

**Annex to 2012 Report on Implementation of Agreement
Between the United States and China on Science and Technology**

Department of Agriculture

Agricultural Research Service (ARS):

On December 10, 2002, Ministry of Science and Technology (MOST) former Minister Xu Guanhua and former USDA Secretary Ann Veneman signed the Protocol Between the Department of Agriculture of the United States of America and the Ministry of Science and Technology of the People's Republic of China on Cooperation in Agriculture Science and Technology. This protocol was delegated by the USDA Secretary to the Under Secretary for Research, Education and Economics (REE) to lead the annual joint meeting. This protocol identified several priority areas for cooperation:

- agricultural biotechnology;
- natural resource management;
- dairy production;
- food safety;
- agricultural products processing;
- water-saving agricultural technology; and
- bioenergy

An annual Joint Working Group (JWG) was established in 2003. In July 2009, USDA/REE Under Secretary Raj Shah hosted his counterpart for the JWG to discuss the protocol and also signed Annex VIII for food safety research. Cooperation focused on agricultural biotechnology, natural resource management, dairy production, food safety, agricultural products processing, water-saving agricultural technology, and bioenergy. During 2010 and 2011, the JWG met twice to discuss implementation of the protocol, which has numerous activities under each of the above mentioned themes. The 8th annual JWG met in Yangling, China, and the 9th JWG met in Las Cruces, New Mexico. This annual meeting is a time for the REE Under Secretary and the MOST Vice Minister to hear updates on the protocol and to set research guidelines, prioritize resources and assess impact.

At the 8th JWG REE Under Secretary and MOST Vice Minister signed Annexes IX and X for Dairy Production and Water Saving Technology research. These are

the most recent research annexes to be signed under the Protocol. During the 9th JWG there was discussion strengthening bilateral research engagement to focus on three areas of food security research; biotechnology, water saving technology, and genebank technologies.

As a result of the 9th JWG USDA Secretary Vilsack signed a letter of intent with MOST Minister Wan in November to continue a bilateral dialogue with MOST on three “flagship programs” for food security that will utilize USDA and MOST expertise.

In 2007, the USDA signed an MOU with the U.S. Department of Energy and the Chinese National Development and Reform Commission (NDRC) for bioenergy development. In 2010-2011 NDRC-National Energy Administration (NEA) hosted an Advanced Biofuels Forum in Beijing and USDA/DOE hosted a second annual forum in Washington and Georgia. USDA is interested in cold- and drought-tolerant sweet sorghum germplasm grown in China and has initiated a dialogue with NEA on a feedstock development program.

ARS also supports the Sino-American Biological Control Lab (S-ABCL), which is on the campus of the Chinese Academy of Agricultural Sciences in Beijing and jointly investigates the control of invasive insect pests and resistive plant species.

Animal and Plant Health Inspection Service (APHIS):

In 2010-2011, APHIS held, co-sponsored, or participated in events on the following topics: wildlife borne diseases, biotechnology regulation, wildlife borne diseases sampling and surveillance, veterinary epidemiology, international transboundary animal disease, and disaster and emergency medicine.

World Conference on Disaster & Emergency Medicine May 31-June 3, 2011, China: The World Conference is sponsored each year by the World Association of Disaster and Emergency Medicine. This year’s congress was held in Beijing, China in conjunction with the 14th Conference of the Chinese Society for Emergency Medicine. The conference included a session on veterinary medicine for the first time. Delegates from a variety of disciplines including approximately fifteen veterinarians attended. The benefits of APHIS participation included contributions of expertise and networking at veterinary medicine session and the leadership role in helping the conference planners shape future veterinary medicine sessions.

2011 International Course on Veterinary Epidemiology Aug. 22-Sept. 02, 2011 USA: APHIS, in collaboration with the Colorado State University and the Association of Veterinary Epidemiology and Preventive Medicine (AVEPM), has

implemented the annual two-week international course to provide training to enhance the epidemiological skills of international veterinarians. This course was designed to provide veterinarians with basic skills and concepts in epidemiology. An emphasis on highly pathogenic avian influenza (HPAI) was made in the course as well as other important transboundary diseases such as FMD, H1N1, and Bluetongue, which continue to be significant threats to animal health in regions around the world. Participants from the following countries were represented: Armenia, Brazil, China, Gambia, Iraq, Kenya, Korea, Kazakhstan, Mexico, Nigeria, Panama, Philippines, Thailand, Uganda, Austria, Turkey, Haiti, and India.

2011 International Transboundary Animal Disease Course Sept. 17-Oct. 1, 2011 USA: The ITAD course combines classroom and laboratory exercises enabling participants to first review the etiology of the specific transboundary animal disease being studied and then observe selected diseases in the laboratory. During the two weeks of the course, participants conduct clinical examinations of animals inoculated with selected transboundary animal diseases (TADs) and later perform full necropsies under the direction of USDA foreign animal disease experts. This experience of observing the clinical symptoms and then conducting hands-on necropsies provides the most comprehensive and practical way to study these diseases. There were 23 participants from the following countries: Armenia, China, Croatia, Dominican Republic, Cameroon, Kenya, Haiti, India, Korea, Mexico, Peru, Russia, Saudi Arabia, Senegal, Ukraine, and Yemen.

China – Twinning Project, CEAH and CAHEC/China; August 8-25, 2011: Centers for Epidemiology and Animal Health (CEAH) – China Animal Health and Epidemiology Center (CAHEC) Twinning Project FY 2011. During calendar year 2011, two collaborative events occurred. Two CEAH scientists provided training on basic epidemiology to 24 CAHEC scientists in Qingdao. The two-week course was designed to provide the framework upon which future trainings and projects will be based. In addition to training, time was spent identifying potential surveillance projects and the data, which will be necessary to support the projects. In August, three CAHEC scientists spent two weeks at CEAH working on the surveillance project that had been identified. The twinning contract supported travel for two of the scientists and CAHEC paid the costs for the third scientist. The project chosen was to develop a brucellosis surveillance plan for three China cities (similar to counties in the United States). In addition, three and a half days of training was provided on the outbreak surveillance toolbox that the CEAH National Surveillance Unit has developed.

China – Training Wildlife Borne Diseases Sampling and Surveillance (Ft. Collins), November 15-24, 2010: Wildlife Services' National Wildlife Disease Program (NWDP) implemented a training on wildlife borne diseases sampling and surveillance for an audience of 12 Chinese animal health officials at the department director level. The training occurred in Ft. Collins, Colorado, and Washington, DC. The Chinese participants were representatives from the Chinese Academy of Sciences (CAS) and the Chinese State Forest Administration (SFA). While in Washington, DC, the participants had meetings at the USDA South Building and the National Zoo. At the National Zoo, the participants received a guided tour from the Zoo Director with particular emphasis on the Zoo's panda breeding program. The Chinese participants have oversight of the Chinese portion of the National Zoo's interchange program with China for pandas. This activity was part of a MOU between the WS NWDP and the Chinese Academy of Sciences.

China – Wildlife Disease Presentation in Alexandria, Virginia, April 11-13, 2011: NWDP attended a U.S. Fish and Wildlife Service activity in Alexandria, Virginia, to give a presentation on wildlife diseases. The audience for the presentation was a high-level delegation from the Chinese State Forest Administration. The activity was part of a MOU between the NWDP and the Chinese Academy of Sciences.

China – Cooperative Surveillance Activities for Wildlife Diseases March 7-10, 2011: NWDP attended a cooperative session on surveillance activities for avian influenza and other wildlife diseases in Beijing, China. The session specifically implemented protocol review activities regarding China's surveillance techniques for avian influenza and other wildlife diseases. The activity is part of a MOU between the NWDP and the Chinese Academy of Sciences (CAS) including the Chinese Institute of Zoology, located within the CAS. According to NWDP, there is ongoing communication between the NWDP and the CAS regarding wildlife disease surveillance techniques, and this trip was an opportunity to implement protocol review of current techniques.

China, Wildlife Disease Training on Sample Collection and Surveillance September 1-2, 2011: NWDP participated in a wildlife disease sample collection and surveillance training held at the University of Harbin in Harbin, China. The training was organized in collaboration with the UN FAO and Colorado State University. There were approximately 50 participants at the training, including approximately 35 officials from the China State Forest Administration. Dale Nolte was a presenter. The activity was part of a MOU between the NWDP and the Chinese Academy of Sciences and the Chinese State Forest Administration.

China, Beijing Regional Workshop, Wildlife Borne Diseases August 29-30, 2011: NWDP attended a regional workshop in Beijing, China, on wildlife borne diseases. The workshop was organized by China's bureau of Life Sciences and Biotechnology in coordination with the China Institute of Zoology, and the China State Forest Administration. The activity was part of a MOU between the NWDP and the Chinese Academy of Sciences. The Bureau of Life Sciences and Biotechnology and the Institute of Zoology are both part of the Chinese Academy of Sciences. The regional workshop included representatives from the following countries: Indonesia, Russia, Bangladesh, Philippines, Canada, Vietnam, South Korea, Japan, Cambodia, Thailand, Kenya, and the United States.

Biotechnology Working Group, Regulatory Workshop Sept. 19-23, 2011 China: As China continues to expand its research and development of biotechnology crops, it is anticipated that Chinese biotechnology products could end up in the U.S. market. The workshop provided participants with a detailed description of the U.S. regulatory framework for biotech crops and facilitated partnership between China and the U.S. on the use of genetically engineered crops. The workshop described how developers can obtain the necessary regulatory reviews prior to products being placed on the U.S. market. The workshop is expected to build upon previous discussion between U.S. and Chinese regulatory officials and explain how Chinese participation in the U.S. regulatory system may benefit both China and the United States.

Asia Pacific Conference on Wildlife Borne Diseases, July 19-23, 2010: The NWDP collaborated with the Chinese Academy of Sciences (CAS), Bureau of Life Sciences and Biotechnology (BLSB) and the Chinese State Forestry Administration, Department of Wildlife Conservation and Nature Reserve Management to sponsor the Asia Pacific Conference on Wildlife Borne Diseases. The conference was hosted by the CAS Institute of Zoology (IOZ) in Beijing, China on July 19-23, 2010. Approximately 120 participants attended the conference representing 15 countries. Objectives of the meeting were to share scientific expertise on wildlife-borne diseases among scientists; promote exchange among scientists and resource officials; provide an opportunity for promoting collaboration among countries within the Asia-Pacific region; and encourage exchange with other countries.

Foreign Agricultural Service (FAS):

2008-2009 USDA and China exchanged approximately 20 agricultural related science and technology teams – 10 U.S. teams and 10 Chinese teams – on an annual basis under the Scientific Cooperation Exchange Program in order to

exchange technical information and/or identify potential areas for joint cooperation. Teams of up to 5 members visited the partner country for up to 15 days, with multi-city agendas planned in consultation with USDA and China's Ministry of Agriculture designed to strengthen linkages between academic, private and public institutions. Areas for cooperation identified include sustainable forestry policies, agricultural subsidies and credit insurance systems, fruit breeding and cultivation technology, fertilizer management, produce production and quality standards, and biomass. This collaboration included a five-member USDA Economic Research Services team visiting farmer cooperatives and agricultural enterprises in China in order to better understand how China is implementing its 2006 law on farmer cooperatives, to learn how cooperatives are adopting better food safety practices, and offer advice based on U.S. experience. Other programs included cooperation in risk analysis training, fellowship programs, water resource management and aquaculture, meat safety, and pesticide regulation. Over 2,100 American and Chinese scientists and agricultural professionals have participated in this program since its establishment in 1978.

National Institute of Food and Agriculture (NIFA):

Through various competitive grants programs and other mechanisms, NIFA provides U.S. higher education institutions with support for research, extension and teaching programs that advance American agriculture. Several of those institutions use NIFA's support to engage with Chinese colleagues, and by doing so, enhance agricultural science programs here in the U.S. through student and faculty exchanges funded through grants, and collaboration on ideas, techniques and data. Areas of collaboration included agro-biotechnology, bio-energy education, veterinary sciences, food safety, youth development, and aquaculture.

NIFA is providing support (2008-2013) to the University of California for a project called "The Optimal Gas Tax for California." The main goal of this project is to use research and data to calculate the optimal gasoline tax for the state of California. During the project, the research was expanded to estimate the optimal gasoline tax for China as well.

NIFA is providing support (2008-2013) to the University of Florida for a project called "Economic Impacts of International Trade and Domestic Policies on Southern Agriculture." The main purpose of this project is to employ quantitative methods and international trade theories to examine how domestic and foreign agricultural policies, as well as international institutions and policies, affect the competitiveness and performance of commodity markets in relation to agriculture. The international comparison for this project included an in-depth analysis of the

dramatic changes over the last several decades that food consumption in China has experienced.

NIFA is providing support (2008-2012) to Purdue University for a project titled “Home Learning Environments and School Readiness Skills of Preschool Children.” The main goal of this project is to gain a further understanding of parents’ key practices that stimulate children’s school readiness skills, which will ultimately lead to better academic achievement. This project utilized an ongoing cross-cultural investigation of the development of preschoolers’ self-regulation skills in four cultures including: the United States, China, Taiwan, and South Korea.

NIFA is providing support (2008-2012) to Purdue University for a project called “Functional Foods Containing Novel Carbohydrates for Energy Balance and Improved Health.” The goal of this project is to develop and examine carbohydrate-based foods with a property of promoting energy balance as one of the essential and feasible measures to prevent the occurrence of obesity. This research included student participation from the Jiangnan University, China.

NIFA is providing support (2007-2012) to South Dakota State University for the project “Utilizing Biotechniques to Enhance Wheat Germplasms.” The main goal of this project is to identify the key genes and their markers for the control of FHB (a destructive disease in wheat and barley). The research collaboration for this project included scientists from Sichuan Agricultural University, China.

NIFA is providing support (2007-2012) to Utah State University for a project called “Using DNA Sequences to Untangle the Relationships of Aphids and Provide Molecular Signatures for Agricultural Pests.” The goal of this project is to collect DNA sequence data to help identify aphids and to help understand relationships among aphids, especially pest species. Scientists from Shanxi University, China assisted in a world-wide sample collection that represented all major aphid pest species in North America.

NIFA is providing support (2007-2012) to Michigan State University a project called “Enhancing Profitability of Berry Production in Michigan.” The goal of this project is to develop techniques to increase profitability of current berry production systems, and to investigate alternative species of berries for production in Michigan. In order to test other species of berries, Wolfberry (*Lycium barbarum*) genotypes were collected from commercial sources in North America and China.

NIFA is providing support (2007-2012) to Michigan State University for a project titled “Super Markets: Examining the Entry of U.S. Agribusiness Products into Chinese and Indian Consumer Retail Markets.” The goal of this project is to understand China and India’s food distribution systems, in order to make these complex systems more transparent for United States food producers and processors. Informative details regarding Chinese food systems, consumer opinions, buyer-supplier relationships, and emerging markets were collected for this project.

U.S. Forest Service (USFS):

With similar climate conditions and species composition, many forest ecosystems in China mirror ecosystems in the U.S. These commonalities make technical exchange in areas such as forest fire management, invasive species control, forest health restoration, and climate change management mutually beneficial. To this end, the USFS signed an MOU under the S&T umbrella agreement with the Chinese State Forestry Administration (SFA) in 2000. Since then, we have had a highly fruitful and focused exchange including the following activities between 2010 and 2011: In July 2010, the USFS hosted seven forest managers from SFA for an eight-day study visit to the United States with meetings focused on the U.S. approach to forest fire management, converting biomass to biofuel, pest species control, watershed management, climate change adaptation, and sustainable tourism. Over the past decade, we have established eleven community-based protection and restoration pilot sites in a variety of forest ecosystems across China. In June 2011, a group of representatives from USFS, the Memphis Zoo, and SFA revisited two of these forest health demonstration sites in China to assess them and jointly determined the path forward. In June 2011, the USFS renewed its MOU with SFA and jointly outlined the technical activities that its agencies will collaborate on over the next two years. Finally, in October 2011 the USFS hosted seven delegates from SFA for a study visit focused agency management and administration and on law enforcement.

Department of Commerce

National Institute of Standards and Technology (NIST):

NIST has one binding bilateral agreement with the Chinese Academy of Sciences for cooperation in the fields of chemistry, physics, materials and engineering measurement sciences. In addition, NIST administers a Protocol between the U.S. Department of Commerce and the Chinese Administration for Quality Supervision, Inspection and Quarantine, under which three Joint Working Groups were established in metrology, standards, and conformity assessment, to develop and implement activities. Several visits, research activities and workshops have taken place since the signing of the Protocol in 2008. NIST also collaborates with China through the Protocol Concerning Scientific and Technical Cooperation in the Earthquake and Volcano Sciences signed in 2009, which is co-signed on the U.S. side by NSF, NIST, and USGS and on the Chinese side by National Natural Science Foundation and the China Earthquake Administration. Finally, NIST provided support for several workshops with Chinese representatives on key metrology areas. These workshops are co-sponsored by NIST, the U.S. industry and several Chinese institutions such as the Chinese Academy of Sciences (CAS) and National Institute of Metrology (NIM).

National Oceanic and Atmospheric Administration (NOAA):

NOAA administered protocols facilitating cooperation with China in: 1) atmospheric science and technology; 2) marine and fishery science and technology; and 3) implementing UNGA Resolution 46/215 in the North Pacific Ocean establishing boarding procedures for law enforcement officials of either country to board and inspect U.S. or Chinese-flagged vessels suspected of driftnet fishing. NOAA participated in several meetings relating to these protocols in 2008-2009, including: the 16th session of the NOAA and China Meteorological Administration (CMA) Joint Working Group for the Atmosphere Protocol in Beijing, China during October 20-21, 2008; the Marine Science Forum under the Marine and Fishery Science and Technology Protocol in Xiamen, China in November 2008; and the Ocean Data and Information Panel under the Marine and Fishery Science and Technology Protocol, held in September 2009.

In 2010-2011, NOAA participated in several meetings relating to its three protocols: the 17th session of the NOAA and China Meteorological Administration (CMA) Joint Working Group for the Atmosphere Protocol; the 18th session of the NOAA-State Oceanic Administration (SOA) Joint Working Group for the Marine and Fishery Science and Technology Protocol; the 8th meeting of the Living

Marine Resources Panel; and the 2nd NOAA-SOA Marine Science Forum under the Marine and Fishery Science and Technology Protocol. NOAA and China's State Oceanic Administration agreed to a 2011-2015 Framework Plan for Ocean Science and Technology Cooperation.

Department of Defense

The U.S. Department of Defense attended twelve international S&T conferences in China in 2008-2009, and over twenty in 2010-2011, receiving briefings and providing approved presentations. Among the conference topics were vacuum electronics, energetics, ultra wide band antennas and arrays, non-oxide glasses and optical materials, crystal growth technologies, robotics, portable fuel cells, non-oxide glasses, metamaterials, ballistics, and nanomaterials for electrochemical systems. The Department also engaged in exchanges with China on pandemic influenza and other health-related issues, and on energy, disaster management, and environmental issues.

Department of Energy

The Department of Energy has supported U.S.-Chinese collaborations for more than 30 years. DOE has three ongoing agreements under the U.S.-China S&T Agreement: Implementing Accord on High Energy Physics (1979), the Protocol on Nuclear Physics and Controlled Magnetic Fusion (1983), and the Fossil Energy Protocol (2000). DOE also cooperates on projects relating to climate change science and clean energy research. A \$150 million Clean Energy Research Center was established in November 2009 through collaboration among DOE and China's Ministry of Science and Technology and its National Energy Administration. In total, more than 100 U.S.-China research activities were defined.

The Clean Energy Research Center is funded equally by the United States and China. The U.S. government contributes \$12.5 million in funding to each of three areas: Building Energy Efficiency; Clean Vehicles; and Advanced Coal Technology. These contributions are matched by consortia supporting each area composed of university and industry partners and national laboratories. Though each country's contributions fund its own-country partners, work projects are planned and carried out jointly.

Outcomes of the 2008-2009 U.S.-Chinese collaborative activities included over 250 joint publications in climate change research; deployment of the Atmospheric Radiation Measurement mobile facility in Shouxian and the subsequent obtaining of unique cloud and aerosol data essential for the improvement of climate models; participation in an advanced neutrino experiment at Daya Bay, China; access to the Chinese Experimental Advanced Superconducting Tokamak, a superconducting tokamak, which is not available in the United States, in preparation for ITER operation; and contributions to the Continuous Electron Beam Accelerator Facility 6GeV experimental program at Thomas Jefferson National Accelerator Facility.

Outcomes of 2010-2011 activities included DOE participation in an advanced neutrino experiment at Daya Bay, China; research collaborations leading to the observation of the helium antimatter nucleus at Brookhaven National Laboratory; generation of more than 25 journal articles from U.S.-Chinese collaborations in fusion energy sciences; and contributions to the Continuous Electron Beam Accelerator Facility 6GeV experimental program, 12GeV upgrade, and accelerator research at the Thomas Jefferson National Accelerator Facility.

Department of Health and Human Services

HHS cooperates with China under the S&T Agreement including areas of public health, biomedical research, health-care and health policy research, health administration, finance, and the control and prevention of disease, prevention of neural tube defects, AIDS cooperation, emerging and re-emerging infectious diseases, collaboration in integrative and traditional Chinese medicine, and regulation of food, drugs, and medical devices. HHS also collaborated with China in global immunization, outbreak response, surveillance, and epidemiologic training through its Centers for Disease Prevention and Control (CDC). In addition, HHS collaborated with China through its National Institutes of Health (NIH) in basic biomedical and behavioral sciences. An MOU with the Chinese Academy of Sciences supports this collaboration by identifying and supporting new training opportunities for scientific researchers and stimulation of new areas of mutual research. In FY 2009, 18 out of 27 HHS/NIH institutes and centers were involved with counterparts in China, and in FY 2010, 17 out of 27 HHS/NIH institutes and centers were involved with counterparts in China, mainly through a domestic grant to a U.S. investigator. HHS also collaborated with China through its Health Resources and Services Administration (HRSA) in the National Marrow Donor Program Agreements for Unrelated Blood Stem Cell Transplants. Additionally, in 2008 FDA opened offices in Beijing, Shanghai, and Guangzhou, staffed by policy and technical experts and inspectors, giving FDA the capacity to inspect more Chinese facilities; work with the exporting industry; and provide technical advice to its Chinese counterparts. FDA's China Office represents an integral element of FDA's efforts to strengthen the safety of Chinese goods exported to the United States, protecting Americans in the areas of food and drug safety.

Department of Interior

Fish and Wildlife Service:

Under the Protocol on Cooperation and Exchanges in the Field of Conservation of Nature, signed in 1986, U.S. Fish and Wildlife Service (FWS) has had an ongoing dialogue with wildlife managers in China via exchanges of information and specialists for addressing conservation of wetlands, river ecosystems and habitat including nature reserves, as well as implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The principal Chinese counterpart agencies are the SFA and Ministry of Agriculture.

In calendar year 2010, 30 U.S. participants traveled to China and 80 Chinese traveled to the United States under the auspices of the Protocol on Cooperation and Exchanges in the Field of Conservation of Nature, coordinated by FWS Division of International Conservation and China's State Forestry Administration. In CY 2011, 17 U.S. participants and 13 Chinese traveled; the exchange program is guided by the principles of reciprocity and partnership.

Fisheries: FWS Fisheries is engaged in a dialogue on the conservation of fisheries and aquatic biodiversity with the Ministry of Agriculture and other organizations. The two countries discuss management of ecosystems that have been heavily impacted by development for navigation, power production, agriculture, and urbanization. Conservation of fishery resources in these systems focuses on maintaining and improving habitats and populations that have suffered from changes in flow, degradation of physical habitat, fragmentation, sedimentation, and changes in species composition, including the introduction of invasive species. FWS demonstrates technically advanced methods to propagate fish and mussels for release, restore habitat function and quality, and assess the condition of fish populations and habitats, including genetic integrity, movement and distribution.

In April 2010 three scientists from China spent three weeks in the Midwest stationed at the Genoa National Fish Hatchery in Wisconsin. Work assignments were scheduled with the LaCrosse Fish Health Center, the LaCrosse Fish and Wildlife Conservation Office, and the Upper Midwest Environmental Science Center. The delegation worked alongside hatchery staff to spawn lake sturgeon and process the eggs, assist LaCrosse Fish Health Center in their wild fish healthy survey sampling, and assist the LaCrosse Fish and Wildlife Conservation Office assess stocked sturgeon populations in Legend Lake of the Menominee Indian Reservation. The group viewed Long Term Resource Monitoring efforts ongoing at the USGS's Upper Midwest Science Center, and assisted in sample collections

in a cooperative sturgeon egg development study initiated by the Genoa hatchery. The Chinese visitors were impressed with the beauty of the Upper Mississippi River National Wildlife Refuge and its ongoing island habitat restoration projects. They also assisted in endangered mussel recovery, learning how to infest host fish with mussel larvae, and engaged in spring-river netting operations.

In June 2010 two staff from the FWS Southeast Region Fisheries Program, including a biologist from Bears Bluff National Fish Hatchery in South Carolina, along with a biologist from Genoa National Fish Hatchery in Wisconsin, spent three weeks in northeast China's Heilongjiang Province to work with Chinese colleagues for three weeks at hatcheries, laboratories and rivers and lakes on assessment of breeding facilities, sturgeon spawning, abundance surveys of threatened and endangered fish species, collection of brood stock and eggs, and preventive health treatments. The impact of urban, industrial, and hydropower development on aquatic habitats through sedimentation, contaminants, and blocking fish passage was studied as well.

In September 2010 the Third International Symposium on Ecology and Biodiversity in Large Rivers of Northeast Asia and North America, was held in Memphis, Tennessee. Building on two prior symposia in Khabarovsk, Russia (2002) and Harbin, China (2006), the third symposium brought together 33 Chinese and more than 115 North American and Russian researchers, river engineers, wetland managers, and conservation biologists to discuss local and landscape-scale management of large rivers and associated natural resources. The symposium focused on the countries' mutual objectives of managing riverine ecosystems to ensure optimal levels of water quality and quantity, restoring and managing riverine and riparian wetlands, increasing sustainable fishery stocks, and conserving their internationally significant natural resources. In addition to plenary and breakout sessions, symposium participants participated in a one-day trip on the Lower Mississippi River to discuss the role of river engineering in the restoration and management of large riverine ecosystems and view native fish species and habitats. The Symposium was organized with FWS partners including the U.S. Environmental Protection Agency, Army Corps of Engineers, Lower Mississippi River Conservation Committee, and Mississippi Interstate Cooperative Resource Association.

A six-person FWS team visited Guangdong, Wuhan, and Shanghai, China, in December 2011 for discussion of rare fish species habitat conservation and management with the Pearl River Fisheries Research Institute and the Yangtze River Fisheries Research Institute, among others.

Nature Reserves

FWS cooperation with China on nature reserve management has been recognized by the U.S.-China Framework for Ten Year Cooperation on Energy and Environment (TYF), a high-level intergovernmental forum.

In June 2010, a six-person FWS team visited nature reserves, several of which receive large numbers of visitors annually, in Sichuan and Yunnan Provinces of China. A focus of this exchange was sharing approaches in managing visitation, while fulfilling the mission to conserve wildlife and habitat. As China's population grows more affluent, visitation to scenic and natural areas is increasing.

In November 2010 an eight-person Chinese delegation visited National Wildlife Refuges in Minnesota and Wisconsin where they were familiarized with management of wetlands and environmental education efforts.

A seven-person delegation from China's State Forestry Administration visited federal and state-managed public lands in New England for two weeks in September 2011. The delegation observed firsthand various management philosophies while touring national wildlife refuges, a national park, a national forest, and two state parks. Each stop emphasized government partnerships with public groups and citizens in managing land for wildlife and people. In the design and construction of visitor facilities, the U.S. side shared experience in energy-saving and environmentally friendly approaches, and in making facilities accessible to the disabled. Of note, the visitors saw examples of former military ammunition bunkers transformed into bat hibernacula.

Wildlife

China's diverse ecosystems provide habitat for approximately 10 percent of the earth's wildlife, some of which is found nowhere else, including the giant panda and golden monkey. Under the Multinational Species Conservation Fund, grant assistance has been provided for the conservation of tigers, gibbons, Asian elephants and marine turtles in China. FWS has a panda policy to assist U.S. zoos applying for giant panda importation permits. The policy focuses on the conservation of the species in the wild in China.

In October 2011, 11 U.S. specialists, including FWS personnel, two U.S. Geological Survey staff, and biologists from U.S. zoological parks, traveled to Sichuan Province, China, to participate in a workshop on the reintroduction of giant pandas and other species to the wild.

For one week in October 2011, four Chinese specialists traveled to field sites in Colorado and New Mexico for familiarization with captive breeding management and reintroduction-release efforts for the endangered black-footed ferret.

Wetlands

Wetlands management, restoration, and conservation have long been priority topics for dialogue between FWS and China's State Forestry Administration and have been recognized by the U.S.-China Framework for Ten Year Cooperation on Energy and Environment.

In June 2010, 10 Chinese visitors under the sponsorship of the U.S. Department of State's International Visitor Leadership Program met with FWS Washington Office staff and traveled to the Poplar Island wetlands restoration project in the Chesapeake Bay.

In October 2010, a 10-person group from China visited National Wildlife Refuge wetland habitat in the Midwest, including sites designated as Wetlands of International Importance.

In November 2010, a 10-person U.S. delegation, nine from FWS and one from EPA, traveled to Zhejiang, Hunan and Jiangxi Provinces in China to discuss wetlands management, conservation, and restoration.

In July-August 2011, two biologists from Beijing Forestry University visited Bandon Marsh National Wildlife Refuge in Oregon at the invitation of Oregon Coast National Wildlife Refuge Complex. They took part in coastal wetland habitat restoration efforts, helping to create future tidal channels. The visitors also assisted with bird, fish, amphibian and water quality monitoring studies, removed non-native invasive plants, monitored construction to protect archaeological resources, and much more. China's coastal wetland habitat is diminishing, impacting bird species breeding in Alaska and migrating to China. FWS encourages China to take positive steps for preserving coastal wetlands. The visitors also learned about the "Walking Wetlands" program, an integrated pest management technique that rotates blocks of farmland with flooded wetlands to organically suppress plant parasitic nematodes and other soil diseases and pests.

National Park Service:

The NPS collaborated with China under an MOU for cooperation in parks management signed with the Ministry of Construction, now known as the Ministry of Housing and Urban-Rural Development (MHURD), first established in 1998

and since renewed. NPS has also established a number of sister park relationships with Chinese protected areas, which is yielding a boon of Chinese tourists to these American national park units, as well as enabling sharing of lessons learned from the sister park relationships. NPS also hosts many Chinese delegations in the United States during its self-originated study tours of U.S. national parks. NPS and MHURD renewed their cooperative efforts through a 2009-2010 Action Plan, which reflected the ministry's new name. The NPS also provided staff expertise to cultural heritage and natural resource projects in China managed by the U.S.-based Global Heritage Fund and the World Bank.

United States Geological Survey:

The USGS has been actively engaged in cooperative research with China since the formal Protocol Agreement for Earthquake Studies was signed in 1980. This engagement continues under the Protocol Concerning Scientific and Technical Cooperation in the Earthquake and Volcano Sciences signed in 2009, which is co-signed on the U.S. side by NSF, NIST, and USGS and on the Chinese side by National Natural Science Foundation and the China Earthquake Administration. Perhaps the most important bilateral activity is the operation of 10 cooperative seismic observatories in China. In addition to seismological observatories, the USGS participated in research using a wide range of additional data. These studies include GPS data, field investigations of active faults and earthquake-triggered landslides, crustal and uppermost mantle structure using active and passive sources, engineering seismology, analysis of earthquake strong ground motion data, probabilistic earthquake hazard maps, and earthquake aftershock probabilities.

USGS currently has six protocols with various Chinese government organizations. These protocols are in Earthquake and Volcano Sciences, Earth Sciences, Water Resources, Surveying and Mapping, Mineral Information, and Earth Observation and Digital Earth; a seventh protocol in Biology is being negotiated. In 2010-2011, annual coordination meetings were held by the parties to review activities, discuss challenges, and plan for future studies ranging from earthquake engineering to data and information exchange. Annual reviews have also been ongoing under the exchange of Mineral Information Protocol. These meetings have focused on the exchange of mineral information such as demand, production, consumption and recycling. All become part of the USGS yearly reports on World commodities.

Under the Surveying and Mapping Protocol, USGS is actively involved in discussions that will lead to cooperative project activities encompassing the study

of land use and land cover in China using Landsat remote sensing techniques. This activity is part of the larger USGS study that is global in extent. In 2010, USGS completed global mineral resources assessment activities under the USGS-China Geological Survey/Ministry of Land and Resources Earth Sciences Protocol. These activities included the compilation, analysis and interpretation of selected mineral resource commodities in support of the USGS Global Mineral Resources Assessment Program.

In November 2010, the USGS Director attended an international plenary meeting in Beijing. This meeting brought together ministerial level officials to discuss the sharing of earth observational data from satellite remote sensing platforms. During the meeting, she signed a new protocol between USGS and the Chinese Centre for Earth Observation and Digital Earth. The implementation of this protocol is now in progress. The USGS Director also hosted a luncheon at the U.S. Embassy in Beijing for the leaders of all the Chinese organizations that have protocol agreements with USGS.

Department of Transportation

Cooperation through the U.S.-China Transportation Forum covers rail, transit, maritime, and several other modes of transportation. A Working Group on New Technologies in Transport with a focus on rail was established. This group is a mechanism for the U.S. and China to share information on innovative technologies designed to increase the rail efficiency and safety for both high-speed passenger and freight rail. 2010-2011 DOT cooperation with China through the Transportation Forum's Working Groups covered issues such as Transport of Hazardous Materials, Urban Congestion, Disaster Assistance Coordination, and New Technologies in Transport – Rail, and Ports and Inland Waterways.

Environmental Protection Agency

EPA and China cooperated in areas including prevention and management of air pollution, water pollution, hazardous and solid waste, and persistent organic pollutants and other toxic substances; development of environmental law and institutions; implementation and enforcement of environmental law; and management of environmental information. EPA organizes and participates in numerous working groups and meetings to address these areas of cooperation, and research areas of mutual interest include sustainability science and technology, new environmental technologies, and green communities and sustainability. Programs reduce pollution loads and their impacts on the United States through atmospheric transport, oceanic currents via contaminated fish, and through commerce and trade. Chinese partners include the Ministry of Environmental Protection, Ministry of Science and Technology, National Development and Reform Commission; Tsinghua University, Zhejiang University, Chinese Research Academy of Environmental Sciences and other academic organizations; and industrial/trade associations.

National Science Foundation

NSF conducted cooperative scientific activities with China under the U.S.-China S&T Agreement under two protocols: 1) the “Basic Sciences Protocol,” and 2) the Protocol Agreement for Earthquake Studies, both originally signed in 1980. NSF opened its office in Beijing in May of 2006. NSF’s Chinese counterparts include MOST, the National Natural Science Foundation, and the Chinese Academy of Sciences, the Chinese Ministry of Education, the Chinese Academy of Social Sciences, and the Chinese Earthquake Administration.

In calendar years 2008-2009, NSF awarded \$17,370,447 to U.S. researchers engaged in collaborative activities involving China under the umbrella S&T Agreement, including \$15,236,445 relevant to the umbrella S&T Agreement and “Basic Sciences Protocol,” and \$2,134,002 relevant to the umbrella S&T Agreement and “Earthquake Studies Protocol.” NSF also conducted scientific activities with China through the Integrated Ocean Drilling Program (IODP). NSF sent 81 U.S. graduate students to China in 2008-2009 for research through the East Asia and Pacific Summer Institutes, a program operated in China under an agreement with the Ministry of Science and Technology of China (MOST).

In calendar years 2010-2011, NSF awarded \$15,766,998 to U.S. researchers engaged in bilateral collaborative activities with China, including \$14,195,577 relevant to the umbrella S&T Agreement and “Basic Sciences Protocol,” and \$1,571,421 relevant to the umbrella S&T Agreement and “Earthquake Studies Protocol.” NSF also conducted scientific activities with China through the Integrated Ocean Drilling Program (IODP). NSF sent 80 U.S. graduate students to China in 2010 and 2011 for research through the East Asia and Pacific Summer Institutes.

Nuclear Regulatory Commission

In 2007, the U.S. Nuclear Regulatory Commission (NRC) signed the Memorandum of Cooperation (MOC) on Nuclear Safety for the Westinghouse AP1000 Nuclear Reactor between the NRC and China's National Nuclear Safety Administration (NNSA). This MOC laid the groundwork for the two agencies to cooperate on matters related to China's construction of the AP1000. In 2008, the U.S. NRC and China NNSA renewed the Protocol on Cooperation in Nuclear Safety Matters. Since the MOC and Protocol signing, the NRC has placed multiple staff at the China Sanmen site to observe construction of the AP1000 nuclear reactor. The NRC also assigned a construction inspector to the NNSA (Ministry of Environmental Protection) Shanghai Office to assist in developing a comprehensive construction oversight program. China's NNSA has sent multiple staff to the NRC for on-the-job training and they have worked in various offices within the agency, including headquarters and the regional offices. In 2010, the NRC signed the Memorandum of Further Cooperation on the Nuclear Safety of AP1000 Nuclear Reactor with the National Nuclear Safety Administration (NNSA).

Office of Science and Technology Policy

The President named OSTP the U.S. Executive Agent under the 1979 S&T Agreement. Consistent with this obligation and the President's constitutional authority to conduct the foreign relations of the United States, OSTP participated in the Joint Commission Meeting on Scientific and Technological Cooperation, which meets biannually to coordinate and manage the collaborative science and technology activities of the U.S. and Chinese governments. The Joint Commission addresses subjects such as agriculture, energy, health, the environment, earth sciences, marine research, and nuclear safety. As called for in the agreement, OSTP chaired the JCM in 2009 and will do so again in 2012.

Additionally, in 2010, the Strategic and Economic Dialogue established a U.S.-China Dialogue on Innovation Policy ("Innovation Policy Dialogue") to take place under the auspices of the Joint Commission. Consistent with the President's constitutional authority, during 2010 and 2011, OSTP participated in the Innovation Policy Dialogue, which serves as a forum for sharing best practices in promoting innovation, entrepreneurship and for identifying, analyzing, and overcoming China's barriers to innovation and will do so again in 2012. These activities provide access to Chinese scientists and facilities, and serve as opportunities to encourage the Chinese government to engage in policies and programs that are consistent with global standards, activities, and best practices. These diplomatic activities improve the U.S. scientific capabilities and the economic competitiveness of U.S. business.