Forecast Mekong 2012: Building Scientific Capacity

In 2009, U.S. Secretary of State Hillary R. Clinton joined the Foreign Ministers of Cambodia, Laos, Thailand, and Vietnam in launching the Lower Mekong Initiative to enhance U.S. engagement with the countries of the Lower Mekong River Basin in the areas of environment, health, education, and infrastructure. The U.S. Geological Survey (USGS) Forecast Mekong supports the Lower Mekong Initiative through a variety of activities. The principal objectives of Forecast Mekong include the following:

- Build scientific capacity in the Lower Mekong Basin and promote cooperation and collaboration among scientists working in the region.

- Provide data, information, and scientific models to help resource managers there make informed decisions.

- Produce forecasting and visualization tools to support basin planning, including climate change adaptation.

The focus of this product is Forecast Mekong accomplishments and current activities related to the development of scientific capacity at organizations and institutions in the region. Building on accomplishments in 2010 and 2011, Forecast Mekong continues to enhance scientific capacity in the Lower Mekong Basin with a suite of activities in 2012.

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Capacity Building Accomplishments in 2010 and 2011

Forecast Mekong capacity building accomplishments in 2010 and 2011 included providing the following:

- technical support to study persistent organic pollutants

- a USGS groundwater scientist to the Mekong River Commission

- two geospatial scientists to Can Tho University, Vietnam

- training courses on sediment transport, sediment sampling, and lab sediment analysis

- workshops on wetlands mapping, Web-based mapping, geographic information systems, and remote sensing

- workshops and capacity building on data integration and databases

Capacity Building Activities in 2012

Mekong River Basin Fisheries

In February 2012, the USGS and partnering organizations conducted a workshop in Phnom Penh, Cambodia, to seek consensus on Mekong River fish-sampling protocol and data-sharing schemes. Outcomes of the workshop, organized as the Mekong Fish Monitoring Network, included agreement to develop and share a Web-based fish database and implement pilot fish collections with shared protocols in Vietnam and Laos. A 2012 fish monitoring data collection pilot project will be led by network members seeking to implement the shared protocols by continued training of villagers and students and collecting additional fish data from creel (catch of individual fishers) and market surveys. Future priorities include conducting repeated samples in specific habitat sites to allow for statistical analysis more robust than past analyses that did not include occupancy analysis of habitat use by fish and remote tracking of fish by using telemetry.

Hydrographic Surveying

The USGS will perform multibeam echosounder (MBES) sonar hydrographic surveys at the confluence of the Mekong, Tonlé Sap, and Bassac Rivers near Phnom Penh. The MBES survey will map the riverbed by producing a high-resolution three-dimensional (3-D) digital dataset. Acoustic Doppler current profiler measurements will be used to determine river discharge and associated velocity vectors at selected locations during the hydrographic survey, and a real-time kinematic Global Positioning System unit will be used to provide elevation and positioning for the survey. A major objective of the hydrographic survey is to provide MBES survey training for technical staff from the Mekong River Commission and agencies of its member countries. Representatives of each organization will rotate on and off the survey vessel to ensure that all partners receive MBES survey training. Selected Mekong River Commission staff involved in the MBES survey will receive data-processing training in the United States.

Graphic Visualization Tool

A graphic visualization tool (GVT) produced in 2012 in cooperation with the Mekong River Commission will optimize output from basin-scale hydrology models by combining high-resolution 3-D bathymetric data from 2012 USGS hydrographic surveys on the Mekong River and accompanying tributaries to produce a video containing visualizations and virtual animations of complex riverbed environments and flow dynamics. The GVT will also illustrate potential influences of dams on downstream water conditions and riverbed structures that ultimately could affect riverine fisheries and flood-plain ecosystems. All GVTs are being developed to facilitate future integration into other decision framework tools and basin-scale models that will evaluate potential cumulative impacts of existing and proposed tributary and main-stem dams. Staff from the Mekong River Commission will receive training in the United States on the development of the GVT.
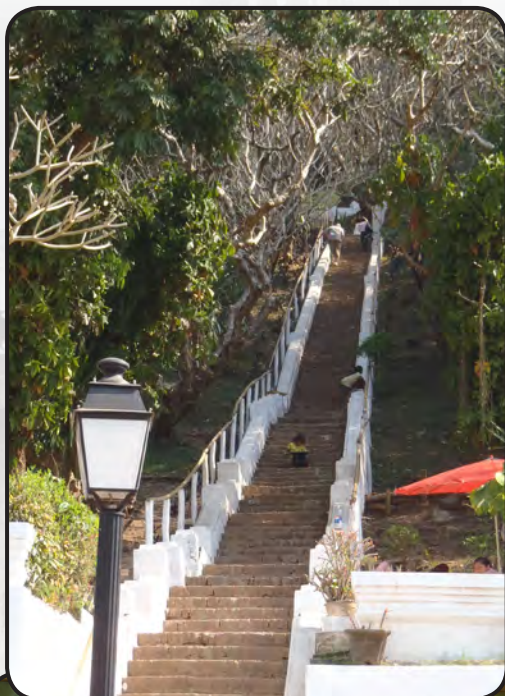
Community-Based Salinity Monitoring

Can Tho University and the USGS are developing a novel approach to monitoring salinity intrusion in the Mekong Delta that uses a network of local university students and farmers to collect water salinity data. Salinity measurements will be transmitted from the field via text messaging directly into a real-time data integration and Web mapping application developed by Can Tho University and the USGS. The USGS is providing technical assistance to computer programmers and ecologists at Can Tho University to transfer the Web-based technology to the university. Timely access to water salinity data for local farmers can help them adapt to changing salinity levels by using methods such as adjusting rice cropping calendars or planting salt-tolerant rice varieties.
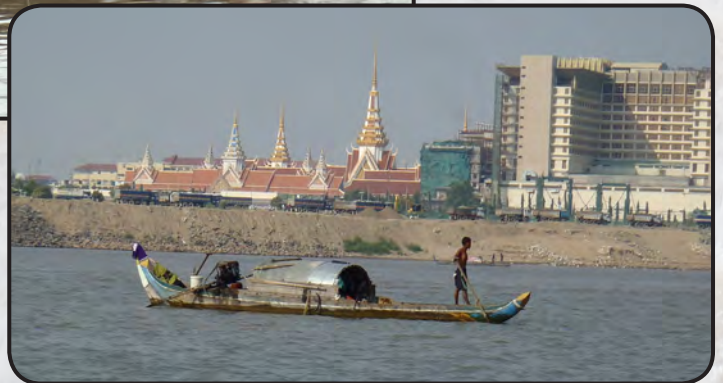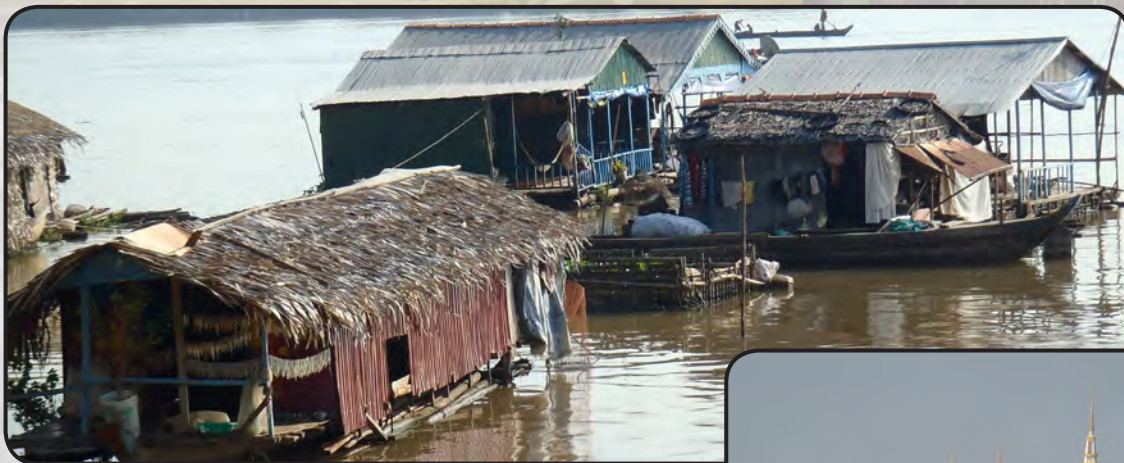
Basin-Scale Water Quality Modeling Workshop

The USGS is planning for a 2012 workshop to introduce scientists and engineers from the Mekong River Commission and Can Tho University to a basin-scale water quality model now widely used in the United States and New Zealand. The modeling technique, known as SPAtially Referenced Regressions On Watershed Attributes (SPARROW), could provide a tool to map sources of contaminants to streams throughout the entire Mekong Basin and track contaminants as they move downstream, possibly affecting water quality in the Mekong Delta region. Because of the multinational character of the Mekong Basin, initial SPARROW model calibrations could serve as a consistent framework that could be used by all Mekong Basin nations to identify information needs and facilitate improved understanding of water quality conditions in the watershed as a whole.

Scientific Exchange

The USGS National Wetlands Research Center will host a researcher from Vietnam National University in Ho Chi Minh City from the Department of Ecology and Evolutionary Biology for a 6-week scientific exchange visit in June 2012. The visiting researcher has extensive experience in environmental conservation and development projects, ecological monitoring, avian ecology, and biodiversity research. This type of scientific exchange will help scientists in Southeast Asia apply the latest scientific research methods and remote-sensing and geographic information systems technology to environmental conservation in the Mekong Basin. The visiting researcher's role as a lecturer at Vietnam National University provides a mechanism to transfer the knowledge and capabilities he gains during his visit to students and other scientists working in the region.

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