dissolved oxygen in the lower Puyallup and White Rivers. The Washington State Department of Ecology will use the data to recalibrate the model used to determine wasteload allocations. Contact: Gary Turney, 253-428-3600 ext.2626, glturney@usgs.gov

Salmon River Watershed Analysis, Quinault Indian Nation. The Quinault Indian Nation collaborated with USGS and several other agencies to conduct an analysis of the Salmon River watershed. The Salmon River watershed covers three square miles of forested land, much of which has been affected by timber harvesting. The river has native runs of chinook and coho salmon, as well as steelhead trout. The Quinault Nation also operates a salmon hatchery on the river. The watershed analysis will serve as a tool to support decision-making processes in managing the river system and restoring salmon runs. Under two separate projects, the USGS led efforts for two modules - hydrology and geomorphology - of the watershed analysis. As part of the hydrology module, USGS staff measured and described low-flow discharge at selected sites on the Salmon River and correlated low-flow discharges with nearby continuous-discharge records to estimate low-flow magnitudes and recurrence intervals on the Salmon River. As part of the geomorphology module, USGS scientists investigated channel-migration processes, including interactions among channel migration, large woody debris, floodplains, and the surrounding forest. Historic channels and logjams were also mapped. The results of these studies were written in separate report chapters that will be published in FY2002. Contact: Bill Bidlake, 253-428-3600 ext.2641, wbidlake@usgs.gov; Jim O'Connor, 503-251-3222, oconnor@usgs.gov

Coastal Erosion in Willapa Bay, Washington. The USGS, the Bureau of Indian Affairs, and the Army Corps of Engineers are cooperating in a study of coastal erosion on lands of the Shoalwater Bay Indian Tribe, located in Willapa Bay, Washington. Tribal lands are rapidly eroding, increasing the frequency of flooding and the loss of valuable intertidal habitat. The joint study will allow the Tribe to make informed decisions to remedy this coastal problem. This study is benefiting from

the recently completed "Southwest Washington Coastal Erosion Study" carried out by the USGS and the Washington State Department of Ecology. This cooperative project used fundamental and applied studies to develop a regional perspective and understanding of coastal processes, sediment transport, and associated shoreline changes. The study examined the effects of man-made influences (enhanced runoff, dredging operations, Columbia River dams) and natural processes (climate variability, subsidence caused by earthquakes, coastal dune development) on sediment budgets and on the long-term shoreline change trends of the southwest Washington coast. Contact: Guy Gelfenbaum, 650-329-5483, ggelfenbaum@usgs.gov

Hydrogeologic Issues of the Shoalwater Bay Indian Tribe and Tokeland Peninsula. The Shoalwater Bay Indian Tribe obtains water from an artesian aquifer underlying its lands and the Tokeland Peninsula. The Tribe is concerned about the effects of increasing population and commercial activities on the quantity and quality of water in the aquifer. Specific water-quality concerns include seawater intrusion, contamination from septic tanks, and contamination from pesticides applied in nearby forests. The USGS conducted a study describing the general hydrology and water chemistry of the aquifer, including concentrations of nitrate and selected pesticides. An interpretive report describing the findings was prepared and will be published next year. Contact: Gary Turney, 253-428-3600 ext.2624, glturney@usgs.gov

Ground-Water Resources of the Yakima River Valley, Confederated Tribes and Bands of the Yakama Nation. Surface water in the Yakima River Basin is under adjudication. The amount of surface water available for appropriation is not known, but there are increasing demands for water for municipal, fisheries, agricultural, industrial, and recreational uses. These demands must either be met by ground-water withdrawals and/or by changes in the way water resources are allocated and used. Ongoing management of water in the basin also may be affected by rules to protect salmonoid fish under the Endangered Species Act. In 2000, the USGS began a study of the ground-water system in the basin, in cooperation with the U.S. Bureau of Reclamation and the Washington State Department of Ecology, and working with the Confederated Tribes and Bands of the Yakama Nation. The study will describe the geologic framework and ground-water flow system in the Yakima River basin, as well as the interaction between ground water and surface water. A ground-water model will be constructed as a tool to improve understanding of the system and to help estimate the effects of selected management strategies. As part of this project about 2,000 wells were visited to verify locations and measure water levels. Data on these wells has added to the USGS National Water Inventory System. Water levels were measured five times at about 800 of these wells. Lithologic information from the visited wells is currently being put into digital form for use in constructing maps of the hydrogeologic units. Concurrently, the interaction of ground water and surface water along selected reaches is being monitored on an hourly basis by collecting continuous water-level and temperature data. Historical municipal ground-water withdrawal data has been collected and compiled, and agricultural withdrawal data will be collected in FY2002. Work began on estimating ground-water recharge, with recharge being estimated for the upland, forested areas in the basin using four previously constructed watershed models. New methods were developed to thermally profile long river reaches to locate areas of large ground-water contributions and to estimate potential areas of good salmonid habitat. Contact: John Vaccaro, 253-428-3600 ext.2620, jvaccaro@usgs.gov

Yakima River Basin Stream Quality and Biological Communities. The lands of the Confederated Tribes and Bands of the Yakama Indian Nation encompass more than 100,000 acres of intensively irrigated land within the Yakima River Basin. Agricultural runoff from the Yakama Nation has been assessed by USGS hydrologists during this project, along with similar data from the rest of the basin's agricultural areas to determine the effect of different irrigation methods and agricultural practices on surface water quality. The USGS National Water Quality Assessment (NAWQA) program has worked cooperatively with personnel from the Yakama Nation's Department of Natural Resources. Small- and intermediate-sized agricultural drainages within the Yakama Nation were added to the NAWQA sampling network. In addition, chemical suites from routinely sampled sites were augmented with NAWQA pesticide and trace element determinations to characterize agricultural return flow at the mouths of tributaries to the Yakima River. A ground-water sample was collected to measure emerging contaminants, including pharmaceuticals, that may be entering the shallow ground water from combined animal feeding operations. Sampling small- and medium-sized agricultural drainages was undertaken in June, July, and October 2001. Results from these samplings are being interpreted during 2002. An interpretative report, Water-Resources Investigations Report (WRIR) 01-4211, has been completed on present-day pesticides and degradation products in surface water; it is available at: http://oregon.usgs.gov/projs_dir/yakima/index.html. This report is based on samples collected from the mouths of major agricultural tributaries to the Yakima River. Samples were collected during peak irrigation in August 1999 as well as multiple times from three locations (two agricultural tributaries and a main stem site) from May 1999 to January 2000. Other reports are expected to be available in the first half of 2003. Contact: Greg Fuhrer, 503-251-3231, gjfuhrer@usgs.gov

Columbia River Chinook Salmon. The U.S. Department of Energy's Hanford Laboratory in Washington State has become a nuclear waste disposal site. Tribes in the region, including the

Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Reservation, and the Nez Perce Tribe, are concerned that chromium leaking from the site might adversely affect a wide variety of salmonids through reduced survival. Gender alterations identified in these stocks also raised concerns about diminished reproductive capacity of natural populations. In addition, earlier studies focused on anadromous salmonids, especially chinook salmon, that only live in the Hanford Reach during early development. Until the present study, species that spend their entire lives in the Hanford Reach have been largely ignored. The Tribes are particularly concerned about the human health aspects of consuming these fish. In a USGS laboratory, USGS biologists have simulated conditions of the Hanford Reach of the Columbia River in Washington to study impacts under various exposures to chromium. Contact: Michael J. Mac, 573-875-5399, michael_mac@usgs.gov

Steelhead Restoration. USGS fishery biologists continue cooperating with the Confederated Tribes and Bands of the Yakama Indian Nation in an effort to restore steelhead trout in the Wind River basin in southwestern Washington State. Federal scientists and Tribal representatives worked together on a Technical Advisory Committee to the Wind River Watershed Council. Contact: Western Fisheries Research Center, Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov

Watershed Restoration for Reintroduction of Salmon and Steelhead. USGS fishery biologists are partnering with the Confederated Tribes and Bands of the Yakama Indian Nation fishery biologists in an effort to assess and restore the Rattlesnake Creek watershed of the White Salmon River basin. Restoration of this watershed is especially important because of the possible reintroduction of salmon and steelhead above Condit Dam on the White Salmon River. Federal scientists and Tribal representatives worked together on a Technical Advisory Committee to the White Salmon Watershed Management Council. Contact: Western Fisheries Research Center, Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov

Water Management and Steelhead on National Wildlife Refuges. USGS fishery biologists have begun to study the effects of water and land management at Toppenish National Wildlife Refuge (managed by the U.S. Fish and Wildlife Service). Fishery biologists of the Confederated Tribes and Bands of the Yakama Indian Nation are cooperating in this study. A study is underway to estimate the numbers of steelhead that enter the refuge, their residence times, and their condition and growth rate. The Toppenish National Wildlife Refuge is adjacent to the Yakama Indian Reservation in southern Washington State. Information should be useful to refuge managers for managing water movement, constructing or removing dykes, or altering vegetation types. Contact: Western Fisheries Research Center, Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov

Pacific Lamprey. The USGS is continuing to assist the Confederated Tribes of the Umatilla Reservation (CTUIR) in their effort to reestablish Pacific lampreys in the Umatilla River. Currently, USGS biologists are cooperating with the CTUIR to conduct research on several aspects of the life history and habitat needs of lampreys in the Columbia River basin. First, USGS staff completed a preliminary examination of the timing, behavior, and overwintering and spawning habitat use by Pacific lampreys migrating upstream in the John Day River, a river system similar to the Umatilla. Second, the USGS is continuing a CTUIR-funded investigation of the olfactory sensitivity of Pacific lampreys to pheromones released by other lampreys and

Lamprey have round, elongate, flexible cartilaginous bodies and skin with no scales. Lamprey feel very smooth and slimy. The mouth is down-turned and adapted for clinging and sucking. Pacific lamprey are dark bluish-gray or dark brown, can reach 30 inches long, and weigh more than a pound. Photo by Jim Seelye and Jennifer Bayer

lampreys' use of these pheromones as a migratory cue. Third, the USGS is completing a study to define critical habitat needs of lamprey eggs and early larvae by conducting experiments to measure effects of temperature on these early life history stages. Lastly, in cooperation with the CTUIR, the USGS is refining identification and aging techniques for larval lamprey. All of these projects are intended to provide information that will help the CTUIR implement their Umatilla River restoration plan. Biologists from the USGS and CTUIR have often combined efforts in such activities as field collections of larval lampreys, and laboratory dissections of larval lampreys for identification and aging studies. Additionally, USGS and CTUIR biologists have routinely shared information from cooperative studies, as in

USGS presentations of two studies on olfactory sensitivity and temperature effects on larvae at the 19th Annual Pacific Regional Conference of the Native American Fish and Wildlife Society, which was hosted by the CTUIR. Contact: Western Fisheries Research Center, Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov

Bull Trout in Beulah Reservoir, Oregon. In 2001, USGS fishery biologists began a study of the condition and growth of bull trout in Beulah Reservoir, which was created by a Bureau of Reclamation dam. The study includes collaboration with fishery biologists from the Burns Paiute Tribe. Aspects of the study include the seasonal occurrence of bull trout in the reservoir and their diet and movements. A bioenergetics model of bull trout growth will be used, along with physical measurements and a reservoir temperature model, to help managers predict whether a minimum pool level is necessary for bull trout survival in the reservoir. Contact: Western Fisheries Research Center, Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov

Studies of the Deschutes Basin, Oregon. A hydrologic study has been completed that characterized the regional ground-water flow system of the upper Deschutes Basin and developed a methodology to quantitatively evaluate the effects of ground-water pumping on streamflow of the Deschutes River and its tributaries. USGS scientists cooperated with the Confederated Tribes of the Warm Springs Reservation, who hold rights to considerable flow in the river and who have vital interests in streamflow, fisheries, and habitat quality. Legally mandated minimum flows in the Deschutes River are required to protect aquatic wildlife and recreation. These requirements are often not met during dry months, and ground-water pumping has the potential to further reduce streamflow. Another study is under way to determine the distribution of juvenile hatchery-raised spring chinook salmon in the Deschutes River and their potential impact on the aquatic community. Juvenile spring chinook salmon are tagged with radio transmitters and then tracked throughout the lower Deschutes River as they migrate downstream from the Warm Springs National Fish Hatchery. Tracking the juvenile salmon will indicate where fish released during fall will overwinter and how they might impact wild salmon in the Deschutes River. Working together, the Confederated Tribes of the Warm Springs Reservation and USGS scientists have shared the responsibilities for trapping, tagging, tracking, and instream sampling during this study. Contact: Western Fisheries Research Center (fisheries study), Columbia River Research Laboratory, 509-538-2299, jim_seelye@usgs.gov; Marshall Gannett (hydrologic study), 503-251-3233, mgannett@usgs.gov

Geomorphology of the Deschutes River, Oregon. The results of this project will describe the overall geologic and geomorphic context of the Deschutes River system in a way that will help evaluate the effects of the Pelton-Round Butte hydroelectric complex on downstream channel morphology. Project reports are currently being prepared. Portland General Electric and the Confederated Tribes of the Warm Springs Reservation are currently applying jointly to the Federal Energy Regulatory Commission for relicensing of the hydroelectric complex. Contact: Jim O'Connor, 503-251-3222, oconnor@usgs.gov

Regional Ground-Water Hydrology of the Upper Klamath Basin, Oregon and California. USGS hydrologists are quantitatively characterizing the regional ground-water hydrology in the upper Klamath Basin. The study includes characterizing the relation between ground water and surface water, and evaluating the potential for additional ground-water development without adversely affecting streamflow or existing ground-water users. Changes in water management in the basin to accommodate aquatic wildlife have caused shortages of water available for agriculture and for wildlife refuges. Ground water has the potential to augment surface water supplies, but also has the potential to diminish streamflow in some areas. A number of Tribes have interests in the fisheries in both Upper Klamath Lake and the Klamath River, including the Klamath, Yurok, Karuk, and Hoopa Valley Tribes. Contact: Marshall Gannett, 503-251-3233, mgannett@usgs.gov

Anadromous Fishery Restoration. USGS biologists and hydrologists participated in the Klamath River Fishery Restoration Program, a cooperative effort among the Yurok, Karuk, and Hoopa Valley Tribes, the U.S. Fish and Wildlife Service, and California Department of Fish and Game. USGS is improving the System Impact Assessment Model (SIAM) to provide a better understanding of water quality and quantity management problems that limit anadromous fish restoration in the Klamath River below Iron Gate Dam. Scientists will also collect data to fit the model and perform the required analysis. SIAM is scheduled for completion in 2003. Contact: Midcontinent Ecological Science Center, 970-226-9383, david_b_hamilton@usgs.gov Additional information is available at www.mesc.usgs.gov/products/software/siam/siam.asp and www.mesc.usgs.gov/research/5003591.asp

Sediment Oxygen Demand in Upper Klamath and Agency Lakes, Oregon. USGS scientists conducted a study to determine the magnitude and variability of sediment oxygen demand (SOD) in Upper Klamath and Agency Lakes. SOD is a critical component of the dissolved oxygen budget in the lakes, where low dissolved oxygen concentrations are detrimental to endangered sucker fish species of interest to The Klamath Tribes. One aspect of the study evaluated the change in SOD from before the development of summertime algal blooms to late summer, after or during the decline of the blooms. The study also attempted to correlate

SOD and other quantifiable sediment characteristics, in particular coarse/fine distribution, organic carbon content, and the residue lost on ignition. The study was completed in January 2001. Results were published as the Water Resource Investigation Report 01-4080 - "Sediment Oxygen Demand In Upper Klamath and Agency Lakes, Oregon, 1999." The report is also available online at http://oregon.usgs.gov/pubs_dir/online_list.html#014080. Contact: Tamara Wood, 503-251-3255, tmwood@usgs.gov

Traditional Management Techniques on Mesquite Tree Stands at Death Valley. A planning effort is underway to attempt to evaluate and quantify the effects of the re-institution of traditional natural resource usage on stands of mesquite trees in Death Valley National Park. The Timbisha Shoshone Tribe will use traditional methods of wood gathering, stand maintenance, and collection of mesquite bean pods on plots in a pattern designed to understand the effects of such management practices on individual trees and the mesquite tree population. USGS scientists intend to determine the effect (if any) that traditional management practices have on various measures of plant production, plant physiology, and population demography. This project will integrate diverse factors including elements of cultural anthropology. Contact: Todd C. Esque, 702-914-2206 ext.226, todd_esque@usgs.gov

Ichthyophonus Infections in Yukon River Chinook Salmon. With continued funding from the U.S. Fish and Wildlife Service in Alaska, scientists at the USGS Western Fisheries Research Center conducted the third year of a study on the prevalence and intensity of Ichthyophonus infections in returning adult chinook salmon in the Yukon River. The pathogen, similar to a fungus, appears to be an increasing problem in these important stocks, causing adverse flesh quality and possible pre-spawning losses. Historical data and reports from Tribal elders suggest that increasing temperatures in the Yukon River in the past few decades may be associated with the increased severity of disease. This project is of great interest to Tribal, Federal and Canadian fisheries managers and is receiving direct assistance from Athabascans from the communities of Tanana, Louden, Fairbanks, and Nenana, as well as Yupiits from Emmonak. Contact: Western Fisheries Research Center, 206-526-6282, frank_shipley@usgs.gov

Kuskokwim Mineral Belt Project. The USGS Kuskokwim Mineral Belt project, which is scheduled to be completed this year, has investigated the regional geology and assessed the undiscovered mineral deposit potential of one of Alaska's most promising mineral frontiers. The Kuskokwim Mineral Belt (KMB) is an important precious metal-bearing region covering approximately 190,000 km2 (73,000 mi2) in southeastern Alaska. USGS investigations have focused on the historically productive central part of the mineral belt, a 15,000 km2 (5,800 mi2) region, of which nearly 25 percent is Native-patented or interim-conveyed land. Calista Corporation, the regional Alaska Native Corporation, will use the results of these studies to evaluate and manage the resources of their lands-a goal supported by the Department of the Interior's policy to assist Alaska Native groups. Deposits of gold and silver are now known to be associated with specific igneous rock units in this part of Alaska. In addition to precious metals, the KMB has produced mercury from shallow, relatively low-temperature deposits. USGS and Calista geologists have performed joint field investigations and shared geologic, geochemical, and mineral deposit information for the Calista lands. Results of these studies will help USGS scientists estimate the mineral value of this largely unexplored region and will allow Calista Corporation to make better-informed decisions to benefit its people. The USGS and Calista will continue to cooperate under a new Bureau of Land Management mining district project that builds on the USGS work and encompasses the entire KMB. Contact: Marti Miller, 907-786-7437, mlmiller@usgs.gov; Dwight C. Bradley, 907-786-7434, dbradley@usgs.gov

Geochemical Landscape of Alaska Native Corporation Lands. Geologists from the USGS have developed collaborative plans with Alaska Native Corporations to conduct projects with the goal of understanding the geochemical landscape (that is, the spatial variations in the distribution of chemical elements within media such as stream sediment and soil) of Native and adjacent lands. The study areas comprise the southwestern quadrant of Alaska, including the Aleutian Islands. Part of the project includes collecting one sample per 289 km2 (20 km cell) and analyzing each sample for 43 chemical elements of both geological and environmental significance (e.g., mercury, arsenic, and selenium). Geologists from the Calista Corporation and the Bristol Bay Native Corporation participated in acquiring samples for analysis. In FY2001, sampling was completed in the Bristol Bay area; sampling is continuing in the Calista and adjacent areas. The geochemical data will be used to create interpretive derivative maps involving watersheds, lithologies, geology, mineral deposits, and political boundaries. The products of the project are designed to assist the Native Corporations in managing their lands. Contact: Andrew E. Grosz, 703-648-6314, agrosz@usgs.gov

Mapping Sensitive Islands in the Bering Sea. The USGS is working with the National Oceanic and Atmospheric Administration's Office of Response and Restoration to produce digital and paper maps of the Pribilof Islands of Alaska. The maps will be used to identify and protect sensitive habitat areas for migratory birds and marine mammals, particularly the Northern Fur seal. The data will be shared with Alaska Native communities on the islands for them to use in decisions relating to land use, econom-

ic development, and natural resource management. The residents will supply traditional Aleut names for geographic features on the islands that will be incorporated into the final cartographic products. Contact: A.C. Brown, 907-786-7002, acbrown@usgs.gov

Water Quality Sampling of the Taku River. The Douglas Indian Association (DIA), the Alaska Department of Environmental Conservation, and the USGS initiated a 5-year cooperative water-quality project to collect baseline water-quality data for the Taku River, an important salmon fishery. Although the watershed is undeveloped, a new mine is proposed in the watershed on the Canadian side of the border. The Taku River is also subject to glacial outburst floods that affect the River's water quality. The USGS is conducting the field sampling, and the U.S. Environmental Protection Agency is analyzing the samples. The DIA has provided an intern to assist USGS researchers with the sampling for part of the project. During 2001, USGS scientists began working with the Water Survey of Canada and the Canadian faction of DIA by providing logistical support and discharge measurements for the collection of water quality samples on the Taku River and several of its tributaries on the Canadian side of the border. Contact: Bruce Bigelow, 907-586-7287, bbigelow@usgs.gov

Traditions of Gathering Eggs. A study of traditional egg-gathering practices in Glacier Bay National Park has documented the use of selected park areas by Native residents of Hoonah for the purpose of bird-egg-gathering over several generations. Glaucous-winged gulls are the species most commonly targeted. Harvest strategies vary by family but are generally based on accurate knowledge of gull nesting behavior and ecology. Traditional Huna Tlingit gull egg harvests were not highly ritualized but were sometimes marked by individual spiritual observances. Virtually all Huna respondents responded negatively to the prohibition of their gull egg harvests by the Federal government. Respondents voiced strong interest in resuming legal gull egg harvests within Glacier Bay National Park and Reserve. Results are reported in: Hunn, E., D. R. Johnson, P. Russell, and T. Thornton, June 2001, A Study of Traditional Use of Birds' Eggs by the Huna Tlingit. Technical Report, USGS/BRD/FRESC/Cascadia Field Station, Seattle, WA, 181 pp. Contact: Darryll Johnson, CFS, 206-685-7404, darryllj@u.washington.edu

Water Quality Sampling of Peterson Creek. In the summer of 2001, the Central Council of Tlingit and Haida Indian Tribes of Alaska entered into a two-year cooperative agreement with USGS to collect baseline water-quality data for Peterson Creek, a valuable salmon fishery located on north Douglas Island near Juneau, Alaska. Peterson Creek, with a drainage basin less than five square miles, will be affected by a large development project that is scheduled to begin in the near future. Field crews consisting of two Tlingit-Haida staff, an Alaska Department of Fish and Game employee, and two USGS personnel divided the basin into nine sub-basins and began a rigorous sampling and measuring program for each sub-basin over a variety of flow conditions. Contact: Bruce Bigelow, 907-586-7287, bbigelow@usgs.gov

Alaska Volcanoes and Alaska Natives. Open communications between Alaska Natives and the USGS Alaska Volcano Observatory (AVO) are crucial in helping to safeguard Alaskan communities. Numerous Alaska Native villages and corporations communicate with the AVO during periods of volcanic activity. Native officials transmit on-site observations to AVO, and AVO scientists distribute interpretive and hazards information to the Native communities. Many of these communities are on the AVO automatic weekly update fax and/or electronic mail lists that provide the status of activity of more than 40 active volcanoes in the Aleutian Islands. All Native villages in the Aleutians, including Nelson Lagoon, Naknek, Unalaska, Akutan, False Pass, Atka, and King Cove, are near active volcanoes. AVO also conducts geological field studies and services existing seismic-monitoring equipment to provide real-time warnings of volcanic activity and related hazards to aircraft and local communities. USGS communications and research involved obtaining letters of non-objection for proposed volcano hazards work and accessing lands owned or selected by several Alaska Native corporations, including The Aleut Corporation, Akutan Corporation, Ounalashka Corporation, Ahtna Corporation, and Cook Inlet Region Incorporated. Contact: Thomas Murray, 907-786-7042, tlmurray@usgs.gov

Black-footed ferret.
Image courtesy of the Centers for Disease Control.

Technical Assistance

Technical Assistance

Technical Assistance

Nottawaseppi Huron Band of Potawatomi Water Issues. Little is known about surface- and ground-water resources beneath the lands of the Nottawaseppi Huron Band of Potawatomi. Tribal members living on the Reservation depend upon domestic water from fairly shallow wells completed in unconsolidated glacial and lacustrine deposits. Three small tributaries of the St. Joseph River system pass through agricultural land prior to crossing the Reservation. In FY2000, a 4-year cooperative agreement was implemented between the Tribe and the USGS. The cooperative study will analyze and describe Tribal water resources. Results of the study will be used to establish baseline conditions. USGS and Tribal environmental staff are working cooperatively on several aspects of the data collection effort. Activities in FY2001 included surface- and ground-water measurements. Surface water was sampled and analyzed for a suite of water constituents including common agricultural pesticides/herbicides. Sampling on the three tributaries to the St. Joseph River system investigated surface-water quality during three distinct periods of agricultural activity: immediately after fall harvest, prior to plant emergence in the spring, and during the early summer growth season. Activities in FY2002 are expected to concentrate almost exclusively onground water, with water-quality sampling and potentiometric surface delineation scheduled (potentiometric surface can be defined as the standing water level in a bore hole). A single early- to mid-summer surface-water-quality sampling on the three tributaries to the St. Joseph River system is also scheduled. Contact: Tom Weaver, 906-786-0714, tlweaver@usgs.gov

Lac Vieux Desert Band of Lake Superior Chippewa Indians. USGS Michigan Water Resources Office staff met representatives of the Lac Vieux Desert Band of Lake Superior Chippewa to develop a Quality Assurance Project Plan (QAPP) for submission by the Tribe to the U.S. Environmental Protection Agency. The Plan would provide for a cooperative 4-year study of surface-water quality in Lac Vieux Desert. Additional activities will probably include streamflow measurements of three tributaries and the outlet of the lake and re-establishment of a lake level monitoring station. Potential activities include defining ground-water/surface-water interaction within the lake basin and determination of the basin's water budget. A multi-year cooperative agreement between the USGS and the Lac Vieux Desert Band of Lake Superior Chippewa Indians will be forthcoming in early FY2002 after completion of the EPA QAPP review. Contact: Tom Weaver, 906-786-0714, tlweaver@usgs.gov

Ground-Water Contribution and Community Water Systems, Menominee Lands. The USGS is studying the extent and composition of areas that contribute water to, and travel time of water captured by, community wells on lands of the Menominee Indian Tribe of Wisconsin. This information will be used by the Menominee government for water resource and well-head protection planning in community areas. USGS Contact: Charles Dunning, 608-821-3827, cdunning@usgs.gov; Menominee Contact: Gary Schuettpelz, 715-799-4937, gschuett@mail.wiscnet.net

Oneida Hydrologic Investigations. The objectives of this cooperative project with the Oneida Tribe of Wisconsin are to collect long-term data at two sites and to perform trend analysis for pesticides, nutrients, and suspended sediment. This results of the study will assist Oneida officials with environmental and developmental planning. USGS Contact: Kevin Richards, 608-821-3861, krichard@usgs.gov; Oneida Contact: Jim Snitgen, 920-869-5812

Ho Chunk Water Quality. The USGS has begun assisting the Ho Chunk Nation by assessing the hydrology and water quality of the streams on and in close proximity to Ho Chunk lands. The project will include an analysis of existing information on chemical, physical, and biological investigations. Areas will be identified for which more information is needed to define water quality. Monitoring will then be undertaken to collect the necessary data. Data collected will be used to prepare a comprehensive water-management program for the Ho Chunk Nation. USGS Contact: Dan Sullivan, 608-821-3869, djsulliv@usgs.gov Ho Chunk Contact: Michelle Gorski, 715-284-2852, mgorski@ho-chunk.com

Water-Quality, Chemical, and Biological Monitoring Of Selected Lakes. The USGS has an extensive project in Wisconsin, in which the St. Croix Chippewa Tribe is one of many cooperators. The project will determine the current water quality and trophic status of lakes and assess the condition of specific lakes in comparison with other lakes of the same type in the region. A quantitative database will be built so that any future detrimental changes or trends can be detected quickly and evaluated objectively. USGS Contact: Bernie Lenz, 715-234-4015, bnlenz@usgs.gov St. Croix Contact: Leslie Weaver, 715-349-2195

Neopit Mill Pond Sedimentation And Sediment Chemistry Study. The Menominee Indian Tribe of Wisconsin is cooperating with the USGS on a study of sedimentation characteristics in Neopit Mill Pond, which was formed by damming the West Branch of the Wolf River. USGS Wisconsin Water Resources District personnel are determining the texture, age, and organic and trace ele-

ment chemistry of sediment stored behind the dam. The USGS staff, with the help of Menominee Tribe personnel, will also map the pre-dam channel and topography of the West Branch of the Wolf River through the mill pond. USGS Contact: Faith Fitzpatrick, 608-821-3818, fafitzpa@usgs.gov; Menominee Contact: Doug Cox, 715-799-4937, dcox@itol.com

Historical Trends in Streamflow, Sedimentation Rates, and Sediment Trace Element Concentrations Associated with the Wolf River, Keshena Falls to Balsam Row Dam. This project identified natural and historic concentrations of trace elements in streambed, floodplain, and backwater sediments of the Wolf River from Keshena Falls to Balsam Row Dam, mostly within the lands of the Menominee Indian Tribe of Wisconsin. This cooperative study between the Menominee Tribe and the USGS also determined the range of historic (150+ years) variability of flooding and the sedimentation characteristics along the same reach of the Wolf River. Major factors affecting stream sedimentation and flooding characteristics-geologic/natural versus land-use effects-were identified. This study was completed in FY2001 and a report is being prepared. USGS Contact: Faith Fitzpatrick, 608-821-3818, fafitzpa@usgs.gov; Menominee contact: Doug Cox, 715-799-4937, dcox@itol.com

Spirit Lake Nation Capacity Building. USGS personnel accompanied Spirit Lake Tribal staff in the field and provided quality-assurance regarding the collection, processing, and shipping of water-quality samples. USGS personnel have helped Tribal staff assemble and install wetland-monitoring packages, and provided training on how to read and record water-level information, how to calibrate the equipment, and how to transfer data from the field to the office. USGS personnel have also provided training on how to select an appropriate location for a discharge measurement, how to make a discharge measurement, and how to compile a discharge measurement. Contact: Wayne R. Berkas, 701-250-7429, wrberkas@usgs.gov

Hogs, Water, and the Rosebud Sioux Tribe. USGS hydrologists are providing technical assistance to the Rosebud Sioux Tribe for their development of monitoring plans for proposed pork production facilities. Tribal and USGS staffs are also working together on a related proposal to improve understanding of ground-water flow in the Pierre Shale by studying the hydrogeology near the potential pork production sites. The Rosebud Sioux Tribe will apply this technical assistance to future water-quality monitoring efforts on their lands. Contact: Larry D. Putnam, 605-355-4560 ext. 212, ldputnam@usgs.gov

Hydrologic Information and Capacity Building for the Caddo Tribe. The Caddo Tribe of Oklahoma is concerned about the vulnerability of ground water to pesticide contamination in northern Caddo County and Canadian County, Oklahoma. On behalf of the Tribe, the USGS is constructing an aquifer sensitivity map to outline areas where the aquifer is susceptible to pesticide contamination. The Tribe, with USGS assistance, is developing a geographic information system (GIS) that will include land use, pesticide use, and other data for parcels of land. USGS scientists are working with Tribal employees on ways to use GIS resources to make ground-water vulnerability maps. At the Caddo Tribal headquarters in May 2001, several Tribal members were trained in the use of spatial data and basic GIS software applications by USGS staff. The training was coordinated with the U.S. Army Corp of Engineers, a USGS partner. Training will be continued in FY2002. Contact: Carol J. Becker, 405-810-4436, cjbecker@usgs.gov

Technical Assistance to the Blackfeet Tribe on Water Resources Issues. In FY2001, the USGS continued to provide technical assistance to the Blackfeet Nation on water-resources issues. The USGS provided the Blackfeet Tribal government with information and guidance on stream-gage construction, operation, and maintenance, as well as stream-gaging procedures, and flow computation. Tribal authorities, with USGS advice, are also developing a pesticide management plan to protect the Reservation's water resources. Contact: Mike Cannon, 406-457-5900, mcannon@usgs.gov

Mapping Exotic Plants in the Southwest. In conjunction with land managers, biologists at the USGS Forest and Rangeland Ecosystem Science Center's Colorado Plateau Field Station are developing a database on exotic plants in the Southwest. The database will become an important tool for inventorying, monitoring, and sharing data on exotic (non-native) plant species that are invading the area. USGS scientists are gathering data on the plants and compiling it according to Federal standards. The database can also be used to generate maps of locations of the plants. The goals of this effort include developing and maintaining the Southwest Exotics Plant Database, maintaining a distribution system that integrates educational, management, and scientific information to aid in control of the exotic plant species, and facilitating a collaborative partnership among Tribal, Federal, State, and private land managers. Contact: Kathryn Thomas, 520-556-7466 ext. 235, kathryn_a_thomas@usgs.gov

Navajo Surface Water Project. The Navajo Surface Water project is designed to help personnel of the Navajo Nation's Water Resources Department compute streamflow records and operate their streamflow-gaging stations. The USGS is providing technical assistance to Navajo hydrologists and technicians by populating databases with hydrologic data to compute and store streamflow data. USGS scientists also are training Navajo personnel to compute records and develop rating curves. Additionally, USGS personnel are providing quality assurance for the project.

The USGS currently operates two streamflow gages in cooperation with the Navajo Nation to provide near real-time hydrologic data and to provide training opportunities to Tribal personnel. Contact: Gregory G. Fisk, 520-556-7225, ggfisk@usgs.gov

Wetlands on the Navajo Reservation. USGS wetland scientists assisted in the design of a constructed wetland on the Navajo Nation and are subsequently studying whether the design improves the quality of the wastewater from the community of Piñon, Arizona, for reuse and/or discharge. Concurrently, this wetland was designed to provide wildlife habitat that is otherwise scarce in the area. This is a cooperative effort among the Navajo Nation, the Indian Health Service, Bureau of Reclamation, and the USGS. Besides collecting water quality data at this site annually since 1999, the group has been collecting sediments, vegetation, and invertebrates annually for bioaccumulation studies of certain chemical elements of concern. Results from this research will provide information on how and when to build additional treatment wetland cells for further development in the Piñon area and in other remote locations within the arid southwest. Contact: Mid-Continent Ecological Science Center, 303-445-2212 or 303-445-2230, joan_thullen@usgs.gov or james_j_sartoris@usgs.gov

Stream-Gaging Cooperation. The White Mountain Apache Tribe permitted USGS employees to access stream gages on Tribal lands, under the terms of an Intergovernmental Agreement. USGS staff helped train White Mountain Apache Tribal staff in water-quality and surface-water data collection techniques. Contact: Christopher Smith-Arizona 520-670-6671 ext.251, cfsmith@usgs.gov

Availability and Quality of Surface-Water and Ground-Water Resources of the Yavapai-Prescott Indian Tribe. During 2001, the USGS collected water-level measurements at 12 wells, measured stream discharge at 2 streamflow gages, and collected water-quality samples from springs, wells, and surface-water sites on lands of the Yavapai-Prescott Indian Tribe. This program was designed to assist the Tribe in managing its water resources and to provide water-quality data that the Tribe could use to assess the health of Tribal members by meeting EPA water-quality standards. Contact: Robert J. Hart, 928-556-7137, bhart@usgs.gov; Gregory G. Fisk, 520-556-7225, ggfisk@usgs.gov

Moapa Data Management Tools. The USGS Nevada Water Resources District, in cooperation with the USGS-Biological Resource Discipline, and Lake Mead National Recreation Area donated excess computer equipment to the Moapa Band of Paiute Indians to help them develop Tribal geographic information system. USGS Water Resources personnel met with Tribal representatives to discuss future training and assistance for the Tribe. Contact: Contact: Donald Harper. 702-897-4015, harper@usgs.gov

Streamgaging by the Hoopa Valley Tribe. Hoopa Valley Tribal employees are operating four gaging stations in the Trinity River watershed under general direction and quality assurance review by USGS scientists. Tribal employees have attended USGS

Roger Sinclair, Blackfeet Nation Water Resource Department, helping install a staff gage in Duck Lake, Blackfeet Nation. Photo by M.R. Cannon.

classes on sediment measurement in addition to on-the-job training during USGS field work. As part of the Trinity River Restoration Program, the Hoopa Valley Tribe is planning to expand its role in stream discharge measurements and sediment sampling. Contact: Jim Bowers, 760-247-1401, jcbowers@usgs.gov

Surface-Water Quality Training for the Karuk Tribe of California. USGS scientists are training Karuk Tribal personnel in water-quality sampling, measurement, and quality assurance/quality control procedures. The training builds Tribal capacity to manage water resources. Contact: Jim Bowers, 760-247-1401, jcbowers@usgs.gov

Ground-Water Model Review. The USGS provided review of a consultant's ground water model prepared for the Bureau of Indian Affairs. The model covers parts of the Owens Valley. Contact: Wesley Danskin, 858-637-6832, wdanskin@usgs.gov

Timbisha Shoshone GIS training. The Federal Government has recently transferred ownership of land within and adjacent to Death Valley National Park to the Timbisha Shoshone Tribe. The USGS Nevada Water Resources District provided technical expertise to the Tribe to help incorporate Geographic Information Systems (GIS) into their land management and planning processes. USGS employees assisted Tribal personnel to improve Tribal knowledge of GIS software, develop a project related to Tribal concerns, exchange existing data coverage's maintained by other agencies, and produce maps and data to demonstrate GIS capabilities to the Tribal Council. Contact: Donald Harper. 702-897-4015, harper@usgs.gov

Aquifer Characterization with the Morongo Band of Mission Indians. USGS hydrogeologists continued work on a project to provide the Morongo Band with comprehensive information on the chemical and physical characteristics of their primary water supply aquifers. Technical reports were provided earlier and a graphical poster for use by the Morongo Band is being reviewed. The poster will be used to educate residents of the area and to improve management of their water supply resource. Contact: Allen Christensen, 858-637-6875, ahchrist@usgs.gov

USGS Technical Assistance to Bureau of Indian Affairs (BIA). The USGS continues to provide networking support to the BIA. During FY2001, the USGS created a new BIA backbone (digital system support) in Alaska. The USGS also ensured connections throughout the BIA, in both Alaska and the rest of the United States, by configuring their routers. The USGS employees moved the BIA onto a new computer system and facilitated several separate moves of digital equipment for the BIA in Anchorage. Some additional routing issues were resolved for all of the BIA in early FY2002. Contact: Pat Murphy, 650-329-4044, pmurphy@noc.usgs.net

Students at Southwestern Indian Polytechnic Institute. Photo by Joseph Kerski, USGS.

Surface-Water Monitoring Stations. The USGS operates the following surface-water monitoring stations, usually with cooperative funding from the Tribe, the Bureau of Indian Affairs (BIA), or a third party:

No. of Stations	Cooperator	Contact
2	Passamaquoddy Tribe	Contact: Robert Lent, Maine, 207-622-8201, rmlent@usgs.gov
2	Seminole Tribe of Florida & South Florida Water Management District (includes 2 continuous recorders with Tribal nutrient autosamplers)	Contact: Mitch Murray, Florida, 305-717-5827, mmurray@usgs.gov
1	Keweenaw Bay Indian Community	Contact: Tom Weaver, Michigan, 906-786-0714, tlweaver@usgs.gov
2 1 1 1 1 1	Sokaogon Chippewa, Mole Lake Band Bad River Band of Lake Superior Chippewa Indians Menominee Indian Tribe of Wisconsin Oneida Tribe of Wisconsin Mohican Nation, Stockbridge-Munsee Band Lac du Flambeau Band of Lake Superior Chippewa Indians	Contact: Rob Waschbusch, Wisconsin, 608-821-3868, rjwaschb@usgs.gov
2 3	Prairie Island Indian Community Bois Forte Band of Chippewa	Contact: James Fallon, Minnesota, 763-783-3255, jfallon@usgs.gov
2	Three Affiliated Tribes	Contact: Doug Emerson, North Dakota, 701-250-7402, demerson@usgs.gov
5 3 1 1 5 3	Bureau of Indian Affairs Oglala Sioux Tribe Standing Rock Sioux Tribe Sisseton-Wahpeton Sioux Tribe Rosebud Sioux Tribe Lower Brule Sioux Tribe	Contact: Ralph Teller, South Dakota, 605-355-4560 ext. 222, rwteller@usgs.gov
1	Citizen Potatwatomi Nation	Contact: Robert Blazs, Oklahoma, 405-810-4419, rblazs@usgs.gov
2 9 7 4 11 3	Fort Peck Assiniboine and Sioux Tribes Confederated Salish and Kootenai Tribes Blackfeet Nation Northern Cheyenne Tribe Bureau of Indian Affairs Chippewa Cree Tribes of the Rocky Boy's Reservation	Contact: Wayne Berkas, Montana, 406-457-5900, wrberkas@usgs.gov
17	Tribal Water Engineer through the Joint Business Council of the Northern Arapaho and Eastern Shoshone Tribes (Wind River Reservation)	Contact: Bob Swanson, Wyoming, 307-778-2931, rswanson@usgs.gov
2 1	Southern Ute Indian Tribe Ute Mountain Ute Tribe	Contact: Bob Boulger, Colorado, 970-245-5257 ext. 21, rboulger@usgs.gov

Surface-Water Monitoring Stations - Continued

No. of Stations	Cooperator	Contact
5 2	Bureau of Indian Affairs Pueblo of Zuni	Contact: Michael Roark, New Mexico, 505-830-7954, mroark@usgs.gov
1 4	Nez Perce Tribe Bureau of Indian Affairs (BIA)	Contact: Thomas S. Brennan, Idaho, 208-387-1366, tbrennan@usgs.gov
1 3 1 2 2 3 6 1 2	Bureau of Indian Affairs & Peabody Coal Co. (Navajo Reservation) Bureau of Indian Affairs & Peabody Coal Co. (Hopi Reservation) Arizona Department of Water Resources (Navajo Reservation) Hopi Tribe Havasupai Tribe Hualapai Tribe Yavapai-Prescott Indian Tribe (2 continuous records and 4 crest-stage gages) Tohono O'odham Nation Pueblo of Zuni	Christopher Smith, Arizona, 520-670-6671 x251, cfsmith@usgs.gov
3 10 1 1	Pyramid Lake Paiute Tribe Walker River Paiute Tribe Summit Lake Paiute Tribe Shoshone-Paiute Tribes	Contact: Kerry Garcia, Nevada, 775-887-7659, ktgarcia@usgs.gov
4 2 1 1 1 1 1 7 2 1 6 7 2 1	Confederated Tribes and Bands of the Yakama Nation Nisqually Indian Tribe Quinault Indian Nation Makah Nation Quileute Tribe Coeur d'Alene Tribe Skokomish Tribe of Indians The Tulalip Tribes Spokane Tribe of Indians Nooksack Indian Tribe Lummi Nation Confederated Tribes of the Umatilla Indian Reservation Jamestown S'Klallam Tribe Bureau of Indian Affairs	Contact: Robert Kimbrough, Washington, 253-428-3600 x2608, rakimbro@usgs.gov
11 1	Confederated Tribes of the Warm Springs Reservation Nez Perce Tribe	Contact: Thomas A. Herrett, Oregon, 503-251-3239, herrett@usgs.gov
7 2 2	Hoopa Valley Tribe Karuk Tribe of California Tule River Tribe	Contact: Robert Mason, California, 916-278-3178, rrmason@usgs.gov
1 1 3	Haida Corporation Central Council of the Tlingit and Haida Indian Tribes of Alaska Alaska Native Tribal Health Consortium	Contact: David F Meyer, Alaska, 907-786-7141, dfmeyer@usgs.gov

Water-Quality Monitoring Stations. The USGS collects water-quality data at the following sites:

No. of Stations	Cooperator	Contact
4 4 4	Three Affiliated Tribes (lake sites) Spirit Lake Nation (ground-water wells) Turtle Mountain Band of Chippewa Indians (lake sites)	Contact: Doug Emerson, North Dakota, 701-250-7402, demerson@usgs.gov
5 6	Prairie Band of Potawatomi Nation (surface-water sites) Prairie Band of Potawatomi Nation (wells)	Contact: Jim Putnam, Kansas, 785-832-3573, jputnam@usgs.gov
2	Southern Ute Indian Tribe	Contact: Bob Boulger, Colorado, 970-245-5257 ext. 21, rboulger@usgs.gov
3	Crow Tribe of Indians	Contact: Lori Tuck, Montana, 406-457-5900, ltuck@usgs.gov
6	Wind River Environmental Quality Commission through the Joint Business Council of the Eastern Shoshone and Northern Arapaho Tribes (Wind River Reservation)	Contact: Bob Swanson, Wyoming, 307-778-2931, rswanson@usgs.gov
1 4	Pyramid Lake Paiute Tribe Walker River Paiute Tribe	Contact: Kerry Garcia, Nevada, 775-887-7659, ktgarcia@usgs.gov
4	Yavapai-Prescott Indian Tribe	Contact: Christopher Smith, Arizona, 520-670-6671x251, cfsmith@usgs.gov
2	Karuk Tribe of California	Contact: Robert Mason, California, 916-278-3178, rrmason@usgs.gov

Ground-Water Monitoring Stations. The USGS operates the following groundwater monitoring stations:

No. of Stations	Cooperator	Contact
1 4 6	Collection of Basic Records (CBR) program (observation well located on Kaibab Band of Paiute Indians' Reservation) Yavapai-Prescott Indian Tribe Bureau of Indian Affairs (Navajo Nation and Hopi Tribe)	Contact: Christopher Smith, Arizona, 520-670-6671, ext. 251, cfsmith@usgs.gov
15 3 6	Pechanga Band and Morongo Band of Mission Indians (wells for monthly depth to water) Pechanga Band and Morongo Band of Mission Indians (continuous record wells) Pechanga Band and Morongo Band of Mission Indians (wells for annual water quality)	Contact: Robert Mason, California, 916-278-3178, rrmason@usgs.gov

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

No. of Stations	Cooperator	Contact
1	Wind River Environmental Quality Commission through the Joint Business Council of the Eastern Shoshone and Northern Arapaho Tribes (Wind River Reservation)	Contact: Bob Swanson, Wyoming, 307-778-2931, rswanson@usgs.gov
3 1	Hopi Tribe Pueblo of Zuni	Contact: Christopher Smith, Arizona, 520-670-6671, ext. 251, cfsmith@usgs.gov

General Coordination

General Coordination

Intertribal GIS Council. The Federal Geographic Data Committee provided its customary support to the Intertribal GIS Council conference in Billings, Montana in June 2001. The conference attracted 300 participants. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

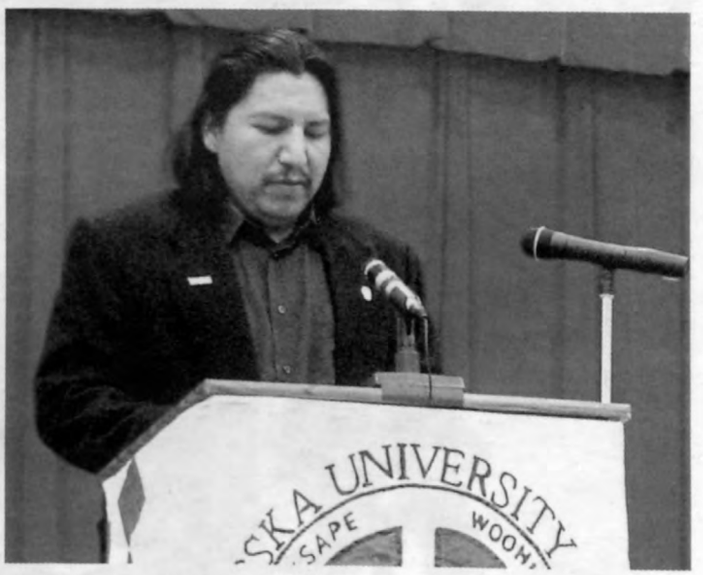
Rural Geospatial Innovations in America (RGIS). The Federal Geographic Data Committee (FGDC) recently approved a memorandum of Agreement (MOU) with Rural Geospatial Innovations in America to assist Tribal, State, regional, and local governments in implementing advanced geospatial information technologies to improve the quality of life, environmental health, and economic competitiveness of rural communities. Efforts in implementing the MOU include: technical assistance in system development and management to Tribal colleges and universities; training programs, including K-12 education, short courses, and university curricula; and advanced spatial analysis for decision-making processes. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Annual Meeting of the Native American Fish and Wildlife Society. The information specialist with the USGS Forest and Rangeland Ecosystem Science Center staffed a USGS display at the Annual Meeting of the Native American Fish and Wildlife Society in Lincoln City, Oregon, in May 2001. Information about scientific studies being conducted in all parts of the USGS was distributed at the display. Contact: Ruth Jacobs, 541-750-7304, ruth_jacobs@usgs.gov

Coordination with Tribal Organizations in Michigan. USGS and Bureau of Indian Affairs (BIA) staff visited Inter-Tribal Council of Michigan and Tribal environmental staff members from Bay Mills Indian Community, Sault Ste. Marie Tribe of Chippewa Indians, Keweenaw Bay Indian Community, and Hannahville Indian Community in June 2001 to discuss availability of BIA grant money and USGS technical support for resolving Tribal water issues. USGS staff attend quarterly Michigan Tribal Environmental Group (MTEG) meetings. The Michigan Tribes, Inter-Tribal Council of Michigan, U.S. Environmental Protection Agency (EPA) Region 5, USGS, U.S. Department of Agriculture, State of Michigan, and other groups and agencies are represented in MTEG. MTEG meetings provide a forum for environmental issues pertinent to Michigan Tribes. The USGS also participates in quarterly Multi-Federal Agency Memorandum of Understanding (MOU) meetings sponsored by the Midwest Region Office, Bureau of Indian Affairs. Federal agencies participating in the MOU workgroup include the BIA, USGS, Indian Health Services, Army Corps of Engineers, and EPA, which meet to cooperatively plan and coordinate Federal-Tribal activities in EPA's Region 5. Contact: Tom Weaver, 906-786-0714, tlweaver@usgs.gov

Ho Chunk Nation Participates in USGS Program Review. Two members of the Ho Chunk Nation's Department of Natural Resources attended parts of the USGS Upper Midwest Environmental Science Center's Strategic Program Review, which was held April 2001 in La Crosse, Wisconsin. USGS involves external partners in these 5-year Strategic Reviews to ensure that products and information are timely and relevant to USGS customers, and released in readily accessible formats. Contact: Linda M. Ott, 608-781-6264, Linda_Ott@usgs.gov

GIS Multi-Agency Forum. The USGS invited representatives from the BIA, Federal Geographic Data Committee, National States Geographic Information Council, and State and Tribal representatives from South Dakota, Iowa, Nebraska, Wyoming, Minnesota, North Dakota, and Montana to coordinate, organize, share GIS information and data, and plan multilateral studies. The meeting was held at the USGS' EROS Data Center in South Dakota in August 2001. The next meeting is scheduled to be held in Montana to continue this work. USGS Contact:Eugene Napier, 605-594-6088, enapier@usgs.gov; Sinte Gleska Contact: James Rattling Leaf, jamesrl@sinte.edu



James Rattling Leaf, Rosebud Sioux Reservation, Mission, South Dakota.
Photographer: Carrie Jucht

Osage-Skiatook Petroleum Environmental Research Project Field Conference. USGS scientists led the Osage-Skiatook Petroleum Environmental Research Project Field Conference in Tulsa and on Skiatook Lake in November 2000. The conference was held to initiate research on the transport, fate, and biologic effects of produced water and hydrocarbon releases from oil production at two sites on Skiatook Lake. Participants included the Osage Nation, U.S. Department of Energy, U.S. Environmental Protection Agency, Bureau of Indian Affairs, U.S. Army Corps of Engineers, University of Tulsa, Oklahoma State University, University of Oklahoma, and USGS research scientists from Oklahoma, Virginia, Colorado, and California. Contact: Jim Otton, 303-236-8020, jkotton@usgs.gov

Missouri River Natural Resources Conference. The 5th Annual Missouri River Natural Resources Conference was held in Great Falls, Montana, in June 2001. The USGS, the Missouri River Natural Resources Committee, and the Missouri River Basin Association have co-sponsored past conferences. Co-sponsors for the 5th Conference also included the Blackfeet Nation, Chippewa Cree Tribes of the Rocky Boy's Reservation, Assiniboine Tribe (Fort Belnap), Gros Ventre Tribe, and Fort Peck Assiniboine and Sioux Tribes. Providing the First Nations' perspective of the Missouri River during the plenary session was Curly Bear Wagner, Going-To-The-Sun Institute, Browning, Montana. Several Native Americans participated in the conference organizing committee, organized social events highlighting Native culture, and made Conference presentations. Native Americans actively participate in this conference particularly when it is held in the upper basin. Contact: Jeanne Heuser, 573-876-1876, jeanne_heuser@usgs.gov
Website for Missouri River science information: http://infolink.cr.usgs.gov

Yukon River Inter-Tribal Watershed Council. The USGS is coordinating the Yukon Basin study, part of the National Stream Quality Accounting Network, with the Alaska Natives and First Nations along the river in both Alaska and Canada. As part of this coordination effort, USGS personnel have met several times with Yukon River Inter-Tribal Watershed Council, and the Alaska District Chief attended the "Yukon River Summit" at Brooks Brook, Yukon Territory in Canada in August 2001. Contact: Gordon Nelson, 907-786-7100, glnelson@usgs.gov

Navajo children helped USGS with water analyses at the Castle Butte Spring. The hypodermic needles are used to filter water samples, but also make great squirt guns. Analyses showed that the water has more than six times the EPA recommended limit for arsenic. The community was notified and people are using alternate water source. Photo by George Breit.

Future Opportunities

Future Opportunities

Intertribal GIS Council (IGC). The Intertribal GIS Council and the USGS, through its support of the Federal Geographic Data Committee (FGDC), intend to co-sponsor and assist in planning the 2002 IGC Annual Conference. The FGDC has co-sponsored this event for the last several years and plans to continue these efforts in the future. Activities with the IGC in FY2002 include producing an updated directory of GIS courses and programs offered at Tribal colleges and universities, creating scholarship and student intern programs, and updating tribal boundaries in coordination with the U.S. Environmental Protection Agency (EPA) and the FGDC. The FGDC, IGC, EPA, and USGS are also exploring opportunities to update Tribal boundary maps through an existing Memorandum of Understanding. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

The Bureau of Indian Affairs (BIA) and the National Native American Law Enforcement Association (NAALEA). The BIA, NAALEA, and USGS, through its support of the Federal Geographic Data Committee (FGDC), are coordinating for the upcoming NAALEA Annual Conference which will include presentations on FGDC, crime mapping, and updates on the National Institute of Justice. Opportunities will be explored to institutionalize GIS and crime mapping into the BIA's Police Academy. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Tour Opportunity. USGS Upper Midwest Environmental Science Center personnel spoke with a representative of the Ho Chunk Nation's Department of Natural Resources about providing a tour of the Center for his staff and discussions of possible interactions in the future. The USGS intends to invite the U.S. Fish and Wildlife Service to participate in discussing how the Federal bureaus can jointly assist the Ho Chunk with tribal fisheries management issues. The proposed May 2001 meeting encountered scheduling problems. The USGS is continuing discussions to reschedule this meeting. Contact: Michael Dewey, 608-781-6206, Michael_Dewey@usgs.gov

Black River Falls, WI, School District. The USGS Upper Midwest Environmental Science Center is pursuing a partnership between the Center and the School District of Black River Falls, Wisconsin. Contact: Michael Dewey, Upper Midwest Environmental Science Center, 608-781-6206, Michael_Dewey@usgs.gov

GIS Workshops Planned. Sinte Gleska University (SGU) and the USGS began planning a series of workshops designed to increase the ability of educators to use geographic information systems (GIS) technology in the classrooms. The first workshop was held at the National Indian Education Association conference in October 2001. The second workshop, scheduled for the American Indian Science and Engineering Society conference in Albuquerque, New Mexico, was held in November 2001. The SGU-USGS team is also planning a series of workshops at SGU during 2002 for elementary, secondary, and university educators. During the workshops, educators will have the opportunity to explore watersheds, landforms, population, ethnicity, age, land use, natural hazards, agriculture, and other issues of cultural and physical geography. They will do this by examining historical and current ground and aerial photographs, digital maps, sounds of tribal ceremonies, satellite images, tables, and charts. Through the use of GIS, teachers and students have the opportunity to investigate real-world data in a problem-solving environment, utilizing the same tools and techniques that Tribal planners, wildlife biologists, and other professionals use on the job. USGS Contact: Joseph Kerski, 303-202-4315, jjkerski@usgs.gov; SGU Contact: James Rattling Leaf, jamesrl@sinte.edu

Geographic Information in the Four Corners Region. Along with other Federal, State, and academic partners in the Colorado Plateau Data Coordination Group, USGS scientists participated in planning a workshop for Four Corners area Tribal users of geographic information systems to provide information about: GIS training and data sharing/partnership opportunities; Navajo Nation Data Resource Center; regional GIS involvement; Tribal and regional pilot projects; Federal and academic GIS projects and research; and presentation of a Colorado Plateau "Information Team" concept. Contact: David M. Vincent, 801-975-3435, dmvincent@usgs.gov

Technical Oversight of Hydrologic Investigations on Lands of the Lummi Nation. The Bureau of Indian Affairs is assisting the Lummi Nation in investigations to determine the ground-water resources on the Reservation available for the Lummi's use. Private consulting firms under contract to BIA are conducting these investigations. Because the results of these investigations may be important to potential legal actions, BIA would like an independent peer review of the work conducted. The USGS has provided a project proposal to BIA to conduct these reviews. An agreement has not yet been finalized relative to this work. Contact: Brian Drost, 253-428-3600 ext.2642, bwdrost@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. Please contact any of the individuals listed below for more information or to discuss questions or concerns.

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