

# Community-Based Drinking Water Quality Analysis



A partnership between  
Gorno-Altai State University and  
Haskell Indian Nations University



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Gorno-Altai State University and  
Haskell Indian Nations University

## Final Report

prepared for the  
U.S. Agency for International Development/  
Association Liaison Office

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Lawrence, Kansas

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## GLOSSARY OF TERMS

ALO—Association Liaison Office

ARIOS-Kansas—Kansas branch of the Russian-American Association for the Development and Integration of Educational Systems

CINS—Center for Indigenous Nations Studies, University of Kansas

CRESS—Center for Russian and East European Studies, University of Kansas

GASU—Gorno-Altai State University

HINU—Haskell Indian Nations University

IUCN—World Conservation Union

KSU—Kansas State University

KU—University of Kansas

NAGPRA—Native American Grave Protection and Repatriation Act

NEH—National Endowment for the Humanities

NSEP—National Security Education Program

NSF-UMEB—National Science Foundation Undergraduate Minorities in Environmental Biology

UNESCO—United Nations Educational, Scientific, and Cultural Organization

USAID—U.S. Agency for International Development

USDA—U.S. Department of Agriculture

USIA—U.S. Information Agency

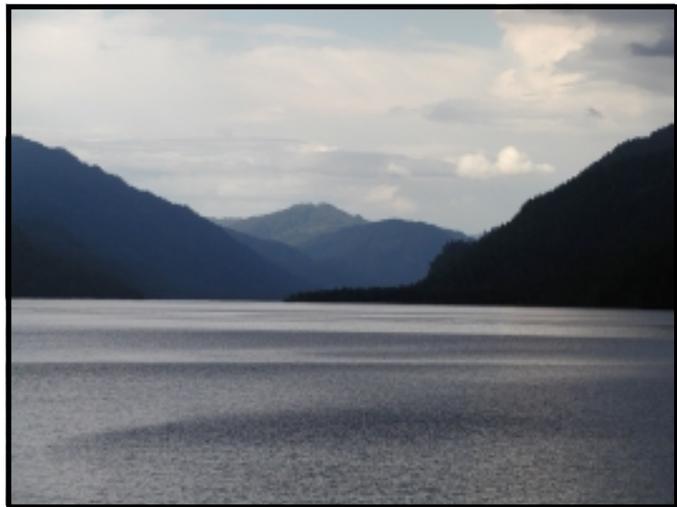
# INTRODUCTION

*by Nikolai Malkov*

The first stage of the joint Russian-American project to organize water quality monitoring in the Altai Republic and the state of Kansas has been finished. What are the results?

The problem of water quality exists both in Kansas and in the Altai. Naturally, there are differences in the acuteness of the water supply problem of these two regions because of different natural conditions. The Altai Republic, being a mountainous region, has richer resources of fresh drinking water than Kansas. These are represented by glaciers, mountain lakes, and rivers. The hydrosystem of the Altai feeds a huge basin of the great Siberian river, Ob, that brings water resources to western Siberia. Thus, the people living in the Altai Mountains bear a special responsibility to the population in the plains. Five UNESCO World Heritage Sites were identified in the territory of the Altai Republic, each of which has rich resources of clean water: Lake Teletskoe, with a water area of 223 square km and a water volume of over 40 cubic km; Mt Belukha, with a glacier area of 150 square km; the Zone of Rest on the Ukok Plateau, with many large, alpine fresh water lakes; and the Altai and Katun State Reserves, with mountain glaciers and a wide net of white water rivers.

In connection with the special natural conditions and the importance of water resources in the Altai Republic, the research in this region received much more attention than the research in the state of Kansas. During this project, American specialists, Cynthia Annett and Wendy Griswold, with their Russian colleagues, Victor Lukyanenko and Nikolai Malkov, studied the water quality of many reservoirs and water sources in all five sites of the UNESCO World Heritage List in the Altai Republic. Among other Americans who did research in the Altai were Daniel Wildcat, George Godfrey, Mikhail Korenman, and students of the Haskell Indian Nations University. The Russian side was represented by the rector of Gorno-Altai State University, Yuri Tabakaev; senior researcher of the Russian Academy of Sciences, Alexander Golubtsov (Moscow); senior lecturer of the Gorno-Altai State University, Vera Aleinikova; and students of this university.



Lake Teletskoe is one of five UNESCO World Heritage Sites located in the Altai Republic.

Wide coverage of the joint Russian-American research in the Russian mass media was very helpful in involving different layers of the population of the Altai Republic, from ministers of the local government and members of Parliament, to rank-and-file citizens. This involvement leaves hope that laws on water resources will further develop, and that measures will be taken to raise the quality of drinking water and keep the water resources of the Altai Republic clean.

It is of great importance that the method of water quality testing and immediate analysis is easy to master, and that it can be used by wide layers of the population. One example of this is that school students of the

Ongudai district were able to use the testing and analysis method after training in field conditions. It is also important that the number of participants increased both in Kansas and the Altai during the course of the project. As a result of constant communication, the mutual understanding of common problems has grown into a strong friendship that is of value on a par with the practical results of the project.

The next stage of our joint work should be spreading our successful experience in organizing the monitoring of drinking water quality to other regions of Russia, the USA, and other countries, in order to create global monitoring of the water resources of our common planet—Earth.

A handwritten signature in black ink, appearing to read 'N. Malkov', with a stylized flourish at the end.

Nikolai Malkov  
Gorno-Altai State University  
USAID/ALO Project Director

## PROJECT ACTIVITIES

In 1999, Gorno-Altai State University (GASU), Haskell Indian Nations University (HINU), Kansas State University (KSU), and the University of Kansas (KU) joined together to create a partnership to address water quality issues common to both the Russian Federation and the U.S. With initial funding from the U.S. Agency for International Development/Association Liaison Office, the partners began engaging in exchange activities to develop a model program for community-based drinking water quality monitoring in remote villages in the Altai Republic of Russia, which would be culturally relevant to indigenous populations living in remote areas.

During the past three years, the partnership has provided training to Russia and U.S. partner institution participants in scientifically rigorous water quality assessment methodology, and in capturing and interpreting traditional ecological knowledge. It has also provided training modules suitable for use by elementary and secondary schoolteachers and community groups who will form a water quality monitoring network in the Altai Republic.

This project initiated a technical environmental extension capacity at GASU, and provided the first international student and faculty exchange opportunity for HINU.

### Phase I (October 1999-September 2000)

Goals for Phase I of the project were to begin developing institutional capacities for student exchanges, initiating faculty exchanges, and identifying appropriate methods and tools for initiating a community-based drinking water quality analysis program.

In December 1999, Cynthia Annett and Wendy Griswold (representing the U.S. partner institutions) traveled to the Altai Republic to work with their partners at GASU to begin implementing the project. During their visit, they engaged in a number of activities aimed at increasing the contribution of faculty and students at GASU to sustainable development in the Altai Republic. Faculty from the chemistry department at GASU met with Dr. Annett to discuss the incorporation of existing data into the program.

A series of meetings was held with the mayor and vice mayor and faculty and administrators from GASU. It was agreed that the city of Gorno-Altai would participate in our project and that results of the water quality monitoring would be incorporated into the decision-making framework for economic development. Mayor Victor Oblogin voiced his concerns about air pollution and other environmental problems associated with local industries. Many of these issues were also presented in newspaper interviews in the local press.

GASU representatives Victor Lukyanenko and Nikolai Malkov visited the U.S. partners in July 2000. The partners spent a week at HINU resulting in 1) a draft outline of the training course, 2) outlines of the physical products of the project, and 3) task assignments and timelines for developing and executing the training course in summer



Nikolai Malkov and Yuri Tabakaev meet with Wendy Griswold and Cynthia Annett to begin implementation of the project in December 1999.



Dan Wildcat, HINU; Victor Oblogin, mayor, Gorno-Altai; and George Godfrey, HINU, in March 2001. During this meeting, a rug and blanket were exchanged, which is representative of a traditional ceremony for beginning a partnership between HINU and the Altai Republic.

Phase I when approximately 100 second-year students of the biology and chemistry department were given a description of the project in November 1999 to learn about requirements needed for their participation. One month later, they had the opportunity to meet representatives from U.S. partner institutions and ask questions about the project. These representatives also had a meeting with students from the languages department, describing goals of the project.

During Phase I, the application process for selecting Haskell students to participate in the summer 2001 exchange activities was initiated. Potential student participants in the exchange were required to enroll in spring and fall semester courses targeted at expanding their knowledge of Russian and Siberian history, ecology, culture, and language. Students engaged in activities such as researching and reporting on Russian current events, initiating communication with their fellow students at GASU via pen pal letters, and reading and discussing a variety of topics, including economics, environmental issues, and health. Students were encouraged to contrast and compare their lives with that of Russians in general and indigenous Altaians in particular. A committee to review and rank student applications for participation in the exchange program was formed. Application guidelines were distributed to the students enrolled in the spring and fall courses.

## Phase II (September 2000-August 2001)

Project goals for Phase II of the project included further development of methods and tools for initiating a community-based drinking water quality analysis program, and facilitating the first exchange visit of Haskell faculty and students to the Altai Republic.

2001. The partners were able to meet with the associate to the president of Kansas State University, the dean of international programs at the University of Kansas, and the executive vice president of HINU to discuss program development and future funding goals.

Representatives from all partner institutions attended the *Higher Education and USAID: Synergy in Development 2000* conference in Washington, D.C. Victor Lukyanenko of GASU and Dan Wildcat of HINU presented an overview of the project and jointly discussed goals of the Russian and American partner institutions, particularly with regard to Native American and indigenous Siberian world views. While in Washington, the partners also met with representatives of the GLOBE program to discuss the possibility of setting up a franchise at the partner institutions, met with USGS representatives to discuss funding opportunities, and met with a representative of the Environmental Protection Agency to explore supplementing the ALO project with EPA funding.

During summer 2000, Dr. Annett from KU/HINU traveled to GASU to help further the development of linkages between the partners and rural villages in the republic, and to meet with officials from the republic government and the city of Gorno-Altai.

The student selection process was initiated at GASU during

Cynthia Annett (KU/HINU), Wendy Griswold (KSU), Dan Wildcat (HINU), and George Godfrey (HINU) visited GASU in March to work with Victor Lukyanenko and Nikolai Malkov to plan the summer 2001 exchange. In addition to developing an itinerary for the student exchange, the partners advanced development of training materials and planning of water quality workshops. The partners visited the Republican National Gymnasium in Gorno-Altai (an elementary school with an Altaian language curriculum) and held discussions with the first deputy head of the republic, Yuri Vasilievich Antaradonov, about the potential for enlisting the Altaian language schools in the water quality monitoring program.

During Phase II, 15 students of the biology and chemistry department at GASU took an additional course in English language and American Culture. Students were required to write essays on environmental issues. A faculty committee selected four of them for participation in the summer 2001 field work with American students, and all the students had a chance to communicate with the Haskell students when they worked in Gorno-Altai. A number of language students helped with communication during the summer 2001 trip.

The Haskell student-selection process for the summer 2001 exchange was completed during Phase II. A committee to review and rank student applications for participation in the exchange program chose five students and two alternates from the students enrolled in a required course, American Indian Studies 390. Using newly obtained funds from the U. S. Department of Agriculture (USDA) (see Appendix C), the two alternates were fully funded to participate in the exchange program. Funds from the USDA grant also provided stipends for two student participants, increasing our capacity for scientific analysis of the water quality data collected during the course of the project. In addition, a National Endowment for the Humanities (NEH) grant (see Appendix C) provided an additional student stipend to work with Mike Cuenca, a specialist in photojournalism and Web site development. Glen Gary, a Haskell student, created a digital archive with more than 1,000 images from the trip, which will be incorporated into the NEH-funded World Geography Web site.



U.S. students Stefanie Reyna, Tina Scott, Sheldon Selwyn, Marei Spaola, Dustina Edmo, Glen Gary, Jennifer Ivie, and Krystale Head with Nikolai Malkov and Yuri Tabakaev, GASU.

Discussions were initiated between the partners and representatives of the ARIOS-Kansas project. ARIOS-Kansas is the Kansas branch of the Russian-American Association for the Development and Integration of Educational Systems, and was created under the auspices of a signed Memorandum of Understanding between the state of Kansas and the Oblast of Voronezh, following a visit to Kansas in December 1994 by the Russian Federation Minister of Education, Dr. Evgeny Tkachenko. During the past eight years, Kansas and Voronezh, Russia, have developed an exchange of elementary and secondary school teachers and students, and have created a semester-long curriculum currently in use in both Kansas and Voronezh schools. The *Kansas-Voronezh Connection: Our Water Heritage* curriculum was initially developed and pilot-tested between Kansas and Voronezh in 1998-2000 under sponsorship of the U.S. Information Agency (USIA) and Eisenhower grants to Kansas State University. Copies of the curriculum in both the English and Russian languages were provided to GASU for adaptation for use in schools in the Altai Republic. Mikhail Korenman of ARIOS-Kansas and Bethany College in Kansas joined the partners

in the Altai Republic during the summer 2001 exchange and helped to train Russian and American participants in water quality analysis.

Using funds from the U.S. Environmental Protection Agency (see Appendix C), the partners were able to purchase water quality testing kits appropriate for elementary and secondary school use. Twenty-seven kits were taken to the Altai during Phase II of the project for use during student training, and for limited distribution and use in the republic's schools.

Two faculty (George Godfrey, Potawatomi; Dan Wildcat, Euchee) and seven students (Dustina Edmo, Shoshone; Glen Gary, Lakota; Krystale Head, Cherokee; Stefanie Reyna, Taos Pueblo; Tina Scott, Creek; Sheldon Selwyn, Nakota; and Marei Spaola, Lakota) from HINU participated in the summer 2001 exchange.

The HINU faculty and student delegation were joined in the Altai Republic by Jennifer Ivie (Chickasaw), a KU graduate student who was working at GASU with funding from a National Security Education Program (NSEP) graduate fellowship (see Appendix C). One of the goals of the USAID/ALO and EPA-sponsored program is to develop an understanding of the linkages between water quality degradation and health, which formed the basis for Ms. Ivie's NSEP application. Ms. Ivie is working with Anne Calhoun (KU) to compile and analyze data collected by Dr. Tatiana Lukyanenko, a faculty member at GASU, to further this goal. Ms. Ivie worked closely with the HINU undergraduates during their stay in the republic.

Significant progress was made during the summer 2001 exchange in structuring formal relationships between individuals and departments of the partner universities. George Godfrey, vice president for academic affairs, and Dan Wildcat, HINU, met with the rector of GASU to discuss details of the university affiliation program and introduce the seven Haskell students to the rector. GASU faculty and students worked closely with the Haskell group, providing language instruction in addition to collaborating on scientific and cultural projects. Additionally, Mikhail Korenman from Bethany College and Kansas State University established ties with Vera Aleinikova, dean of the chemistry and biology department at GASU. Dr. Korenman agreed to host members of the GASU chemistry program in summer 2002 in order to analyze water samples from the Altai Republic in his state-of-the-art analytical chemistry lab. Dr. Korenman also provided GASU with several sets of instruments for testing water quality in the field, significantly increasing the capacity of GASU for monitoring water quality in the Republic.



Marei Spaola, HINU, collects a water sample from Lake Teletskoe during summer 2001.

During the field work, the group collected water samples from Altai National Park water sources. They spent three days in the field and were joined by a group of approximately 70 high school students from all over the republic who were attending an environmental camp. Samples of water were collected from the local river, streams, and other natural sources of water. The tests were done immediately after the samples had been collected. All water sources were found to be very clear (most of them were taken from mountain sources). Results of the tests were given to representatives from the local natural reserve. Three chemistry kits were also left for the reserve to use for future tests. Similar water sampling and

testing was done at water sources such as Lake Teletskoe, springs and wells in surrounding regions, and within the city of Gorno-Altaiisk.

While in the Altai Republic, in addition to field trips which conveyed useful information regarding the ecological and geographical diversity of the region, the HINU delegation had the opportunity to take advantage of five research opportunities/resources useful in exploring the cultural component of this USAID-funded exchange program: 1) interviews were conducted with their Russian language instructor at GASU, an Indigenous Altaian woman, regarding symbolic, material, and non-material culture features of the Indigenous Altai peoples; 2) three visits were made to the Altai Republic Museum in Gorno-Altaiisk to study their indigenous Altai exhibits and examine their collection of cultural artifacts; 3) interviews were conducted with two indigenous Altai scholars at the Altai Studies Research Center in Gorno-Altaiisk; 4) a visit was made to a national reserve/ park, where interviews were conducted with the indigenous superintendent of the reserve/park. In addition, at the national reserve/park, all members of the HINU group had the opportunity to meet children and teachers from the Altai Republic and neighboring republic schools; and 5) Dan Wildcat visited the indigenous Altai collection at the republic's state library.

Other exchange activities included the following:

- Haskell and GASU students viewed and discussed a video of the movie “Smoke Signals.”
- Haskell faculty and students gave a cultural presentation at the Altai language gymnasium to an audience of 70+ students and teachers.
- HINU and GASU partners attended an Altaian cultural festival and viewed displays of indigenous cultures.
- Haskell students and faculty performed Native American dancing and traditions at the Altaian cultural festival.
- When traveling to the Ongudai Region, the delegation received a traditional welcome at Seminski Pass and attended a cultural presentation at the Altai National Park, which focused on traditional Altaian stories and songs.

During summer 2001, Vera E. Mel'chenko, the scientific deputy director of the Katunsky Reserve, requested that Drs. Malkov and Annett conduct a workshop on water quality and management of aquatic resources at the Katunsky Biosphere Reserve, part of the new World Heritage Site in the Altai established by IUCN/UNESCO under the World Heritage Convention for both cultural and natural resource values. Alexander Golubtsov of the Russian Academy of Sciences Severtsov Institute in Moscow, who worked with Drs. Malkov and Annett to assess the health of the fisheries and discuss water quality and fisheries management issues with reserve staff, joined the project.

### **Phase III (October 2001-September 2002)**

Results of the water quality analyses conducted during Phase II of the project were presented by Victor Mamrashev, GASU student, in the Ecological-Biosphere Competition instituted among universities of the Siberian Region in Novosibirsk during the spring of 2002. Mr. Mamrashev presented an overview of the ALO project and data from the field work he conducted with the help of HINU students during the summer of 2001 (see Appendix D). The meeting was attended by representatives from 11 universities, and GASU was awarded sixth place in the competition.



Yuri Tabakaev, GASU rector, addresses the HINU 2002 graduating class.

The student-selection process at GASU was concluded during the fall when four biology and chemistry students, one language student, and one alternate language student were selected to participate in the exchange during Phase III. Among requirements for the students were active participation in the scientific work of the department; good language skills; ability to work in a group; and communication skills. Two of the biology students were unable to participate in the exchange because of family and health problems, so the alternate language student was added to the final list.

During May 7-30, 2002, four faculty and administrators and four students from GASU visited their Kansas partners at four educational institutions, Haskell Indian Nations University, the University of Kansas, Bethany College, and Kansas State University. Participants in the exchange were Yuri Tabakaev, rector; Victor Lukyanenko, dean, foreign languages, director, international programs; Nikolai Malkov, biology professor; Vera Aleinikova, dean, chemistry and biology department; and students Oxana Kolbeshkina, biology; Victor Mamrashev, chemistry; Maria Usova, languages; and Julia Mekechinova, languages.

During the group's visit to Haskell, they participated in activities that allowed them to explore connections between traditional belief systems of North American native peoples and indigenous Siberians, and how traditional knowledge can be used to inform scientific studies of environmental problems. Dan Wildcat led the group in an exploration of environmental issues relevant to many North American indigenous nations, including a tour of the Haskell wetlands and the Haskell medicine wheel. The wetlands are an important Haskell resource, used as an outdoor lab for science courses. The area also has spiritual significance for the Haskell community, and the medicine wheel is recognized nationally as a site of cultural significance to Native Americans.

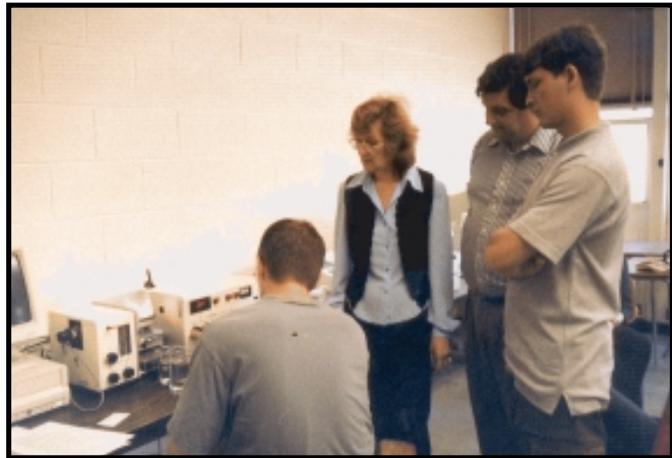
The group visited the University of Kansas, where they met with Dr. Maria Carlson, one of the principal investigators on the ALO grant and director of the Center for Russian and East European Studies (CREES). Possible funding mechanisms and programs for hosting GASU faculty and students at KU were discussed. Dr. Marc Greenberg, chair of the department of Slavic languages and literatures, and faculty from the Center for Russian and East European Studies met with the group to compare language instruction at GASU and KU. This meeting culminated in a tour of the Ermal Garinger Resource Center, conducted by the acting director, Jonathan Perkins. The group also met with staff from the International Programs office, Dean Diana Carlin and Associate Dean Paul D'Anieri. Dr. Jerry Mikkelson from CREES participated in a number of activities with the group, including providing a campus tour and introducing them to visiting Russian scholars who were in residence at KU. Dr. Mikkelson had traveled to the Altai Republic on a Fulbright Fellowship in 2001 and visited the Russian partners at GASU. He is internationally known for his work with the Siberian author Valentin Rasputin, and an essay on the conservation of the Katun River in the Altai Republic written by Rasputin (from *Siberia, Siberia*) and translated by Dr. Mikkelson was recently incorporated into a new book on the Altai Republic (*Album of the Altai Republic*, translated by Victor Lukyanenko). Dr. Mikkelson worked with HINU students throughout the project and helped with logistics of the 2001 exchange visit.

During their visit to KU, the director of the Center for Indigenous Nations Studies (CINS), Don Fixico, met with the group to explore future cooperation and cultural exchanges and discuss mutual interests in traditional knowledge and indigenous world views. Dr. Fixico invited the students and faculty from GASU to submit essays about their visit to Kansas to a journal published by CINS.

The group spent several days at Bethany College in Lindsborg, Kansas, and were hosted by Dr. Mikhail Korenman, a chemistry professor and director of international programs for Bethany College. Dr. Korenman worked with GASU students and faculty and two Haskell students in advanced water chemistry techniques, including an analysis of water samples from the Altai Republic and samples collected from the Smokey Hill River in Kansas. Faculty and students received training in using a portable water chemistry lab, and in software to collect and record data. In addition to being trained in water chemistry analysis, the group filmed a training video in Russian on use of a spectrophotometer and on how to use water quality test kits. Dr. Korenman also provided Dr. Aleinikova with teaching materials used in his chemistry classes.

The group also spent several days at Kansas State University in Manhattan, Kansas. During this time, faculty met with the dean of agriculture and representatives from the Agricultural Extension Program. Their discussions focused on potential collaboration regarding the impact of grazing on water quality, grazing land management, and resource management. Drs. Vera Aleinikova and Larry Erickson discussed the next steps for addressing water quality issues in the Altai Republic and developing educational programs in order to continue water quality work beyond the end of the ALO project.

One hundred water quality test kits were purchased with EPA grant funds and supplied to GASU for distribution to schools in the Altai Republic. Instructions for the test kits were translated into Russian (see Appendix E) by GASU language students. The instructions will be supplemented by introductory material tailored to the GASU water quality monitoring program. The introduction will be in both the Russian and Altaian languages.



**GASU and Bethany College colleagues work on water analysis techniques during spring 2002.**

Cynthia Annett attended the Synergy in Development 2002 Conference sponsored by USAID/ALO. She presented a video documentary (see Appendix F) of the project at this event and also at the U.S. EPA International Programs Office. The video will be distributed by ALO and the Minority Serving Institutions Office at USAID.

## DEVELOPMENT OUTCOMES

This project initiated development outcomes at many levels, including institutional, community, and governmental.

### Institutional Capacity Building

#### *Gorno-Altai State University*

The scientific capabilities of GASU were significantly impacted by participation in this project. The chemistry and biology department received a donation of water quality analysis equipment from Bethany College during Phase II of the project. This equipment included three pH meters, three oxygen meters, three temperature probes, and three calculators. The equipment is used for on-site field sampling of water sources. Use of this equipment and water testing kits gives GASU the opportunity to test water quality on a regular basis, which they had not been able to do previously. In addition, a spectrophotometer will be purchased for GASU using funds provided by the EPA (see Appendix C). The spectrophotometer will allow GASU to do more scientific and more accurate tests at the university labs and during student field work.



**Dan Wildcat, HINU, delivered water quality analysis equipment to Vera Aleinikova, GASU, in summer 2001.**

In addition, the chemistry and biology department was provided with several publications focused on informing citizens about water quality. These publications included EPA documents from the Office of Water Quality such as “Private Drinking Water Wells,” “Total Maximum Daily Load Program,” “Water on Tap: A Consumer’s Guide to the Nation’s Drinking Water,” and “Drinking Water and Health: What You Need to Know.” A collection of past editions of the *Journal of Mountain Research in Development* were acquired by the department. This publication balances research on the world’s mountains with a commitment to sustainable mountain development. The university continues to receive new issues of the journal.

GASU has received equipment to assist in communication with partners, including a computer modem and a Webcam for video conferencing.

The capacity of the languages department at GASU has greatly increased as a direct result of its involvement with the project. There has been an increase in the number of courses taught, and their content has been modified as a result of new information received. Faculty at HINU donated approximately 20 books on Native Americans to

begin a library for the use by GASU students involved in the cultural studies program. Students have used these materials for thesis writing (see Quantitative Data section).

There have been many opportunities for English language students at GASU to gain direct experience in interpretation, as students have been involved as interpreters during each visit made by the U.S. partners to the Altai Republic. In addition, two language students joined the GASU delegation during their visit to Kansas in Phase III of the project. These students served as interpreters for the majority of project activities during the trip. While touring the language teaching facilities at KU, GASU faculty and students were

able to learn about new methods of teaching with the use of modern technology. They were also able to discuss how the capacity of the Ermal Garringer Language Laboratory at KU had been built, what sources of funding were used to obtain the existing equipment, and in what way the university had helped to develop this resource.

The project has allowed scholars outside the project scope to interact with the languages department at GASU. Jerry Mikkelson, professor of Slavic languages and literatures at KU, visited the Altai Republic as part of a Fulbright Fellowship in summer 2001. This visit was the result of Drs. Mikkelson and Lukyanenko having the opportunity to interact during the course of the ALO project. The relationship between Mikkelson and Lukyanenko has resulted in a Russian journal publication for Mikkelson and the incorporation of Mikkelson's previous translation work in a translated work by Lukyanenko. Dr. Mikkelson donated copies of his books and scholarly publications to the library at GASU. In addition, he presented the following lectures at GASU which have been tape recorded and incorporated into coursework at the university:

- “On the Importance of Translation” (in English), Languages Department, GASU (approximately 70 students and faculty in attendance)
- “Is Humor Translatable?” (in English), Languages Department, GASU (approximately 70 students and faculty in attendance)
- “Pushkin’s Poetry” (in Russian), Department of Philology, GASU (over 100 students and faculty in attendance)

The international programs office at GASU has benefited from its involvement in the project as before, the university’s international programs were mainly centered on local partners (Mongolia, Kazakhstan) or Europe (Belgium, France). Now they reflect a truly global perspective with the tremendous cultural potential of involvement with indigenous populations. In addition, during summer 2002 visits to Kansas, GASU’s international programs director, Victor Lukyanenko, had the opportunity to meet with his counterparts in the international programs offices at both KU and KSU.

GASU’s curriculum has been impacted with the addition of the following courses and course components:

- Nikolai Malkov teaches an ecology course in four departments (biology, agriculture, geography, and languages). Information from the water quality monitoring project has been incorporated into each course.
- Vera Aleinikova created a new course on water chemistry. Methods of field analysis using the test kits are taught in this course.
- Victor Lukyanenko introduced a special course on Native American culture in his general country study course using the materials, books, and artifacts donated from Haskell faculty.
- Victor Lukyanenko’s course on American Studies has become more efficient because of the tapes, videos, and artifacts (American flag, anthem, maps, books, etc.) obtained with the help of the project.
- The acquisition of “The Story of English” videos and books radically improved the language courses on theoretical grammar, phonetics, and lexicology.

## *Haskell Indian Nations University*

The World Geography course at Haskell has been heavily impacted as a result of faculty involvement in this project. During the 2001-2002 academic year, guest lecturers from Russia participated in this course, and even more importantly, lectures were presented by Haskell faculty and students who traveled to Siberia on the first international exchange. A Web site with funding from NEH (see Appendix C and [www.seekpeace.com/hinu/Global.html](http://www.seekpeace.com/hinu/Global.html)) based on this material to supplement the World Geography course was developed. Lectures presented by international visitors and the trips by Haskell personnel had led to a groundswell of interest in international exchanges among Haskell students. In addition, materials from the Altai Republic, including pictures, books, and an Altai Republic flag donated by the Ecoregion (investments committee) have been used in the classroom. Works of art by local sculptors and a traditional Altaian felt rug were donated to HINU by the mayor of Gorno-Altai for a cultural display.

The following two semester-long courses were developed and offered at Haskell during Phase II of the project. The intent of the courses was to prepare students to participate in student exchange activities with GASU. Participants in the exchange program were required to attend.

- AIS 390: Russian Culture and Community introduced students to Russian and Siberian culture, sociology, history, and current mainstream and ethnic events.
- AIS 391: Surviving Siberia focused on practical considerations for traveling in a foreign country, expanding student knowledge of current events in Russia, and practice in documenting exchange experiences. Tutoring in basic conversational Russian was provided to the students by KU's Center for Russian and East European Studies.

SLAV 512: Siberia Yesterday and Today, a semester-long course, was jointly offered by KU and HINU and taught by Jerry Mikkelson (KU) and Cynthia Annett (HINU) during Phase I of the project. Lectures for the class were presented by faculty from several institutions in the region, providing expertise on Siberian history, geography, literature, ecology, and ethnography. Students heard presentations from many perspectives on all aspects of Siberian life. Participants in the exchange program were required to attend, and 10 HINU students were enrolled.

## **Community Outreach**

One of the most important goals of the overall program is to find ways to implement results of this work in a sustainable fashion that will have direct, quantifiable impact on the health of the people of the Republic, the conservation of natural resources, and the economic development of the region. Several meetings with community leaders, conservation officials, politicians, and the business community to explain the program, obtain input on ways to implement a water quality assessment network, and to learn about how different stakeholders view our work were conducted. To further this goal, Drs. Malkov and Annett led discussions in Ust-Koksa and the Katunsky Reserve with dozens of reserve staff (ranging from the deputy director for science and the reserve director, to wardens, conservation staff, and personnel involved with the development of ecotourism associated with the reserve), local politicians, and villagers. The Katunsky Biosphere Reserve forms an essential part of the conservation of the major watersheds in the Altai Republic. Dr. Malkov was instrumental in development of the Katunsky Reserve, and organized the visit in order to educate the staff of the new reserve in ways to assess and improve water quality in the regions they manage. Since the Katunsky Reserve is in the headwaters of the Katun River, it is an especially important location for conservation.

The Katunsky Reserve is only five years old and has been developed on lands that were heavily grazed during the Soviet period. Because of the geography of the region, the mountainous lands of the reserve are only accessible to herders from the southern borders, which are now adjacent to Kazakhstan. Since the separation of Kazakhstan from the Russian Federation of States, this border region has been closed to the movement of herders, completely eliminating grazing from the lands of the reserve. For this reason, working in the reserve is particularly appropriate to further our understanding of the impact of grazing on water quality, which is the purpose of the grant funded by USDA to extend the research initiated by the USAID/ALO-funded exchange (see Appendix C).

Drs. Annett and Malkov met with Vassiliy Manyshev, head of the committee on the environment for the Altai Republic, to discuss cooperative work with his ministry. One of the environment inspectors from this committee then accompanied Drs. Annett and Malkov to the southern region of the Altai Republic, with local village leaders, government officials, and officials from the border guard stations who manage the region along the Chinese and Mongolian borders, for discussions about water quality and aquatic resource conservation. Information about the project, as well as the final report from the previous USAID-sponsored project on sustainable development, was distributed throughout the Kosh-Agach district and the Ukok Quiet Zone (UNESCO World Heritage Site). Although this is the most remote region of the republic, it has a population consisting largely of indigenous Altaian people. Because of this, it was considered particularly important to conduct outreach activities in villages in this area.

In addition to meetings with officials and members of the public, Drs. Malkov and Annett worked with environment inspectors in the Ukok Quiet Zone and Kosh-Agach district to assess the state of aquatic resources, and provide recommendations on the management of water and fisheries in the rivers and lakes of the region. A student from the biology program at GASU, Lena Vysotskaya, participated in these activities and subsequently used data she collected in the field to write her thesis, which won first place in 2001 regional competition of students' works. Ms. Vysotskaya's work was funded in part by a supplemental grant from the World Wildlife Fund.

One of the important aspects of the exchange is that it provided direct benefits in a reciprocal fashion to both sides, not only in curriculum development, but also in terms of work to improve water quality in Kansas as well as Siberia. The partners engaged in a number of activities to involve U.S. NGO's and governmental agencies in this work. For example, the partners met with representatives of the Friends of the Kaw and the Wetlands Preservation Committee, two local Kansas NGO's, in order to learn about their activities and offer assistance in publicizing the need to improve water quality in the region. Kansas has the poorest surface water quality in the nation, and the Kansas River (locally called the "Kaw") has twice been listed as one of the top ten most endangered rivers in the U.S. The Haskell/Baker wetlands, located along a tributary of the Kansas River, is the subject of a contentious road building project. Both the Friends of the Kaw and the Wetlands Preservation Committee are involved in lobbying to improve this situation, and we were able to help raise awareness by providing newspaper interviews and public presentations on our exchange project (see Appendix A). The partners also met with the Kansas Riverkeeper and



**The Katunsky Biosphere Reserve forms an essential part of the conservation of the major watersheds in the Altai Republic.**

have initiated a project to help him instruct members of the public in the techniques used by our exchange in testing water quality.

In addition, Dr. Mikhail Korenman has developed a network of public schools in Kansas who are using the same water quality test kits that were provided by our exchange to schools in the Altai Republic. Drs. Korenman and Aleinikova plan to develop an exchange of information about water quality via the Internet in order to compare the water quality in the two regions and raise awareness amongst Kansans of the importance of improving water quality. This work was begun with a comparison during the 2002 visit by the Russian partners of water samples from the Altai and water collected by the partners from Kansas rivers. Incorporating our Russian partners in this way heightens the perceived importance of monitoring and improving water quality, since the typical reaction is “if it is important enough to bring them half-way around the globe, it must be important enough for us to care about.”

### *Additional community outreach efforts*

- During Phase II of the project, Drs. Korenman and Aleinikova worked with the HINU group to make presentations to school groups, the media, and a summer camp in the Ongudai district.
- Dr. Annett participated in a USAID-sponsored meeting organized by the University of Michigan School of Public Health to discuss the challenges of recruiting and retaining TCU students in foreign exchange programs.
- The American partners were guests of honor at a Muslim festival attended by approximately 4,000 people, at which they gave a presentation on the student exchange program and the water quality monitoring project.
- Also during their visit, the partners made a presentation to a meeting of the scientific community of the Altai Republic, attended by approximately 150 regional scientists.
- A presentation was given to an audience of 70+ schoolchildren (aged 12-15) from throughout the republic who were attending a summer camp in Black Hand National Park, Ongudai Region. Three test kits were given to the park director for use in teaching children about water quality. It was very important that local people, especially those who represented the state reserve, participated in the testing and



Children attending summer camp gather for a demonstration on how to use water quality testing kits.

discussion of the results so they can do the same tests in the future by themselves. It was also very educational for local students to discuss water quality and methods for preserving it.

- Several meetings with community leaders, conservation officials, politicians, and the business community to explain the program, obtain input on ways to implement a water quality assessment network, and to learn about how different stakeholders view our work were conducted.

- Dr. Annett addressed an audience of 200 at an Earth Day celebration in Lawrence,

Kansas, in 2002. Her presentation included a discussion of the Haskell/GASU exchange program and its impact on environmental awareness.

## Interactions with Governmental Representatives

### *Meetings with local governments*

- A series of meetings were held between the mayor and vice mayor of Gorno-Altai, the capital of the Altai Republic, and faculty and administrators from GASU, and U.S. partners.
- Drs. Annett and Malkov visited the southern region of the Altai Republic for discussions about water quality and aquatic resource conservation with local village leaders, government officials, and officials from the border guard stations who manage the region along the Chinese and Mongolian borders.
- Information about the project, as well as the final report from the previous USAID-sponsored project on sustainable development, was distributed throughout the Kosh-Agach district and the Ukok Quiet Zone (UNESCO World Heritage Site).
- GASU toured a local elementary and secondary school in Lindsborg, Kansas, providing opportunities for the Russian partners to learn more about techniques used in science education in American schools.
- HINU delegation toured schools in Gorno-Altai to learn about techniques used in science education in Russian schools.

### *Meetings with tribal governments*

The group toured a riverbank filtration project that has been set up by the Prairie Band Potawatomi Nation and discussed how this could be used as one possible solution to water quality issues in the Altai Republic.

### *Meetings with republic representatives*

- Drs. Annett and Malkov met with Vassiliy Manyshev, head of the committee on the environment for the Altai Republic, to discuss cooperative work with his ministry.
- Representatives from U.S. partners and GASU held discussions with the first deputy head of the Republic, Yuriy Vasilievich Antaradonov, about the potential for enlisting Altaian language schools in the water quality monitoring program.
- The partners met with the minister of culture, the chairman of the Altai Republic parliament, and heads of the Kazakh and Azerbaijani Cultural Centers to discuss the participation of diverse ethnic groups in the project.
- The HINU exchange delegation met with the Altai Republic's minister of economy, Svetlana Surazakova.
- Drs. Malkov and Annett led discussions in Ust-Koksa and the Katunsky Reserve with dozens of reserve staff (ranging from the deputy director for science and the reserve director, to wardens, conservation staff, and personnel involved with development of ecotourism associated with the reserve), local politicians, and villagers.

- The rector of GASU is a member of the Altai Republic parliament and as a lawmaker has many contacts with local MPs and government officials. The project has been discussed with a number of members of the parliament and the government of the Altai Republic (including the head of the republic, Mikhail Lapshin, and his first deputies). In part because of these discussions, the newly adopted law on natural resources reflects concern for the purity of drinking water in communities and the desire to make existing laws work.

### *Meetings with regional administrators in Russia*

The rector of GASU has participated in regional and national meetings concerning the administration of elementary and secondary schools in Russia. He presented results of these panel meetings to participants in our program and discussed ways in which the USAID/ALO-funded project could also enhance science education in the republic's schools.

### *Meetings with U.S. government agencies*

- Reports from the USAID-funded program implemented by Ecologically Sustainable Development were presented by the Russian partners to Dr. Annett for distribution. The Russian language report from this previous project provides a plan for ecologically sound land management practices and economic development, and was the impetus for development of the water quality project funded by ALO. Dr. Annett carried the reports back to Moscow and presented them to Evelyn Wheeler, first secretary for technology and the environment at the American Embassy, and to the USAID mission, and brought additional copies back to the U.S. for distribution.



**HINU and GASU colleagues meet with the Altai Republic's minister of economy during summer 2001.**

- American partners met with the USAID Mission at the American Embassy in Moscow and apprised them of the progress that had been made during each phase of the project, providing them with copies of the six-month and twelve-month reports and other materials generated in the course of the project (a total of seven meetings).

- HINU faculty and students traveling to the Altai in Phase II met with the USAID mission staff at the American Embassy in Moscow to discuss the tribal college system and traditional knowledge.

- American partners met with NEH, USDA, and USAID officials in Washington, D.C., during Phase I of the project to discuss potential supplemental funding sources.
- Discussions were initiated between the partners and representatives of the ARIOS-Kansas project. ARIOS-Kansas is the Kansas branch of the Russian-American Association for the Development and Integration of Educational Systems.

### *Meetings with non-governmental organizations*

- During the Phase II summer 2001 exchange, Haskell students, Stefanie Reyna and Marei Spaola, attended a meeting of the Gorno-Altaiisk Rotary Club Chapter at the invitation of the club's former president.
- Reyna and Spaola gave a presentation on their trip to the Altai Republic to the Oskaloosa Rotary Club Chapter in Kansas.
- During the summer 2002 exchange, faculty from the GASU delegation were guests at a Manhattan Rotary luncheon.
- Drs. Malkov and Annett conducted a workshop on water quality and management of aquatic resources at the Katunsky Biosphere Reserve, part of the new World Heritage Site in the Altai established by IUCN/UNESCO under the World Heritage Convention for both cultural and natural resource values.
- Dr. Annett met with project directors at the Academy for Educational Development to discuss possible ways in which AED could work with the partners to extend the current project.
- Dr. Annett made a presentation on the USAID/ALO project at a meeting of the Society for International Development, attended by representatives from USDA, AED, and several Washington-based NGOs and CSOs in March 2001.

## UNEXPECTED OUTCOMES

### Phase I

KU graduate student Jennifer Ivie was awarded a fellowship from the National Security Education Program to focus on children's health in the Altai Republic (see Appendix C).

The Ecoregion (investments committee) donated pictures, books, and an Altai Republic flag to Haskell Indian Nations University for use in the program.

### Phase II

Dan Wildcat met with cultural representatives in the Altai Republic, including director of the Altai Republic museum. Documentation on the Native American Graves Protection and Repatriation Act has been provided to those representatives.

Haskell affiliate Mike Cuenca was awarded a grant from the National Endowment for the Humanities Program, Extending the Reach: Institutional Grant to Historically Black Colleges (HBC), Hispanic Serving Institutions (HSI), and Tribal Colleges/Universities (TCU). This funding has allowed for the digital documentation of the exchange visits and other international activities at Haskell (see Appendix C).

### Phase III

The visit to Kansas by the GASU delegation coincided with spring graduation and pow-wow ceremonies at HINU. Rector Tabakaev was an honored guest during the commencement ceremonies and was on stage to congratulate four of the Haskell students receiving diplomas who had participated in the summer 2001 exchange. The GASU delegation was recognized during the pow-wow celebration subsequent to the graduation ceremonies. During HINU's graduation and pow-wow, the GASU delegation had the opportunity to meet an Alaskan native dance troupe. There have been followup discussions with this group to develop a proposal for a cultural exchange, which will be submitted to the Trust for Mutual Understanding.



**GASU students and faculty had the opportunity to meet representatives from a wide variety of North American indigenous peoples in summer 2002.**

The group toured a local elementary and secondary school in Lindsborg, providing opportunities for the Russian partners to learn more about techniques used in science education in American schools. The rector of GASU questioned school administrators about how programs are funded, and compared the structure of educational funding between the two countries with the intention of providing models for program development in schools in the republic.

Faculty from GASU and U.S. partner institutions met with the provost of Bethany College to discuss future cooperative programs with his institution. Specific plans were generated to incorporate Dr. Korenman's

program into future grant initiatives and to include GASU in initiatives that Bethany College has developed for cooperative environmental exchange programs with Sweden.

Time at Kansas State University was spent developing relationships with additional faculty and departments to expand the scope of cooperative activities between GASU and its Kansas partners. Potential new partners include the Colleges of Education and Agriculture and the Women's Studies Program. Discussion with College of Education faculty focused on educational theories and approaches for training educators, and future education-based programs.

The rector met with representatives from KSU's College of Education's Office of Educational Innovation and Evaluation. The discussion focused on program evaluation techniques, and potential programs to evaluate and assess the needs of women in the Altai Republic. We have identified a joint interest in conducting an assessment of the needs of women in the Altai Republic and will develop a proposal for USAID/ALO to fund this project.

During the May 2002 exchange visit, Dan Wildcat and Yuri Tabakaev agreed to begin working on an edited volume of essays by philosophers and have subsequently compiled and translated several of the essays.

## CHALLENGES AND LESSONS LEARNED

Most Euro-American universities and colleges offer their students opportunities to study in different countries around the world. The vast majority of students taking advantage of these programs are from Euro-American backgrounds. In recent years the number of minority students choosing to study abroad has declined from 16.2% to 15.5% (Perdreau, 2002). With the significant increase in Euro-American students, “it had been difficult to keep pace with equivalent increases in minority group participation on United States programs abroad, despite valiant efforts made by a number of education abroad administrators and faculty program directors” (Perdreau, 2002).

Perdreau (2002) found that the primary barriers to study abroad programs for students from ethnic minority backgrounds have been that (a) students may not believe that studying abroad is a meaningful experience toward their obtaining a degree, (b) students frequently have concerns about how they will be accepted as ethnic minorities in other countries, and (c) students from ethnic-minority cultures frequently do not have the funding that would make such study possible. For American Indian students, most especially those enrolled in tribal colleges or universities, opportunities to study abroad are infrequent and generally not available through sustained programs at their institutions. Tribal colleges and universities continue to struggle to be funded at a survival level (AIHEC, 1998). Tribal colleges and universities continue to operate on an average funding budget of \$2900 or less per student FTE. This stands in stark contrast to the average funding budget of \$7000 per student FTE at majority institutions (Fann, 2002). In addition, many American Indian students attend nearby tribal colleges as commuters from family and work commitments that impinge on the availability of time for study abroad. For many American Indian college students the purpose of studying abroad may be viewed as culturally meaningless. Specifically, the idea of studying in Europe is not likely to encourage American Indian students for a number of reasons. The question that needs to be addressed is: How can we create meaningful programs for studying abroad that address culturally and intellectually relevant needs among American Indian students and scholars? Given this question, we decided to work towards a specific model for responding to this question.

Our experience over the past three years of coordinating international travel between the partner institutions has demonstrated that we can successfully mentor Native American and indigenous Siberian students with no previous travel experience. By



Summer 2001 fieldwork allowed students the opportunity to visit traditional Altaian resources, such as this tribal marker in Altai National Park.

providing intensive mentoring from experienced faculty members, we have been able to overcome significant cultural, economic, and social constraints that would otherwise prevent our students from participation in international exchanges. We have found that one to two students per faculty member is ideal for the difficult travel within Russia and for the level of mentoring that our students require in an international setting. We have also found that the exchanges work best when the students and faculty know and trust each other.

Indigenous students from partner institutions were also able to gain insight into some common issues shared by indigenous cultures. Students found that both American

Indians and Altaians hold common beliefs about the sacredness of water. In both the United States and Russia, water sources on indigenous lands were kept pristine and healthy for thousands of years, yet today many have become too polluted to drink from directly. From an indigenous perspective, water is considered a sacred element, so testing for pollution means more than simply a scientific endeavor. Working on water quality issues together has helped them identify their shared traditional ecological values, and take joint steps to educate young people and improve their drinking water. American Indian students and Altaian students also shared cultural traditions such as songs, dances, and stories about the natural world. While in the Altai Republic, American Indian students were able to convey culturally appropriate and historically accurate information about their individual nations. They were also able to receive similar information about Altaian culture and history. Each group of students attended several cultural events while visiting in the Altai Republic and in Kansas.



The summer 2001 exchange allowed students the opportunity to sample traditional Altaian meals, which are very similar to many North American indigenous foods.

We have come to realize that this communal model for study abroad works well for our Native American students and for their Altaian peers. The emphasis on learning some language, cultural and social mores, organizational skills for traveling abroad, and patience in the entire venture have given our students the opportunity to demonstrate traditional Native American values including wisdom, generosity, courage, and respect. Through this indigenous exchange, students and faculty has discovered the common values and beliefs that unite us as people who respect our living mother, the Earth.

## PLANS FOR FUTURE ACTIVITIES

As a result of this project, stronger relationships have been developed among all institutions involved. Partnerships have been built with agencies that have provided additional funding to supplement and/or expand the scope of the cooperative activities between the universities (see Appendix C). We expect to continue building relationships between the partner institutions. Following are the plans for future and continued collaborations.

The water chemistry test kits provided by funds from the EPA during Phase III will be distributed among schools in six districts of the Altai Republic: Kosh Agach, Ulagan, Ongudai, Turachak, Maima, and Chermal. These districts were chosen because of the strength of their science education programs, their locations around the republic, and their degree of concern about water quality degradation. An effort was made to also include school districts with large Altaian populations (Kosh Agach, Ulagan, and Ongudai). Four secondary schools in Gorno-Altajsk (National Lyceum, Gymnasia #3, City Lyceum, and Republican Lyceum) will also receive the kits. Teachers and students in the participating districts will receive training in use of the test kits, and will monitor water in their districts during both the fall and spring semesters. GASU will use a video created in Phase III of the project to train teachers in use of the testing kits. Data will be provided to Dr. Aleinikova at GASU for archiving and analysis.

Information regarding the quality of drinking water will be collected from schools and will be presented in a numerous meetings in Gorno-Altajsk, as well as in Krasnoyarsk and Novosibirsk. The same information will be made publicly available through local newspapers. Results of the project will also be published on GASU's Web site and updated regularly.

Vera Aleinikova (GASU) and Mikhail Korenman (Bethany) will co-author a paper on results of the water quality work conducted in May 2002. This paper will be submitted to the *International Ecological Congress Journal* for publication. Dr. Aleinikova will also present the scientific results of the water quality monitoring program during the 1<sup>st</sup> International Forum of Analytics and Analysts in Voronezh, Russia, June 2-6, 2003 (<http://www.vgta.vrn.ru/forum/inf-engl.htm>).

Results of the overall project will be disseminated through a documentary video created for showing at the Synergy in Development 2002 Conference.

In spring 2003, Nikolai Malkov will visit partners in Kansas to complete work on the USDA-funded project (see Appendix C). Dr. Malkov will be working with Dan Wildcat from HINU and Ray Pierotti from KU.

KU and KSU have received funds from the NSF UMEB/Environmental Biology Program and International Office (see Appendix C) to continue the student exchange program for an additional four years. This project will provide travel opportunities for undergraduate students and their faculty mentors. An important aspect of the UMEB project is that it supports efforts by HINU to internationalize its undergraduate environmental research program by providing stipends to students participating in exchanges with GASU.

Projects funded by the UMEB program will allow Native American students to participate in scientific research in an international context. Project descriptions and schedules are below.

### *Year 1*

Nikolai Malkov and Vera Aleinikova are scheduled to visit Kansas State University and HINU during summer 2003 to work on the impact of grazing on water quality. Dan Wildcat is the PI on the USDA grant that funded initial aspects of this work. We will take advantage of this already scheduled research trip by incorporating Native American students from American partner institutions who are funded by the NSF-UMEB project, as well as students and faculty who work with Drs. Malkov and Aleinikova at GASU. Scheduled activities include research on the impact of grazing on water quality at the Konza Prairie LTER, water quality analyses using laboratory equipment provided by faculty associated with Kansas State University (Drs. Erickson and Korenman), and discussions about traditional grazing techniques led by Pierotti and Wildcat.

### *Year 2*

Drs. Erickson and Davis are scheduled to travel to GASU during summer 2004 to continue work on water quality analysis and pollution-mitigation strategies begun with funding from the U.S. EPA. Native American students funded by the NSF UMEB will participate in this trip. Two faculty and three students will travel to Siberia to work with Drs. Aleinkova and Maneyev on this project.



**Continued cooperation will help preserve the quality of water resources in the Altai Republic.**

### *Year 3*

Dr. Pierotti will lead a group of faculty and students interested in large mammal ecology to Siberia to discuss the management of wolves, large felids, and ungulates with Dr. Malkov and local experts. Pierotti currently supervises Native American students, working at the LTREB fragmented habitat facility at KU, who study the behavior and ecology of deer and predatory birds and mammals, a project which will be incorporated into the NSF UMEB. During the 2002 exchange, Pierotti and Malkov found a common interest in studying ways to conserve avian and mammalian predators as a component of the traditional knowledge and attitudes of indigenous peoples. This issue is currently of great concern in grazing lands in both the U.S. and Russia. Two faculty and three undergraduate students from Pierotti's group will work in Siberia with Dr. Malkov and his colleagues on ongoing projects concerning management of wolves and snow leopards in grazing lands of the Altai Republic.

### *Year 4*

Dan Wildcat has worked closely with faculty and students from GASU on the incorporation of traditional ecological knowledge into environmental decision making in both the U.S. and Russia. During summer 2006, Wildcat will lead a group of undergraduates, who have worked with him on the NSF UMEB project, to Siberia to work with indigenous Altaian scholars and elders. This will be a continuation of the work begun during the USAID/ALO funded exchange in 2001, which focuses on bridging between traditional knowledge systems and scientific results to create culturally sensitive environmental management.

As a result of Bethany College's involvement in the project, GASU faculty were able to meet Bethany president Dr. Paul Formo and discuss development of a Memorandum of Cooperation between the two institutions. Specifically, Bethany College is very interested in continuing working with GASU faculty and students on environmental projects. This cooperation may lead to a special summer camp for Russian and American students, with an open door for students from other countries. Bethany College is interested in establishing a short-term (two to three weeks) and a long-term (semester - academic year) student exchange program with GASU. Bethany College is also interested in establishing two-way technology communications through the Internet with GASU faculty and students, which may lead to short online courses or student Internet conferences.

During Phase III, GASU representatives had the opportunity to meet with several potential partners at Kansas State University. KSU's College of Agriculture dean and staff members from the Graze Land Water Quality Project met with GASU faculty to discuss potential areas of common interest. Further discussion on future areas of collaboration will be held during the spring 2003 GASU visit to Kansas.

Meetings were held with representatives from the College of Education and Women's Studies Program. A common interest in women's issues has been identified. During a subsequent visit to the Altai Republic in July 2002, KSU representatives met with new potential colleagues from GASU's psychology and pedagogical college to discuss issues of concern for women in the Altai Republic. A submission to the ALO Institutional Partnerships in Higher Education for International Development Program is planned for 2003.

## QUANTITATIVE DATA

1. Eight new institutional programs, policies, or curricula were developed as a result of partnership activities.

### *GASU*

- The Chemical Ecology course in the chemistry department has been modified to include information from the summer 2001 fieldwork on water quality.
- Two chemistry students are writing their coursework and diplomas using data obtained during the summer 2001 fieldwork on water quality.
- A new English language course was developed for biology and chemistry students to prepare them for participation in the USAID/ALO-sponsored exchange program (15 students enrolled during the project period).
- A course on history and culture of North American Indians, with an emphasis on their environmental traditions, was developed (15 students enrolled during the project period).
- Post-graduate student at Altai State University in Barnaul (Altai Krai), Albina Abulova, is using the books donated by HINU faculty to the GASU library to conduct research for her Kandidate (PhD equivalent) dissertation entitled, “Myths and Legends of North American Indians,” which will compare North American and Altaian mythologies.

### *KU/HINU*

SLAV 512: Siberia Yesterday and Today—A semester-long course jointly offered by KU and HINU during Phase I of the project. Lectures for the class were presented by faculty from several institutions in the region, providing expertise on Siberian history, geography, literature, ecology, and ethnography. Students heard presentations from many perspectives on all aspects of Siberian life. Participants in the exchange program were required to attend, and 10 HINU students were enrolled.

### *HINU*

Two semester-long courses were developed and offered at HINU during Phase II of the project. The intent of the courses was to prepare students to participate in student exchange activities with GASU. Participants in the exchange program were required to attend. See development outcomes section for details.

2. 46 females and 59 male host-country nationals were trained through partnership activities.

### *Phase II*

Water quality testing field methods and analysis – 5 days in 3 locations – Ongudai Region, Lake Teletskoye, and Gorno-Altaiisk (5 people)

Training in use of water quality equipment – 1 day, 1 person

Watershed protection and water quality management workshop – 2 days, 25 people

Demonstration of water quality techniques – ½ day, 70 persons, Ongudai Region (school children)

### *Phase III*

Analytical methods of water chemistry – 2 days, Bethany College, Lindsborg, Kansas (4 people)

3. 320 faculty members and students from all U.S. institutions were involved in partnership activities.

Faculty activities – coordinating exchange and partnership activities, support to courses offered on culture and language, assistance in developing curriculum modules, presentations to university classes.

Student activities – actively engaged in classes specific to the exchange, participants in actual exchange and project activities enrolled in courses or workshops where project activities or information obtained from exchanges were presented.

4. \$225,893 in new contributions were leveraged by the partnership for its activities.

- National Science Foundation, Undergraduate Minorities in Environmental Biology, International Travel add-on— \$68,000

- U.S. Department of Agriculture – \$44,987

- U.S. EPA – \$66,780

- National Security Education Program – \$21,000

- National Endowment for the Humanities – \$24,826

- Education and Employment Training Dept. of the Shoshone-Bannock Tribe, Fort Hall, Idaho—\$300.00

5. Five formal links established with other host country or U.S. institutions for capacity-building activities beyond those that were initially proposed.

- U.S. Department of Agriculture – funding study of impacts of traditional grazing techniques on drinking water quality.

- U.S. EPA – providing supplemental funding for USAID-sponsored project.

- National Security Education Program – funding for graduate research by Jennifer Ivie.

- National Endowment for the Humanities – funding project to create a Web-based World Geography course for tribal colleges.

- National Science Foundation – supplemental funding to grant supporting Native American undergraduate students in science and engineering programs. Additional funds will support international travel of faculty and students from all partner institutions.

6. Four host-country institutions benefited from the partnership’s activities through training of staff, participation in workshops.

- Gorno-Altai State University – partner institution, involved in creating and implementing training curricula.
- Katunsky Reserve – participated in watershed protection and water quality management workshop.
- Ukok Quiet Zone—participated in watershed protection and water quality management workshop.
- Black Hand National Park – participated in demonstration of water quality assessment techniques.

7. The host country partners engaged in their government’s policy dialog in some area of development in the following instances:

Committee on natural resources (Altai Republic government)—discussed the project with the head of the committee who promised his support. The university made an application to get a five-year license for the monitoring of water quality.

Committee on ecology (Altai Republic government)—consulted about the areas where the monitoring is most needed.

Regional conference of international university departments (Siberia and the Far East) with officials from the ministry of education of Russia—presentation of the project.

Discussion of the project with the “Ecoregion” (a special structure of the Altai Republic government).

Meetings with the mayor and vice mayor where it was agreed that the city of Gorno-Altai would participate in our project and that results of the water quality monitoring would be incorporated into the decision-making framework for economic development. The mayor voiced his concerns about air pollution and other environmental problems associated with local industries. Many of these issues were also presented in newspaper interviews in the local press.

The rector of GASU has participated in regional and national meetings concerning the administration of elementary and secondary schools in Russia. He presented results of these panel meetings to participants in our program and discussed ways in which our USAID/ALO-funded project could also enhance science education in the republic’s schools.

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Perdreau, C., Study abroad: A 21st century perspective: Building diversity into education abroad programs. 2002. Located at AIFS Foundation [www.aifs.org/aifsfoundation/perdreau.htm](http://www.aifs.org/aifsfoundation/perdreau.htm)>.

## APPENDICES

### Appendix A: Publications and presentations

#### *Publications*

Calhoon, J.A., W.M. Griswold, J.L. Ivie, and C.A. Annett. "Water monitoring project links indigenous students from Kansas and Altai." *Journal of the Initiative for Social Action and Renewal in Eurasia*, Spring 2002, volume 5, Issue 1, pages 28-29. URL: [www.isar.org/isar/archive/GT/GT14griswold.html](http://www.isar.org/isar/archive/GT/GT14griswold.html)

Golubtsov, A.S., C.A. Annett, and N.P. Malkov. "Ichthyofaunal survey of Lake Tal'men'e and upper reaches of the Katun River in July 2001," Report to the Katunsky Biosphere Reserve, 2002, 4 pages. In preparation.

Griswold, W.M., and C.A. Annett. "Kansas-Siberia partnership addresses drinking water quality issues in rural and indigenous communities." *International Ecological Congress Journal*, Spring 2002, volume 5, number 2, pages 39-41.

Lukyanenko, V.N. "Joint university project as an example of international scientific integration." *The role of Inter-Subject Relations in the system of developing education: materials of the international scientific conference (a supplemental publication of the journal, Science, Culture, and Education.)*, August 2001, pages 164-165.

Malkov, N.P., World Heritage Site Album. Translation by V.N. Lukyanenko. In press.

Mamreshev, V., and A. Tlisova. "The monitoring of drinking water quality in the Altai Republic" (abstract). *Journal of Ecology and the Problems of Environmental Protection*, Krasnoyarsk. In press.

Mikkelson, J., "Harmonization of the poetry of translation and study of literature within the integrative special course." *The role of inter-subject relations in the system of developing education: materials of the international scientific conference ( a supplemental publication of the journal, Science, Culture and Education.)*, August 2001, pages 83-85.

Mikkelson, J., and M. Winchell. Contributed material from their English language translation of Valentin Rasputin's book *Siberia, Siberia* to the publication *Altai Republic Album*, Ak Chechek, 2001.

Pierotti, R., et al., "The importance of indigenous perspectives," 2002. In preparation.

#### *Presentations*

Annett, Cynthia, October 2001, World Geography, Haskell Indian Nations University ("Ecology and culture in the Altai Republic" (35 students, 3 faculty).

Annett, Cynthia, and Gerald Mikkelson, February 2002, World Geography, Haskell Indian Nations University. "Water in ecology and culture of the Altai Republic" (30 students and 5 faculty).

Annett, Cynthia, March 2002, American Indian Studies: Native and Western Views of Science, joint course HINU/KU. "The relationship between the environment and cultural traditions in the Altai Republic" (3 faculty and 25 students).

Annett, Cynthia, and Dan Wildcat, March 2002, Slavic languages and literatures: Siberia, then and now. University of Kansas. “Geography, ecology, and indigenous culture of Siberia” (8 students).

Annett, Cynthia, April 2002. “Globalization and the fight to save our rivers.” University of Kansas Environs Earth Day festival, Lawrence, Kansas. This talk presented our work with GASU and resulted in an invitation to talk to the Kansas Audubon Society in September 2002 (over 200 people in attendance).

Annett, Cynthia, August 2002. Project report to Synergy in Development 2002. Washington, D.C.

Annett, Cynthia, August 2002. Project report to EPA International Programs Office. Washington, D.C.

Edmo, Dustina (Shoshone), Krystale Head (Cherokee), Stefanie Reyna (Taos Pueblo), Sheldon Selwyn (Nakota), Marei Spaola (Lakota), and Jennifer Ivie (Chickasaw). World Geography, October 2001, Haskell Indian Nations University (panel presentation on the experiences of students participating in the summer 2001 Altai Republic trip, 35 students and 3 faculty).

Griswold, Wendy, June 2002. “Expedition to Altai: Exploring relationships between science and community.” Girls Researching Our World 2002 Workshop, Kansas State University. <[www.ksu.edu/grow/ExpeditiontoAltai.htm](http://www.ksu.edu/grow/ExpeditiontoAltai.htm)> (15 participants).

Lukyanenko, Victor, November, 1999. Department of Biology. Presentation explaining the project and participation of students (approximately 100 students in attendance).

Lukyanenko, Victor, Languages Department, December, 1999. Presentation explaining the project and participation of students (approximately 70 students in attendance).

Lukyanenko, Victor, 1999. Learned Council of the University. Presentation informing council of the project (more than 60 people were present, mainly heads of departments and chairs).

Lukyanenko, Victor, Cynthia Annett, and Wendy Griswold, December, 1999. Departments of Biology and Chemistry, Gorno-Altai State University (more than 100 students and faculty present).

Lukyanenko, Victor, and Dan Wildcat, July 2001. Project report to Synergy in Development 2001, Washington, D.C.

Mamrashev, Victor, Spring 2002, Regional Student Conference in Novosibirsk, Russia. “Monitoring drinking water quality in the Altai Republic” (representatives from 16 Siberian universities were present; presentation was awarded third place among scientific reports).

Reyna, Stefanie, and Marei Spaola, September 2001, Oskaloosa Rotary Club (20 people in attendance).

Tabakaev, Yuri, Rector of GASU, 2002, addressed the Learned Council to announce the university press conference and invite the council to attend.

Wildcat, Dan, Wendy Griswold, and Cynthia Annett, April 2001, “The role of Kansas universities in indigenous exchange programs,” Vernon Larson International Luncheon Lecture Series, Kansas State University (100+ participants).

Wildcat, Dan, October 2001, World Geography, Haskell Indian Nations University. “Indigenous people and traditional knowledge in the Altai Republic” (35 students and 2 faculty).

Wildcat, Dan, February 2002, World Geography, Haskell Indian Nations University. “Indigenous cultural traditions in the Altai Republic” (30 students).

### *Poster presentation*

Krystale Head and Tina Scott, May 2001, The Altai Republic. Conference on Hazardous Waste Research, Kansas State University.

## **Appendix B. Media reports**

### *Newspaper articles*

The Lawrence-Journal World, Volume 141, Number 310, November 6, 1999, “Water expertise flows to Siberia,” by Dave Ranney.

Earth Medicine, Volume 6, Number 2, Fall 1999, “HINU and Siberian university partner to assess water quality.”

The Indian Leader, Volume 104, Issue 6, November 13, 2000, “Altai exchange program,” by Glen Gary, student participant in the ALO exchange program.

The Lawrence-Journal World, April 23, 2001, “Haskell delegation building warm relationship with Siberians,” by Dave Ranney ([www.ljworld.com/section/citynews/story/50279](http://www.ljworld.com/section/citynews/story/50279)).

The Lawrence Journal-World, May 14, 2002, “Russian visitors tour wetlands,” by Dave Ranney ([www.ljworld.com/section/citynews/story/92855](http://www.ljworld.com/section/citynews/story/92855)).

Lindsborg News Record, May 23, 2002, “Siberians bring water from home for tests at BC.”

The Altaidyn Cholmony (Altaian language newspaper) and the TV news in Gorno-Altai reported on the March 2001 visit by U.S. partners.

1999 – Zvezda Altaya (The Altai Star). Title – “Joint project of the universities.” Victor Lukyanenko and Nikolai Malkov were featured. The article contained a description of the project and the prospects of its development. Also included was information on the purpose of the project, universities, USAID, and U.S. partners.

March 2001—Zvezda Altaya (The Altai Star). Title – “The festival in the city.” The article was about the Nauryz (Moslem) festivities in the city of Gorno-Altai. The author noted, “That was a very nice surprise to be greeted by a representative of the Euchee Tribe who wished warm sun and clear water to the Altaian people.”

Summer 2001—Zvezda Altaya (The Altai Star). An article about the Haskell students. The article presented information about the project, English language classes, and the chance for GASU students to go to the U.S.

Summer 2001 – Ulala (The Altaian language newspaper). An interview with Dustina Edmo, HINU student from the Shoshone-Bannock Nation.

2002—Post Scriptum. The article reported on a press conference held at the university after the GASU delegation’s May visit to the U.S. where results of the trip and its benefits to the university, faculty, students, and water quality was discussed.

2002—Zvezda Altaya (The Altai Star). Title – “The grant of the future.” Nikolai Malkov and Victor Lukyanenko were interviewed about their recent trip to the U.S. The article focused on how we live on a very small planet, which needs the concern of ecologically minded people.

2002—Zvezda Altaya (The Altai Star). An article about GASU biology students. Of specific interest is the mention of Lena Vysotskaya, who received a monetary award from the Altai Republic government and the World Wildlife Federation for her work based on fieldwork accomplished with Nikolai Malkov and Cynthia Annett, and related to the USAID/ALO project.

2002—Zvezda Altaya (The Altai Star). Title — “To the ecological well being.” Interview with Cynthia Annett and Wendy Griswold on the conclusion of the initial project and future collaborations.

### *TV/Video Broadcasts*

March 2001 – Nauryz interview, GTRK (State Television/Radio Company)

Summer 2001 – Republic’s anniversary interview, GTRK (State Television/Radio Company)

Summer 2001 – Interview of Dustina Edmo, GTRK (State Television/Radio Company)

Summer 2001 – Dance performance (at gymnasium and celebration), GTRK (State Television/Radio Company) and Planet Services Company

June 2002 – Press conference held by university – attended by over 80 people, including some from different parts of the republic, GTRK (State Television/Radio Company)

2002 – Community meeting at the gymnasium to discuss the recent visit of GASU representatives to Kansas (was video taped).

2002 – Lena Vysotskaya on television about her participation in the field trip, GTRK (State Television/Radio Company)

## **Appendix C. Grant proposals submitted during the project period**

### *Funded projects*

**World Wildlife Fund, Russian Office.** Individual grant under the Altai Sayan Programme on Biodiversity. Lena Vysotskaya, GASU. \$250.

Conservation of biodiversity in the Altai Republic: Fish and water birds as elements of zoodiversity in the southeastern Altai. Research conducted under the supervision of Dr. Malkov during Phase II of the project that resulted in Ms. Vysotskaya’s thesis research.

**National Security Education Program Graduate Fellowship.** “The association of quality of drinking water with academic, social, and cognitive functioning of children in the Altai Republic.” Jennifer Ivie, KU, Tatianna Lukyanenkova, GASU. \$21,000.

Jennifer Ivie (Chickasaw) worked on her graduate research with Anne Calhoon (Cherokee) in the department of psychology at KU. During summer 2001 and 2002, Ivie worked with researchers from the USAID/ALO project on water quality to analyze existing data on children’s health to determine whether there is a linkage between health problems and water quality.

**U.S. Department of Agriculture Scientific Cooperative Exchange Program.** “Assessing the impact of traditional grazing techniques on drinking water quality: A cooperative program between Haskell Indian Nations University and Gorno-Altai State University, Russia.” Dan Wildcat, HINU, and Nikolai Malkov, GASU. \$44,987.

This project extends the existing cooperative project focused on drinking water quality to include a survey documenting the re-emergence of traditional practices of herd management among indigenous Altaians since the collapse of the Soviet government. Fecal coliform and other nonpoint-source pollutants generated by animal husbandry are the major sources of water pollution in the Altai Republic. This project compares whether there are differences in surface water quality linked to animal husbandry in districts differing in herd management practices. The participants will develop survey techniques that will allow them to identify traditional herding practices and to capture the oral traditions that specify how grazing is managed in traditional systems. These materials will form the basis for a comparative program between indigenous Altaian (Siberian) practices and traditional practices used on selected tribal lands in the U.S.

**U.S. Environmental Protection Agency.** “Science and traditional knowledge: International exchange of indigenous peoples in water quality monitoring and river management between Russia and the United States.” Larry Erickson, KSU. \$66,775.

This funding supplements the original project funded by USAID/ALO. These funds have been used to supply the project with water quality test kits, a portable spectrophotometer, and to supplement travel, thereby increasing the number of participants in the program and opportunities for exchange.

**National Endowment for the Humanities Extending the Reach: Institutional Grant to HBC, HIS, and TCUs.** “Technical support for international coursework development for tribal colleges.” Mike Cuenca, HINU. \$24,826.

Electronic production and dissemination technology are being used to develop support materials for a World Geography course for the North American Tribal Colleges. Project goals were to (1) provide World Wide Web-based technical support resources to be used by the tribal colleges to enhance their use of course material to be delivered via satellite and Internet distance-learning technologies, (2) to produce a series of prototype teaching modules that contain multimedia/videotape presentations of the areas and peoples being studied which will be delivered via the internet, and (3) to provide Web-based resources and materials on opportunities available through internships and study abroad programs at other institutions that would provide resources for students who wish to visit the countries studied in each unit. This effort will enhance the development of international study abroad opportunities and participation for and by the students of the tribal colleges.

**National Science Foundation, Undergraduate Minorities in Environmental Biology Program.** “Recruiting Native Americans into the environmental sciences,” Ray Pierotti, KU, and Larry Erickson, KSU. \$443,000. NSF Proposal Number 0203404.

Despite a long tradition of knowledge about ecological and environmental phenomena, Native Americans are one of the most under-represented groups among undergraduate science majors, graduate students, and science faculty. Under this program, excellent students will be identified at HINU who have an interest in training for a career in either basic or applied research in environmental science or ecology. Students interested in field research in ecology or wildlife biology will be guided into research programs at KU, supervised by the PI and other faculty who have agreed to participate. Students interested in applied environmental problems, including soil and water contamination and methods of remediation, will be directed to programs at KSU under supervision of the co-PI and faculty from HSRC.

Faculty from these programs (KU, KSU, and HINU) have formed a consortium to create the first international program for Native American students at HINU. This program involves exchanges between HINU and GASU. The emphasis is on providing opportunities for students to conduct studies on water quality and health issues that reflect shared concerns between indigenous peoples in North America and Siberia.

This project will (1) incorporate undergraduate students from HINU in research projects in the U.S. and abroad, (2) help HINU students take classes at KU and KSU that cannot yet be offered by the new HINU Environmental Studies Program, and (3) to help prepare HINU undergraduates to enter into the master’s program in INSP at KU, and to master’s programs in the environmental sciences at both KU and KSU.

### *Proposal pending*

**National Endowment for the Humanities Extending the Reach: Institutional Grant to HBC, HIS, and TCUs.** “Relating the indigenous worldview; development of non-eurocentric online geography materials for U.S. tribal colleges.” Dan Wildcat, HINU. \$25,000.

This project proposes to develop interactive online materials for the new international program at Haskell Indian Nations University. This program began with a course on World Geography and a course on the worldviews of indigenous people (American Indian Studies: Native and Western Views of Nature), and has expanded to include international travel for Haskell students and faculty (funded by grants from USAID/ALO, USDA, and EPA). During the 2001-2002 academic year, several guest lecturers from Latin America and Russia participated in these courses, and even more importantly, lectures were presented by HINU faculty and students who traveled to Siberia on the first-ever international exchange. We developed a Web site with funding from NEH (“Technical support for international coursework development for tribal colleges,” ID No. HI-20860-01; [www.seekpeace.com/hinu/Global.html](http://www.seekpeace.com/hinu/Global.html)) based on this material to supplement the world geography course. The lectures presented by international visitors and the trips by HINU personnel led to a groundswell of interest in international exchanges among HINU students. To address this need, we propose to develop online materials that will provide students with the materials they need to successfully apply for international exchanges, focusing on opportunities to work with indigenous people in other countries.

### *Proposals submitted but not funded*

**National Research Council COBASE.** “Drinking water processing and testing in small communities with limited resources.” Larry Erickson, George Marchin, and John Staver, KSU; Vera Aleinikova, GASU. \$4329.00.

This cooperative work would include using the computer facility at KSU to compile and analyze existing data on water chemistry in the Altai Republic. This is beyond the scope of the USAID/ALO-funded project, but would significantly add to our ability to form a comprehensive data base that could be used in planning economic development that potentially impacts water quality.

**United States Information Agency.** “Community needs assessment during economic and governmental restructuring in Siberian and American Indian communities.” Anne Calhoon, KU, and Victor Lukyanenko, GASU. \$300,000.

The institutional partnership between Gorno-Altai State University in the Altai Republic of Russia, Haskell Indian Nations University, Ogalala Lakota College, Northwest Indian College, Kansas State University, and the University of Kansas proposes to address the Altai Republic’s need for economic development and governmental restructuring by developing a culturally appropriate program in public administration.

We propose to (1) create summer institutes for faculty and tribal and community leaders to develop culturally appropriate methodologies for gathering information about governmental, educational, and cultural preservation needs of indigenous communities; (2) provide year-round opportunities for faculty from the consortium to travel to and engage in teaching and research at member institutions; (3) develop ongoing opportunities for members of the consortium to create and participate in distance learning courses; and (4) enhance the development and implementation of computer technology and services for members of the consortium who currently are underserved (the three tribal colleges and Gorno-Altai State University in Siberia) by providing equipment and technical assistance to member institutions.

**National Council for Eurasian and East European Research.** “Historic and current trends in educational instruction in the Altai Republic.” Anne Calhoon, KU. \$69,211.

Development of democratic institutions and civil society in the newly independent states (NIS) depends upon increasing the relevance of school curriculum to children of many cultures, thereby developing the trust and shared values required for development of a civic ethic in children born into the post-Soviet era. Meeting the needs of the changing Russian society requires an infusion of multicultural perspectives into school curricula. We propose to build upon an existing consortium of universities in the U.S. and the Altai Republic (NIS) to create a collection of text based upon indigenous Altaian historical and traditional knowledge related to water ecology. These texts will become the basis for creating informational text designed to be used by students in Russia who are between the ages of 9 and 12. The underlying purposes of creating this transitional form of text is to help children from many cultures progress in literacy from comprehension of known forms of text (narratives), to comprehension of information about the world (informational text), to comprehension of expository text (content area textbooks). The curriculum developed in this project will serve as a cultural bridge supporting students’ participation in learning programs in both the humanities and the sciences.

**National Council on Eurasian and East European Research.** “Preserving culture: Oral history, narrative, and traditional knowledge about the Katun River.” Anne Calhoon, KU; Victor Lukyanenko, GASU. \$70,000.

This project proposed to create a collection of text based upon indigenous Altaian historical and traditional knowledge related to water ecology. These texts would have become the basis for creating informational text designed to be used by students in Russia who are between the ages of 9 and 12. The underlying purposes of creating this transitional form of text is to help children from many cultures progress in

literacy from comprehension of known forms of text (narratives), to comprehension of information about the world (informational text), to comprehension of expository text (content area textbooks). The curriculum developed in this project will serve as a cultural bridge supporting students' participation in learning programs in both the humanities and the sciences.

**U.S. Department of State NIS College and University Partnership Program.** "From data to discourse: Improving the electorate's understanding of scientific information through training for journalists." Larry Erickson, KSU; Mike Cuenca, HINU; Victor Lukyanenko, GASU. \$300,000.

This project proposes to address the Altai Republic's need for training for journalists by developing training opportunities for journalists and exchange opportunities for faculty interested in pursuing research and outreach projects in the fields of journalism and media studies. Overall goals of this project are to improve the capacity of journalists in the Altai Republic, and tribal communities in the U.S., and the state of Kansas in communicating effectively with the public about science/environmental issues; and to provide opportunities for faculty research exchanges for faculty at tribal colleges, Kansas universities and small colleges, and at Gorno-Altai State University.

**National Endowment for the Humanities: Tribal College Faculty Research Grant.** "Global powwow: Joining indigenous peoples of North America and Central Asia." Dan Wildcat, HINU. \$24,000.

This project proposes to develop a documentary of the historic exchange between two indigenous-serving institutions, Haskell Indian Nations University and Gorno-Altai State University. More than 1,000 digital images were captured during the 2001 exchange, and several hours of digital video were captured during the 2002 exchange for use in this project.

## Appendix D. Student reports on science and traditional knowledge

### *Native Altaians connect themselves to us (Native Americans): A report on science and culture by Sheldon Selwyn, Haskell student*

On the 25<sup>th</sup> of June (2001) we experienced one of the most memorable moments in our trip. We traveled to the Altai Republic's National Park-Black Hand Park. We met our Altaian friends at a sacred place known as Semenski Pass, roughly about 2100 km above sea level. "You are our children," was what some of the Altaians had to say about the Haskell group that traveled to the Altai. As we moved about the Altai Republic sampling, we encountered a commonality for which the Altai people could be closely compared to traditional Native American people of the United States. This trip in particular was proof to a theory lingering in our heads about the connection of traditions we shared with the Altai people. We were treated with generosity by the Altaian people while we were in the mountainous terrain. The entrance of the park began with a tour of their national park, along with an oral history of Altaian history and a creation story. Cultural interpretations of musical storytelling followed the tour and more storytelling, until we were ready to retreat to our tents. We camped out this night and learned that both groups of people have high regard for their natural environments. Not only did we learn that the native people had great respect for the land, but we also learned that all connections to the natural environment were in the criteria of this respect. The land, animals, rocks, water, essentially the whole ecosystem, along with the way it is situated, was given a lot of respect and care. The Altai people took many precautionary steps in order to preserve and protect their natural environments in the Black Hand National Park. The spiritual connections to life and their environment is a very common practice that the Altai people will see in the United States when they arrive next summer.

Students and faculty from Haskell and GASU tested the quality of drinking water in the Altai Republic for biochemical oxygen demand, dissolved oxygen, coliform bacteria, pH, temperature change in water, nitrates, phosphates, and turbidity. There were 12 sampling sites all together that collectively composed the sample population of the water quality study in the Altai.

Thirty-three percent of the dissolved oxygen samples had results indicating that bodies of water contained 50% of saturation or greater amounts of dissolved oxygen in the water sources. These samples were taken at a recreation area and at a sacred spring in the Ongudai Region. Seventeen percent of the dissolved oxygen tests suggested there was a saturation of anywhere between 51% to 70% of oxygen in the water sampled east of Gorno-Altaiisk (commonly called Dry Karasuk when translated into English). Another 17% of the dissolved-oxygen tests, taken at Black Hand National Park in Southern Siberia, indicated that the dissolved oxygen was almost completely saturated (between 91-106%), which is excellent. The final 33% of the dissolved-oxygen samples suggested that the oxygen level was in good condition, 71-90% saturated. The final samples were taken from recreation areas in the Altai.

One hundred percent of all biochemical oxygen-demand samples taken from the Altai Republic indicated a ratio of four parts per million.

The pH of the water samples indicated that the water from all sources was very close to seven. The complete range of pH was 6.5 to 8.5. The total range in temperature of all samples was 3 degrees Celsius to 20 degree Celsius. Most of the samples taken in the Altai had very low temperatures. The only sample that had a 20-degree temperature was a pond adjacent to an underground spring in a recreational area. Excluding the pond, the rest of the samples had very cold temperatures, usually around 8 to 10 degrees Celsius. Nitrate tests showed that there was no significant problem with nitrates in water systems in the Altai. This was good information for the people, because many Altaian people plant their own crops. The total amount recorded on all nitrate tests indicated the level of nitrates in the water is less than 5ppm. Phosphate tests were very good as well. There was only one test that showed 2 ppm. The rest of the tests for phosphates had a concentration of 1 ppm. All samples for coliform bacteria showed positive results except one. The sample site that did not show a significant level of coliform bacteria in the drinking water turned out to be the guestrooms in the university dorm. The following are results of the turbidity tests:

- 42% of sample sites.....clear test (0 turbidity, or 0 JTU)
- 25% of sample sites.....good (0.9 to 39.9 JTU)
- 25% of sample sites.....fair (40.0 to 99.9 JTU)
- 8.0% of sample sites.....poor (100 JTU)

Conclusions of the testing showed that the people of Altai have good water, with the exception of the coliform bacteria.

*The Monitoring of Drinking Water Quality in the Altai Republic  
by Alexandra Tlisova and Victor Mamrashev*

А. С. Тлисова, В. А. Мамрашев  
**МОНИТОРИНГ КАЧЕСТВА ПИТЬЕВОЙ ВОДЫ НА ТЕРРИТОРИИ  
РЕСПУБЛИКИ АЛТАЙ.**

Горно-Алтайский государственный университет  
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Данная работа является первой стадией совместного проекта Г-АГУ и Хаскеловского Университета Индейских Народов (HINU), в ходе которого планируется организация мониторинга качества питьевой воды на территории Республики Алтай. Условие Американской стороны – мониторинг должен проводиться местным населением: предварительно обученными учителями средних школ, учениками старших классов, сельской администрацией и всеми желающими.

Цель данной работы – составить общее представление о степени загрязнённости питьевых вод в республике.

Планируется сравнить чистоту питьевых вод республики Алтай и штата Канзас после поведения аналогичных исследований в США.

Для проведения анализов использовались аналитические наборы, предоставленные Канзасским Государственным Университетом. Они позволяют быстро определять содержание растворённого кислорода, фосфатов, нитратов, а так же pH. В наборах так же имеются реактивы для определения биологического потребления кислорода и для тестов на наличие кишечной палочки.

Делегация из HINU состояла из преподавателей: Джордж Годфри, Уэнди Грисвольд, Дэниэл Уайлдкэт и студентов: Кристал Хэд, Тина Скотт, Гленфорд Гэри, Шелдон Селвин, Стэфани Рейна, Дастина Эдмо, Марей Спаола,

Со стороны Г-АГУ в проекте принимали участие преподаватели: Малков Николай Петрович, Лукьяненко Виктор Николаевич, Глебова Марина Владимировна, и студенты: Усова Мария, Вавилкина Виктория, Кошкина Оксана, Тлисова Александра, Игнатъев Константин, Мамрашев Виктор

Для проведения исследования на территории республики были выбраны несколько мест: в Онгудайском районе было взято 5 проб из рек Каракол, Тек-Пенек, Карасу, Аргем, и из ключа в селе Онгудай, 4 пробы - в Телецком озере и его окрестностях. Две пробы были взяты в Горно-Алтайске и одна - за городом, в ключе Сухой Карасук.

Загрязнённость водоёмов, в целом, была признана незначительной. Лишь в двух пробах содержание фосфатов достигло 2 ppm. Содержание нитратов ни в одной из проб не превысило 5 ppm. Величина pH в разных водоёмах колебалась от 6,6 до 8,5. Однако вызывает озабоченность наличие положительной пробы на кишечную палочку в нескольких водоёмах.

В дальнейшем программа мониторинга, испытанная на территории Республики Алтай будет использована на землях индейцев в США. В мае этого года планируется выезд преподавателей и студентов Г-АГУ в США для проведения аналогичных исследований в штате Канзас.

Работа выполнена при поддержке гранта выделенного Ассоциацией Развития Межуниверситетских Контактв (ALO) США. Размер гранта - \$100,000.00.

В 2001 г. Ассоциацией Развития Межуниверситетских Контакттов (ALO) на финансирование совместного проекта Хаскеловского Университета Индейских Народов (HINU), Канзасского Государственного Университета (KSU), Канзасского Университета (KU) и Горно-Алтайского Государственного Университета Г-АГУ, был выделен грант в размере \$100,000.00.

Главная цель проекта – разработка программы обучения сельского населения методам экспрессного анализа качества питьевой воды. Предполагается обучать учителей средних школ, учеников старших классов, сельскую администрацию и всех желающих

Первая стадия проекта - разработка курса обучения населения методам мониторинга качества питьевой воды. Подготовка к визиту американской стороны в республику Алтай.

Вторая стадия предполагала сбор данных о качестве воды на территории республики, формирование базы данных и испытание курса.

Третья фаза – доработка курса обучения, написание пособий по мониторингу и перевод их на Английский, Русский, Алтайский языки.

Мониторинговые наборы Предоставленные Канзасским государственным Университетом позволяют быстро определять содержание растворённого кислорода, фосфатов, нитратов, а так же pH. Так же в наборе имеются реактивы для определения биологического потребления кислорода и для тестов на наличие кишечной палочки. Поскольку эти тесты требуют инкубации, в ряде случаев они не проводились.

Для реализации проекта на территории республики были выбраны несколько мест. Телецкое озеро. Национальный парк в Онгудайском районе был выбран по нескольким причинам. Во первых, ~~здесь имеется~~ большое количество водоёмов, ~~имеющих~~ хозяйственное значение. Во вторых, на территории национального парка размещается детский летний лагерь, где дети со всей республики помимо отдыха изучают историю республики, знакомятся с традициями местных жителей, их воззрениями на взаимоотношения человека и природы. Поэтому лагерь оказался идеальным местом для реализации образовательной, популяризаторской части проекта.

В Онгудайском районе было взято 5 проб из рек Каракол, Тек-Пенек, Карасу, Аргем, и из ключа в селе Онгудай.

делегация из HINU в составе: преподаватели Джордж Годфри, Уэнди Грисвуд, Дэниэл Уайлдкэт, студенты: Кристал Хэд, Тина Скотт, Гленфорд Гэри, Шелдон Селвин, Стэфани Рейна, Дастина Эдмо, Марей Спаола,

Совместно с преподавателями и студентами Г-АГУ: Малков Николай Петрович, Лукьяненко Виктор, Николаевич, Глебова Марина Владимировна, студенты: Усова Мария, Вавилкина Виктория, Кошкина Оксана, Глисова Александр, Игнатъев Константин, Мамрашев Виктор

Место забора пробы:

Дата и время забора пробы:

	Измеренные параметры	Оценки
t°C		
Содержание растворённого кислорода	91-100% 71-90% 51-70% <50%	4 превосходно 3 хорошо 2 удовлетворительно 1 плохо
Биологическое потребление кислорода	0 ppm 4 ppm 8 ppm	4 превосходно 3 хорошо 2 удовлетворительно
Кишечная палочка	Присутствует Отсутствует	1 плохо 3 хорошо
pH	4	1 плохо
	5	1 плохо
	6	3 хорошо
	7	4 превосходно
	8	3 хорошо
	9	1 плохо
NO <sub>3</sub> <sup>-</sup>	10	1 плохо
	5 ppm	2 удовлетворительно
	20 ppm	1 плохо
PO <sub>4</sub> <sup>3-</sup>	40 ppm	1 плохо
	1 ppm	4 превосходно
	2 ppm	3 хорошо
Мутность	4 ppm	2 удовлетворительно
	0	4 превосходно
	0-40	3 хорошо
	40-100	2 удовлетворительно
	100	1 плохо

1.

Место забора пробы: Онгудай национальный парк река Каракол

Дата и время забора пробы: 26.6.2001

9:20

t°C	10	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	-	-

pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	2 ppm	3 хорошо
Мутность	0-40	3 хорошо

2.

Место забора пробы: Онгудай река Текпенек

Дата и время забора пробы: 26.6.2001 10:05

t°C	4	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	-	-
pH	7	4 превосходно
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0	4 превосходно

3.

Место забора пробы: Онгудай ключ на окраине села

Дата и время забора пробы: 26.6.2001 10:10

t°C	4	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	-	-
pH	7	4 превосходно
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно

Мутность	0	4 превосходно

4.

Место забора пробы: Онгудай национальный парк река Карасу

Дата и время забора пробы: 26.6.01 10:30

t°C	8	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	-	-
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	2 ppm	3 хорошо
Мутность	40-100	2 удовлетворительно

5.

Место забора пробы: Онгудуй река Аргем

Дата и время забора пробы: 26.6.2001

t°C	10	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	-	-
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	40-100	2 удовлетворительно

6.

Место забора пробы: Турбаза горизонт Колодец

Дата и время забора пробы: 29.6.2001

8:45

t°C	10	
Содержание растворённого кислорода	91-100%	4 превосходно
Биологическое потребление кислорода	4 ppm	3 хорошо
Кишечная палочка	Присутствует	1 плохо
pH	6	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0	4 превосходно

7.

Место забора пробы: Пруд у турбазы «Горизонт»

Дата и время забора пробы: 29.6.2001

8:50

t°C		
Содержание растворённого кислорода	71-90%	3 хорошо
Биологическое потребление кислорода	4 ppm	3 хорошо
Кишечная палочка	Присутствует	1 плохо
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	100	1 плохо

8.

Место забора пробы: Телецкое озеро

Дата и время забора пробы: 30.6.2001

11:20

t°C	10	
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Содержание растворённого кислорода	<50%	1 плохо
Биологическое потребление кислорода	4 ppm	3 хорошо
Кишечная палочка	-	-
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0-40	3 хорошо

9.

Место забора пробы: Ручей у турбазы «Горизонт»

Дата и время забора пробы: 30.6.2001 11:25

t°C	14	
Содержание растворённого кислорода	71-90%	3 хорошо
Биологическое потребление кислорода	4 ppm	3 хорошо
Кишечная палочка	-	-
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	40-100	1 плохо

10.

Место забора пробы: Карасук ключ Сухой Карасук

Дата и время забора пробы: 30.6.2001 17:40

t°C	8	
Содержание растворённого кислорода	51-70%	2 удовлетворительно

Биологическое потребление кислорода	4 ppm	3 хорошо
Кишечная палочка	-	-
pH	8	3 хорошо
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0	4 превосходно

11.

Место забора пробы: Гостиница

Дата и время забора пробы: 2.7.2001 14:45

t°C	16	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	Отсутствует	3 хорошо
pH	7	4 превосходно
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0	4 превосходно

12.

Место забора пробы: Ул. Социалистическая 62-2

Дата и время забора пробы: 3.7.2001 15:30

t°C	-	
Содержание растворённого кислорода	-	-
Биологическое потребление кислорода	-	-
Кишечная палочка	Отсутствует	3 хорошо

pH	7	4 превосходно
NO <sub>3</sub> <sup>-</sup>	5 ppm	2 удовлетворительно
PO <sub>4</sub> <sup>3-</sup>	1 ppm	4 превосходно
Мутность	0	4 превосходно

### *Importance of indigenous perspectives*

#### *Introduction by Ray Pierotti*

*by Oxana Kolbeshkina, Victor Mamrashev, Julie Mekechinova, Sheldon Selwyn, and Maria Usova*

In recent years there has been considerable discussion of relationships between the worldviews and knowledge base of indigenous peoples, and that of the “dominant” or “Western European” culture. Despite superficially apparent differences that emerge from political attitudes, all Western European attitudes towards nature appear to share the same philosophical roots, i.e. Descartes, Bacon, and the Enlightenment. This philosophical tradition postulates that humans are autonomous from, and in control of, the natural world. In the writings of philosophers in the Western European tradition such as Aristotle, Descartes, and Kant, humans are regarded as creatures apart from the rest of life. In addition, citizens of industrialized societies typically adhere to the perspective that nature can be defined as places separate from humans, that can be visited, but not inhabited by “civilized” humans.

The concept of human history and culture existing independently of local places and the natural world is foreign to indigenous peoples, because for them history cannot be separated from the entire geography, biology, and environment to which they belong. “In the traditional (way of knowing), there is no such thing as isolation from the rest of creation” (Vine Deloria Jr., 1990, pg 17). Indigenous knowledge and philosophy derives from the premise that humans are a part of the natural world, no greater than any other part (Pierotti and Wildcat, 1997a,b, 1999, 2000). Respect for the non-human arises because non-humans are incorporated into the ritual representation of the community and are considered as members of the community.

The influence of local places upon cultures, with the corresponding diversity of peoples attached to those places, guarantees the existence of variation in the ceremonial and symbolic expressions of indigenous worldviews. Across this variation, however, exists a shared way of thinking and a concept of community common to indigenous peoples. Despite relocations, both forced and voluntary, indigenous people take their knowledge with them, which allows them to survive these experiences and establish sacred places in their new homes. The basis of indigenous thought includes 1) importance of local places and the natural environment in cultural identity; 2) respect for non-human entities as individuals and the existence of bonds between humans and non-humans, including incorporation of non-humans into ethical codes of behavior; and 3) recognition of humans as part of the ecological system, rather than as separate from and defining that system.

Systems of knowledge that underpin such ways of thought are derived from empirical observations resulting from patient attention to the natural world and its patterns. To live with the geography and biology of your environment without trying to alter it solely to meet human needs stands in opposition to the traditional Western European view that “space” exists to be conquered. In the indigenous tradition,

nature exists on its own terms, and individual non-humans have their own reasons for existence, independent of human interpretation. Indigenous societies existed under conditions of constant pressure on the resources upon which they depended. Thus, means had to be found to convince human communities and families to economize with regard to their use of natural resources.

Such worldviews involve representing sound ecological management in strongly ethical (or religious) terms, and developing views of the environment that stress specific bonds between nature and the human community. Such knowledge represents both science and religion, in the sense that religion is the ritual representation of the community, and a device for sanctioning moral and ethical codes. “The task of the tribal religion...is to determine the proper relationship that the people must have with other living beings” (Vine Deloria Jr., 1992). As a result, indigenous knowledge is based on and has considerable insight into the workings of nature.

As part of this project we developed interactions between indigenous peoples in the Altai region of southwestern Siberia and Native American faculty and students from Haskell Indian Nations University in Lawrence, Kansas. The Haskell contingent represented a variety of tribes, including Euchee, Potawatomi, Lakota, Shoshone, and Comanche. In the summer of 2001, two faculty and six students from Haskell traveled to the Altai region of Siberia, and in the spring of 2002, four faculty and four students from Gorno Altaisk University in the Altai came to Kansas. The following essays were written by students who participated in this program to express their feelings about the experience of sharing interactions with indigenous peoples from different parts of the world.

### *Sheldon Selwyn: Haskell student experience of the Altai*

I am a strong believer in the traditions my people used long before I came to be, and I carry with me the ways of my ancestors. I am a member of the Ihanktonwan Oyate (Yankton Sioux Tribe). My tribal teachings have taught me to carry wisdom, generosity, courage, and respect as I live my life. My trip to the Altai region of Siberia taught me a great deal about how my own government treats us as American citizens. I flew half way around the world and found conditions similar to those that I have experienced in South Dakota.

I have a strong feeling in my heart for the people of the Altai Republic; they are similar to my relatives here in the United States. I learned during my visit that socio-economic conditions in the Altai are similar to those on tribal lands within the United States. The people of the Altai are strong people, similar to my people. The easiest way for me to describe what Native American qualities are noticeably similar to those of people in the Altai Republic is that over the last few centuries Native Americans have experienced many uncalled for actions by our own (U.S.) government. Living and socio-economic conditions, poor education, and high mortality rates, etc. of indigenous people in the United States fit the common experiences of both groups of people. I can provide numerous examples of how reservation life is not right for my people. At the same time, I was able to relate similar issues with Altai Republic people.

As I met people in the city of Gorno-Altaisk, similarities became apparent with regard to numerous issues concerning public health. The predominance of poor socio-economic conditions in both peoples leads to poor health, complicated by poor education, low prosperity, and overall poor opportunities for both personal and economic growth. I can only wish that these conditions will improve in both parts of the world. I have been affected in a positive way by this trip, because one effect was to push me more toward continuing my education.

## *Nature and Altaian traditions*

Altaians and the indigenous people of the United States share the same values of respect, generosity, courage, and wisdom. They present themselves in a respectful manner when they introduce themselves to other groups of people. I was able to see some Altaian traditions and many involved ceremonies and rituals, with emphasis on the spiritual side of traditions. Other traditions I saw incorporated music into the culture with storytelling and dance. In the Altai Mountains, we were invited to see the native Altai culture (dances, storytelling, singing, and prayer). In the same trip we were also shown the surrounding mountain ranges and told ancient creation stories. We learned from their elders and the caretakers of their land the history and connection the Altai people have with the land they live on. The Altai people had an interest in preserving the animals, plants, water, and land that their Creator gave to them. Indigenous people of the United States resemble the Altai people in the things we consider to be sacred. We both honor the beauty of natural world that the Creator has allowed us to use.

I noticed how much the Altai people have respect for their water. The natural springs are protected from abuse by people and considered very sacred. The Altai people have spiritual connections to their natural springs; they offer prayer flags at various springs throughout the land. In the United States, we use prayer flags and ties in a similar way. We use them to connect our prayers with the Creator. What was really interesting was the idea that both groups of people usually put the prayer flags onto trees, where the symbolism of the tree reaching toward the sky would allow a closer link with the Creator. In my culture, putting flags on a tree does not suggest that the Creator is in the sky. It suggests that using a natural tree would bring your prayers closer to the Creator. Here in the United States, we translate the word water into water of life, as to suggest the significance of water in our lives. We realize that life would not exist without water.

The Altai people recognize the importance of water in their ecosystems by trying to protect it from pollution. We use water to purify the mental, emotional, spiritual, and physical aspects of our lives in stone lodges as indigenous people. The stone lodge ceremonies we have here in the United States leave out no element of our environment. We use water, trees, stones, plants, soils, animals, and our intentions to do well in our stone lodge ceremonies. We are considered to be in the womb of Mother Earth when we enter into the sacred stone lodge. All others that enter the lodge with us are considered our relatives. The importance of water is essential in our ceremonies; it is so important that we have ceremonies built around water just as the Altai people have. In both cultures, use of water in ceremonies is a way that our ancestors helped us to realize the importance of water in our lives. It allows us to accept the fact that any of our relatives (plants, animals, soils, etc.), along with ourselves, cannot live without water. Another important fact is that it is taught to us while we are young children, increasing the chances of us remembering the valuable information throughout life.

Understanding the interconnection by which ecosystems on Earth are closely tied with each other is shared by Altaians and Native Americans. My people try to protect their environments as much as possible, sometimes going to extreme circumstances. The Yankton Sioux tribe travels to surrounding communities and picks up materials that would otherwise be sent to landfills and recycles as much as possible. Recycling materials offer great benefits to preserving natural environments, but the profitability involved is very small monetarily. This is one way that our tribal government is protecting our land, by helping to slow the increased amount of landfills within and around our boundaries. My tribe is trying to preserve our land for future generations where laws have failed to keep landfills out of and around tribal boundaries.

The Altai people also assume the responsibility of protecting their environments from pollution. They protect their sacred natural springs and have indicated that most of their land is now considered restricted

areas where non-members cannot trespass. The Altai people have learned from the past that it is not easy to clean up after people who do not have the same values for Mother Earth as they do.

The most obvious similarity between the Altai people and Native American people is the interaction between the people and their environments. Traditional ceremonies have common interests in a way that enables communities to care for their environments. We also share interests in preserving our land for future generations and deal with environmental problems with limited resources. A great deal of respect is also given to the elders of the tribes in both countries. In return for the respecting elders is an exchange of knowledge that the elders have been given by their ancestors. The Altaian country is not developed land and is kept pure so that the processes of Mother Earth can work naturally, as it is for most places in Indian country where Native Americans have had the opportunity to keep their sacred sites clean.

### *Essays by students from Gorno-Altai State University*

#### *Julia Mekechinova*

I am 21, and am Altaian both by blood and by birth. Both of my parents are Altai people. The Altai people are divided into two subgroups – the south Altai people and the north Altai people. Altai Kizhi and Telengits are of the south; and Chalkandu, Tiba, and Kumandy belong to the north. My mother is Chalkandu, my father was Altai Kizhi; therefore I am half Altai Kizhi, half Chalkandu and belong to both the south and the north.

I was born and grew up in Gorno-Altai, the center of the Altai Republic. Our republic is part of the Russian Federation, situated in the south of Siberia. It is a very beautiful place with high blue mountains, fast clear rivers, deep lakes, fresh air full of the smell of herbs and flowers, and wonderful people who surprise and fascinate everyone who comes here. Though this place is my native land, I never get used to its beauty.

I study languages, have studied English for 14 years, and really enjoy it. I learned my first simple English expressions, such as *What is your name? – My name is... I love you, Mother, father, sister...* from my mother, who knows a little bit of the English language from school. I also had a wonderful teacher of English at school. All these things led me to continue my study of language at the university. I have already been to England and the United States, and hope that I will be able to return.

I recently became involved in and interested in ethnography. I am sure that my visit to the Haskell Indian Nations University and Kansas State universities contributed to this interest. I worked with an English ethnopsychologist, Dr. Caral Pegg from Cambridge University, this summer. We went to some villages of our republic, met ordinary people, and asked them about the traditions, spiritual beliefs and religion of the Altai people. They sang traditional songs, told us legends and myths, and described traditional Altai rituals. We saw many wonderful and significant places of Altai, which impressed me, because despite being fully Altaian, I know very little about Altai culture. I've learned many new things, which are very interesting and important for me. I now understand how important it is not to lose our traditional culture, and to preserve it and know it.

The Altai is my ancestors' land, my land. It is a land of incredible beauty and wealth. Our mountains are rich in deep forests; our fields are green and have no fences. We have swiftly rushing rivers, pure springs, and lakes that shine like jewels among the rocks. There is no exaggeration in these statements. My people who have always lived on these territories always were careful to show respect to the natural water sources.

Nature here has always been perceived as being something animate, having its own spirit and mind. The Altaian people, whose beliefs have been described as heathenism, endow everything around them with its own special power. The water is considered to be a source of life, and also of spiritual and material purity and health.

Our natural springs are traditionally sacred places which are called “Arŷan Suu,” which means “the sacred water.” These springs are usually cleaned by people and fenced to protect the water against cattle. At any spring, one can find a tree covered with ribbons which people tie onto the branches to thank nature for the gift of the water, and to ask the spring not to forget them. Altaians have a tradition in which you wash your hands and face whenever you approach a water source. Such a simple ritual helps a person to clear his or her mind and enables you to free yourself from any ill will. After this ritual, one can pray, and after praying and giving thanks, take the water for drinking and other needs. It is important to realize that this ritual is also practiced at rivers and lakes, to show deep respect to nature and the water.

It is sad for me to say that not all people today practice such traditions. The elders pay more attention to the rituals than do younger people who often ignore them. The reason, I think, can be found in the way of life, upbringing, and culture, which have changed a lot. The pollution of ponds and rivers is a serious dilemma, as well or reduces any desire to wash your hands and face in the river.

It is absolutely obvious that something must be done to bring back the old traditions and restore the harmony with nature. Losing the links with our past and forgetting our ancestors’ habits and traditions will make us weaker people and destroy our harmony with both our traditions and with nature.

Examples of destroyed harmony can easily be found. I myself grew up in a city where the past is neglected in comparison to the way people act in the country. I know a little of my people’s history and culture, but I am not completely fluent in my native language. As for my parents, they were born and grew up in the country, but later they moved to city to study. My father was a student in at our local university in Gorno-Altaiisk, but my mother was a student much farther away, in Moscow. After completing their studies, neither of my parents came back to the native villages from which they came, but stayed to live and work in Gorno-Altaiisk. They gradually learned to speak mostly Russian, and stopped speaking the language they had known since they were kids. The rural way of life didn’t fit the city, even though the city is very small. Many things changed, and soon their parents moved closer to live near them. My sister and I were raised in a way that didn’t teach us anything about traditions and rituals. When we encountered traditional rituals on some occasions, we didn’t realize the meaning and didn’t ask to have the meaning explained. It is only now that I realize the mistake my parents have made in allowing the minute links that could lead us to the roots to be broken. There is no accusation in these words, because I know my parents wished and continue to wish us only good. It is my responsibility to change the situation myself. People who lost their roots several generations ago must feel worse, and the saddest cases are those that happened to those who does not realize this loss and therefore do nothing to reconnect themselves to their traditions.

It is hard to consider how respect for nature and tradition can be restored to life, and how to stimulate and revive the interest of young people for the past, present, and future of their people and motherland. One thing of which I am sure is that conditions should not be left like they are, and ecological and cultural literacy needs to be emphasized and strengthened. The nature and ecology of the Altai Mountains is unique, just as the culture of the Altaian people is unique, like the culture of any people living on the Earth.

### *Oxana Kolbeshkina*

I was born on 26 May 1981 in Gorno-Altai. I grew up in a big family, went in for sports, the favorites being gymnastics and volleyball. In 1996, I was sent north to attend an art lyceum in Norilsk. Biology, philosophy, and psychology were my most inspiring school subjects, and when I graduated, I was awarded the title of the sociology expert's assistant.

1998 was the year when I came back to my native city, and when I married the man I love, whom I had already known for three years. My husband graduated from Gorno-Altai State University several years ago and continues his education in biology. I am a student in chemistry and biology, with an additional specialization in psychology.

I have had an interest in biology since early in school when my attention was drawn first to the general laws that underlie biology. Soon I became more and more interested in understanding the harmony of nature and the relationship of humans to nature, and I became interested in finding the answer to how long such harmony can last.

The most important problem I see is the poor ecological state of our nature and particularly of our water resources on which we depend. I cannot be indifferent to the pollution of our rivers and lakes.

Here is a case from my own experience. I've heard much of the beauty and clean water of the Aja Lake. My first visit to it took place two years ago. Being surrounded by mountains and forests left a great impression on me; however, that first impression vanished very soon. I walked around in excitement but scarcely had I approached the bank, when my emotions flew away. I was scared by the way people treated the place. They swam, bathed in the sun, and left trash right where they were at the same time. There was some stuff that floated on the surface of the lake, and I understood that it wasn't only that the danger of pollution of this lake and the forest that surrounded the lake, but that this danger threatened nature in general. I have seen people give similar treatment to the Katun River, which is our largest and most sacred river. Development for tourism caused contamination of the water. The people here leave much trash and don't notice that they insult nature. I clearly understand how cruel the modern world is, and that industry needs to be developed, but this barbarous attitude to nature I won't put up with.

Every year brings me increasing unease about the gulf between mankind and nature that grows bigger and bigger. Soon we may forget the notion of harmony of the relationship between man and nature itself. The biological disasters make humans suffer both in terms of daily life and may also be causing damage to human genes as well. What type of future are we preparing to give to our children? I'm afraid to give an answer to this question, because it is too obvious.

I love my republic; I love the nature that is part of my home. I wish that my children are able to live in ecologically safe places, and I wish they would be able to drink water that brings them health, not illness.

### *Victor Mamrashev*

I was born on 19 January 1981 in Gorno-Altai in southwestern Siberia. I combined my school studies with sport and study in art school. I graduated secondary school in 1998 and entered university in Gorno-Altai, where I became a student of chemistry and biology with a specialization in chemistry and ecological environment. I'm in my fifth year, and after I graduate next year, I will continue my study of chemistry.

In July 2001, I took part in the joint project of students and professors from GASU and HINU (Haskell Indian Nations University) when the Native American students came to the Altai. We worked at Teltskoje Lake in connection with assessing water quality. In March 2002, I read a report on the project of the common work of GASU and HINU.

Since the beginning of time, people living close to nature have always had a special attitude with regard to nature, no matter whether they were indigenous people of America or Altai. Every natural object was assumed to have a spirit and a soul, and also to be cognizant. Every natural phenomenon was given a mysterious or spiritual component. This attitude generated respect for every living and non-living thing. People were eager to live in harmony with nature, to be part of nature, and not above it. That is why they did not experience what the Western way of thought considers to be environmental problems.

The contemporary human desire to be independent from nature has created an unnatural environment for us to live in, and makes mankind and nature opposed to each other. Modern people place comfort, warm homes, clothes, and food as high priority. Our self-involvement has led us to ignore the costs this imposes on the natural world. Nature is regarded, simply, as the source of material wealth, and is not considered to be source of spirituality at all. The words of a Communist “thinker” might be taken as the motto of modern civilization – “We shouldn’t wait for good from nature, taking it is our task.”

I remember a kind of an experiment carried out in the former USSR. To cultivate the land that was too arid for regular cultivation, a river mouth was altered that was a major source of water for the Aral Sea. This irrigation diverted such large amounts of water that the sea quickly became shallow and more saline. No living beings could live in salt water of the sea, whose new shorelines were several kilometers closer to its center. Both the fish and human navigation died.

The result of this experiment was the following: the small profits realized from cultivating the land did not defray expenses, because the changes caused the death of both navigation and the fishery on which people depended. Saddest of all was that the change resulted in the death of a huge ecosystem. The people’s deliberate and thoughtless intrusion caused the major disaster. There were some more large-scale foolish plans (e.g., to change the current direction of some Siberian rivers) that, fortunately, have not yet come true.

Notwithstanding the good aims of contemporary society, combined with deep knowledge of ecology, biology, and climate science, we cannot precisely predict the possible consequences of what people do. Nature remains always more farsighted and wise than humans, patiently checking our mistakes. It manages to sustain itself and us, yet sometimes it fails. How long can it continue? That is why we should start respecting it again like our ancestors always did.

The nature of our republic possesses extraordinary beauty, although we don’t have strong economic growth at the same time. While choosing the right way to develop our economy, the most important aspect for us, according to which we make our choice, must be the future prosperity of both economic and natural factors together.

Economic growth or progress is considered to be an objective natural process, so it would be foolish trying to prevent it or to reverse development. What we really need today is to figure out how to solve the economic problems while not creating new ecological ones.

## *Maria Usova*

I am 21 and just graduated from Gorno-Altai State University with a specialization in languages. Because of my English, I have made many American friends, and worked as a translator for representatives of Haskell and Kansas State Universities, which helped develop the relationship with my university Gorno-Altai.

My elder brother, younger sister, and I were born into the family of two teachers, who came to Ongudai (the village where we were all born) to give lessons in geography, biology, mathematics, physics, and astronomy for kids at the local school. Our family was happy because as far back as I can remember, we were always asking questions, and our parents told us rather scientific story-tales about countries on the other side of the globe, about the people who lived there, and about stars and planets and constellations in the night sky.

We liked to go into the mountains that surround our village. There I was taught how to travel through the dense forests and how to define my location in unfamiliar places. I also learned to find edible mushrooms, berries and nuts. I remember how much impressed I was the first time I saw snakes and heard them hissing in high grass. The rivers high in the mountains were very cold. My father even showed me the glacier, and I wondered how snow could be here when it is summer in our village! My parents are good photographers and taking pictures was their hobby. They made many pictures that preserve the beauty of those days, which today has been changed.

My family spent much time together and with our relatives, too. I remember my mother tried to draw a family tree, but even in just the last 100 years the family tree is very big. We laugh and say simply that we are Russians. In this case the word 'Russian' indicates the mixing of a variety of bloods and roots. When people don't know their exact ancestry (and it is always difficult to say), they usually say, "I'm Russian." I refer to myself as Russian, even though I have Ukrainian and Altaian blood. Perhaps this multiple ancestry made me interested in languages.

Any person who is proud to be a citizen of his country is raised with love and affection in her heart for the motherland that grows stronger over the years. Russia has been the largest country on the world's map for many centuries already – we really have a huge motherland we love. How can each of us find his little part of motherland in these vast spaces? Though every Russian realizes where "my motherland" is. It is where a person was born, was taught to speak her native language, where his parents opened the world for him for the first time...

I'm proud I was born in Altai. Every day here gives me the possibility to enjoy the fantastic nature around me as it changes daily and seasonally, like in a fairyland. I close my eyes and see the emerald of green grass and hear the solemn twitter of birds, the hissing songs of snakes, the boiling and rushing sounds of our mountainous creeks, and the jingling of ice springs – these are things my brother and I were shown and told stories of by our parents when we were kids. That is how they taught us to love nature.

I remember the variety of different impressions shown by different people when they first met the beauty of our Altai – there were people who got surprised, some were astonished and remembered their impressions of encountering this beauty for a long time, some longed for these mountains afterwards, and some have never left this place. The water incessantly gushing from the rocks, fine drops of spray like beads and silver dew... the burning palette of fire tongues... magic sounds of springs of the Altai topshur... the popular wisdom of the Altai songs... severe whiteness of the mountainous peaks and glaciers yesterday, today, tomorrow...always.

“I can’t help but feel sadness when I think of our generation...”. These are the words of a classic work of literature, and I think the author underlined the very truth in this simple sentence. It’s true that people perceive nature differently, and the meaning of ecological and environment have changed in the consciousness of modern people. We won’t hear people say directly that they don’t care for nature and have no respect for the place they live, but such an attitude is obvious from the behavior of some people. There’s nothing wrong with some people wanting to have a rest at the river’s bank, but the ultimate question is— how do they organize and structure their leisure. Do they behave in a respectful manner? Pretending that environmental problems don’t exist or the indifference of most people to such problems renders our claims to the authorities about how to behave properly useless. We of the younger generation must start first! And if we succeed, we’ll be rewarded.

To close, I will tell you one more story. It happened in Ongudai, where my parents live (in southern Altai). As a calm summer night fell, we heard the astonished and excited call of my father who wanted us to come out quickly— he was calling us to look at the moon rainbow... Have you ever seen a moon rainbow? I have here in the Altai.

To finish, we would all like to honor the memory of the father of one of the Altaian students, Alexander Mekechinov. We lost him in June 2002. He was about 54, and only now we realize that terrible meaning of the phrase, “*We never appreciate those things we have.*” He was a very strong man with an open heart and generous soul. He was like a burning fire and burned down too early.

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## Appendix E. Water-quality monitoring modules

### *Introduction*

Oh, sacred Waters,  
Be our protection  
Satisfy our thirst  
Give us happiness  
Which is higher than any treasure  
Higher than all world rulers.  
Oh, Waters, give us the blessed consolation.

"Rigveda", sacred Indian book

Nature is sacred for native Altaian people. Mountain tops and passes, huge Siberian pines, animals and birds are addressed as human beings. Still, rivers, lakes and springs occupy a special place in the life and folk-lore of the Altaians. Practically every river and lake has a legend or a story devoted to it. One can recognize a sacred spring seeing pieces of cloth tied to the trees nearby. Water is the highest treasure of nature for the Altaians.

Water is the most precious resource, which provides the existence of all living beings on the Earth. Living organisms are connected by thousands of threads with water. The Mongolian proverb says: "A man starts to value water only after the last spring dies".

Water is most sensitive to pollution. Household and industrial waters turn clear rivers, which were rich in fish, into muddy pits filled with poison and microbes. Excessive abundance of blue-green water plants leadsto a low content of oxygen in water and to a slow dying of life in a water reservoir. Water quality issues and observance of necessary sanitary norms is considered one of the basic priorities, which can provide sustainable economic and ecological development of the Altai Republic. Following are the translated instructions from the water quality kits being distributed in the Altai Republic (LaMotte Low Cost Water Monitoring Kit 5886).

### *Предисловие*

*О, священные воды,  
Будьте нашей защитой  
Утолите нашу жажду,  
Дайте нам счастье,  
Которое выше всех ценностей  
Выше всех правителей мира,  
О, воды, дайте нам  
Святое утешение.  
Ригведа  
Священная древнеиндийская  
Книга*

Природа священна для алтайцев. Горные вершины и перевалы, огромные кедры, животные и птицы были одушевленными для них. И все-таки реки, озера и родники занимают особое место в жизни и фольклоре алтайцев. Практически каждой реке и озеру посвящена легенда. Священные источники легко узнать по полоскам белой материи, привязанным к рядом стоящим деревьям. Вода самый дорогой дар природы для алтайцев.

Вода – самый драгоценный ресурс, обеспечивающий существование всего живого на Земле. Живые организмы связаны с водой тысячами нитей. Монгольская пословица говорит: « Человек начинает ценить воду только после высыхания последнего родника.»

Вода очень чувствительна к загрязнению. Бытовые и промышленные стоки превращают богатые рыбой реки в грязные канавы полные яда и микробов. Увеличенное количество сине-зеленых водорослей приводит к пониженному содержанию кислорода в воде и медленному исчезновению жизни водного резервуара. Вопросы качества воды и соблюдение необходимых санитарных норм являются одним из основных приоритетов, который может обеспечить устойчивое экономическое и экологическое развитие Республики Алтай.

### **Dissolved-oxygen procedure**

Определение содержания кислорода в воде.

1. Измерьте температуру образца воды при помощи шкалы.
2. Зачерпните пробиркой воду, чтобы вода покрывала ее до краев.
3. Опустите две таблетки реактива на растворенный кислород в воду.
4. Закройте пробирку крышкой. Убедитесь, чтобы в воде не было пузырьков воздуха.
5. Взболтайте содержимое до полного растворения реактива. Это может занять 4 минуты.
6. Подождите 5 минут до появления цвета.
7. Сравните полученный цвет образца воды с таблицей для определения содержания кислорода. Результаты опыта запишите в промилле.

### **Biochemical oxygen demand (BOD)**

Биохемическое потребление кислорода (БПК).

БПК – это определение количества растворенного кислорода, используемого бактериями при распаде органических отходов. Из-за того, что в загрязненных реках и стоячей воде бактериями потребляется большое количество кислорода, возникает его недостаток для развития других водных организмов.

### **BOD procedure**

Определение БПК.

1. Зачерпните пробиркой воду, аккуратно закройте пробирку крышкой, оставляя в ней как можно меньше воздуха.
2. Оберните пробирку алюминиевой фольгой и оставьте в темном месте при комнатной температуре на 5 дней.
3. Разверните пробирку, опустите две таблетки реактива на растворенный кислород.
4. Закройте пробирку крышкой. Убедитесь, чтобы в воде не было пузырьков воздуха. Взболтайте содержимое до полного растворения реактива. Подождите 5 минут.

5. Сравните полученный цвет образца воды с эталонами цветов. Разницу между уровнем растворенного кислорода в незакрытой фольгой пробирке и закрытой и составляет биохимическое потребление кислорода в образце воды.

### ***Nitrate***

Нитраты.

Нитрат необходим водным растениям и животным для образования белка. Распад отмерших растений и животных организмов освобождает нитрат в водную среду. Содержание нитрата в воде ускоряет процесс роста и разложения растений, тем самым снижая уровень кислорода в воде. Сточные воды – это главная причина повышения содержания нитрата в водной среде, в то время как удобрения и стоки вод с сельскохозяйственных полей тоже ведут к его увеличению. Питьевая вода с высоким содержанием нитрата влияет на способность крови человека принимать кислород. Вы обязательно должны провести профессиональное тестирование питьевой воды на содержание нитрата.

### ***Nitrate procedure***

Нахождение нитратов.

1. Наполните пробирку водой до шкалы 5 мл.
2. Опустите в пробирку одну таблетку реактива на нитрат.
3. Закройте пробирку крышкой и взболтайте содержимое до полного растворения реактива.
4. Подождите 5 минут до появления красного цвета.
5. Сравните полученный цвет образца воды с эталонами цветов. Результаты опыта запишите в промилле.

### ***pH***

pH

Измерение pH – это измерение качества воды на кислотность и основность. Шкала pH изменяется от 0 (повышенная кислотность), до 14 (повышенная основность), где 7 – нормальный показатель. Нормой pH в воде является 6.5 – 8.2. Большинство водных организмов адаптируются к особому уровню содержания pH и могут погибнуть при его малейшем изменении. На содержание pH могут повлиять воды промышленных отходов, воды с сельскохозяйственных земель, а также неправильная организация добычи полезных ископаемых.

### ***pH procedure***

Нахождение pH

1. Наполните пробирку водой до шкалы 10 мл.
2. Опустите в пробирку одну таблетку реактива на pH.
3. Закройте пробирку крышкой и взболтайте содержимое до полного растворения реактива.
4. Сравните полученный цвет образца воды с эталонами цветов. Результаты опыта запишите в промилле.

## ***Phosphate***

### **Фосфаты**

Фосфат необходим для роста растений и животных, поскольку он является основным элементом метаболических реакций. Повышенное содержание фосфата может вызвать отклонение от нормального роста растения, что приведет к повышению активности бактерий и снижению уровня растворенного кислорода в воде.

Фосфаты появляются вместе с отходами жизнедеятельности человека, в связи с промышленным загрязнением, стоками вод с сельскохозяйственных угодий и т.д.

### ***Phosphate procedure***

#### **Нахождение фосфатов**

5. Наполните пробирку водой до шкалы 10 мл.
6. Опустите в пробирку одну таблетку реактива на фосфат.
7. Закройте пробирку крышкой и взболтайте содержимое до полного растворения реактива.
8. Подождите 5 минут до появления голубого цвета.
9. Сравните полученный цвет образца воды с эталонами цветов. Результаты опыта запишите в протоколе.

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## **Appendix G. Documentary produced for ALO Synergy in Development 2002 Conference**

A video documentary on the HINU-GASU exchange project is available for download at < <http://www.seekpeace.com/civil/hinugasu.mov> >.

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