

December 1, 2010

FY2011 LMI FORECAST MEKONG PROJECT TASKS

Task #1 Support CTU/ ICF Persistent Organic Pollutants Project (POP)

Task Summary: Develop wetlands maps and assist with development of POP sampling protocol and field sampling design.

Task Lead(s): **Scott Wilson** (Wetlands Maps) and **Charlie Demas** (POP sampling protocol/design) in coordination with Jeb Barzen of ICF and Dr. Ni of CTU

Subtasks:

1. Identify existing wetlands maps and attempt to acquire data.
2. Work closely with ICF and CTU to:
 - a. Design POP sampling protocol.
 - b. Assist with design of field-based wetland site characterization.
 - c. Design wetlands mapping protocol and identify training needs.
 - d. Generate sampling points in the Mekong basin.
 - e. Participate in POP training at December Workshop in HCMC.
3. Acquire imagery and conduct preliminary wetlands classification.
 - a. Potential sources: USGS GLOVIS, University of Maryland Global Land Cover Facility, Thailand Remote Sensing Agency.
4. Choose an established wetland mapping classification scheme.
 - a. Hydrogeomorphic (HGM)
 - b. Anderson Level I or II
 - c. National Wetlands Inventory (USFWS)
 - d. RAMSAR classification (marine/coastal, inland, human-made wetlands; subdivided into fresh/saline/brackish/alkaline, can be further subdivided.
5. Image classification based on Landsat imagery
 - a. Divide the study area according to UNEP ecological zones or WWF ecoregions to facilitate image classification.
 - b. Develop or acquire ancillary data such as DEM-based topographic indices, soils data, etc.
 - c. Use field data acquired during POP sampling to develop preliminary wetlands map.
 - d. To be completed by partners at CTU with training and assistance from USGS remote sensing scientists.
6. Develop a joint report with CTU on methods, results, and publish maps.

Task Schedule/Deliverables:

- Sept 2010, begin interaction with ICF and CTU on mapping and POP design requirements.

- Nov 2010, finish compilation of rough draft wetlands map.
- Nov 2010, field test of POP sampling and wetland classification protocol in Louisiana.
- Dec 13-15, 2010, participate in wetlands workshop and training session.
- April 2011, protocol for POP sampling and wetland field data collection.
- June 2011, Regional Wetland Mapping Strategy.
- Dec 2011, new iteration of wetlands map.

Task #2 Geospatial Information and Scientific Visualization (Inventory, Development, Dissemination, and Training)

Task Summary: Develop database of geospatial data for Southeast Asia and make accessible through the web. Include new downscaled climate data for the Mekong basin, monthly MODIS-based indices developed in FY2010, land cover data, and preliminary wetland maps for the Mekong basin. Develop Forecast Mekong website to serve data publicly and keep the scientific community up to date on current research and activities.

Task Lead(s): **Scott Wilson, Cindy Thatcher, Craig Conzelmann, Elijah Ramsey, Chris Wells, and Brady Couvillion**

Subtasks:

1. Geospatial data exchange and coordination with CTU, WISDOM and others. (Thatcher)
 - a. Collect and develop GIS data for use in Decision Support tool (Task 1 & 3), such as potential reservoir boundaries, hydrogeomorphic SRTM-based elevation data.
 - b. Develop long term wetland mapping strategy for the Mekong basin with the University Network.
2. Develop high quality climate data visualizations and time-series animations for presentation on website. (Conzelmann)
3. Automate the production and delivery of MODIS-based greenness/wetness indices and produce scientific articles. (Couvillion)
4. Create new website for Forecast Mekong and web interface to display and serve data for download, including site characterization for wetland mapping projects. (Conzelmann)
5. Provide scientific capacity building through in-country workshops and technology transfer projects to scientists and students in SE Asia. (below is a list of potential science capability building workshops).
 - a. Introduction to Radar mapping workshop. (Ramsey)
 - b. Wetlands classification using historic aerial photography (likely using 1960's era aerial photos). Also, will investigate US classified assets of the area. (Wells)
 - c. Geospatial database management and web publishing.

Task Schedule/Deliverables:

- Ongoing through FY-11, collect and develop GIS data.
- Dec 2010, complete climate data visualizations and time-series animations.
- Dec 2010, complete automation and delivery of MODIS-based greenness/wetness indices.
- March 2011, finish creation of new Forecast Mekong website that includes data server.
- June 2011, complete Radar and historical mapping indexes.
- Sept 2011, complete mapping workshop.

Task #3 Develop Graphic Visualization Tool for Simulating Hydropower Dam Impacts

Task Summary: Develop a Graphic Visualization Tool (GVT) for a geographically-limited reach of the Lower Mekong River to simulate impacts of a proposed hydropower project on ecosystem services, including effects on fish migration and biodiversity, and on agriculture (rice farming). The GVT will be designed to quantify expected changes in basin size, streamflow, sediment loads, rice production, migration of fish (grouped by guilds), and other expected impacts of hydropower dams. The geographically-limited GVT will be developed in a way that allows easy integration with larger scale DSS's such as the Mekong Decision Support Framework being developed by the MRC. Future integration into a basin-scale DSS will facilitate the evaluation of potential cumulative impacts on food security (fish and rice farming) from multiple dams.

The USGS will consult with the MRC to select a dam site that is ecologically important, has a high potential of being built, and is relatively data rich. The USDA Soil and Water Assessment Tool (SWAT) developed for the Mekong Basin will be used to provide baseline hydrology, land use, and water chemistry information for use in the GVT. If the SWAT model is sufficiently robust, the USGS will be able to move more quickly into the development of the biology and ecosystems aspects of the GVT. The USGS will also coordinate with other organizations working in the basin such as the U.S. Army Corps of Engineers (USACE) and the Natural Heritage Institute (NHI) to avoid duplication of efforts and to share information. The University Network will be enlisted to fill critical biological and ecosystems data gaps at the selected dam site.

Task Leads: **Tom Doyle, Rick Wilson, and Craig Conzelmann**

Subtasks:

1. Nov 2010, meet with Texas A&M University to determine SWAT utility.
2. Jan 2011, attend SWAT Training Workshop in HoChiMinh City, Vietnam.
3. Coordinate with MRC and Texas A&M officials for exchange of Mekong SWAT model output.

4. Configure SRTM Hydrogeomorphic-Elevation Model of Mekong River Basin.
5. Configure Proposed Hydropower Dam Location and Specifications.
6. Determine Reservoir Boundaries and Land Displacement Maps.
7. Configure Mekong SWAT Model Output for Change in Water Parameters Affected by Dams.
8. Integrate Biota Distribution and Disruption Scenarios on fish migration and rice reproduction.
9. Construct Algorithms for Altered Ecological Services with Changing Water Relationships and their impacts on food security.
10. Perform data assessment on existing models outputs to ensure compatibility with graphic visualization platforms.

Task Schedule/Deliverables:

- Nov 2010, meet with TAMU to determine SWAT utility for DSS.
- Jan 2011, participate in SWAT workshop.
- Feb 2011, complete configuration of elevation model and dam specifications.
- March 2011, complete reservoir boundary, land displacement maps, and water algorithms.
- April 2011, complete integration of biotic distribution and disruption scenarios, and ecological services algorithms.
- May 2011, complete prototype Graphic Visualization Tool and application for 1 proposed dam site.
- June 2011, video showing GVT model outputs/simulations for one proposed dam site, for use at 2011 LMI Ministerial meeting.

Task #4 Preliminary Assessment of the Potential Effects of Dams

Task Summary: Produce synthesis document “Potential Effects of Dams and Reservoirs on the Mekong River on Downstream Flow, Water Budgets, and Sediment Transport”. Includes lessons learned from the lock and dam controls along the Mississippi River. The synthesis would identify what types of data are needed to better understand or document impacts of dams, summarize the history of dam construction and bank stabilization projects on the Missouri and Mississippi Rivers (and to a lesser extent the Columbia River). The document will summarize the impacts of these projects on the ecology, hydrology, and sediment transport of these rivers and associated impacts on the Mississippi Delta. Data on the magnitude of impacts will be included (if available) as well as a scientific opinion regarding which impacts continue to be the most detrimental. The document will include historical information, changes in sediment loads/concentrations, impacts on the fisheries, and lessons learned.

Task Lead: **Reed Green, Rick Wilson, Charlie Demas**

Task Schedule/Deliverables:

- April 2011, complete first draft and colleague reviews.
- Sept 2011, complete SIR for publication, provide copies to the U.S. State Department and Mekong River Commission.

Task #5 CTU Capacity Building and WISDOM Coordination

Task Summary: TDY assignment of geospatial scientist to CTU. Fund small proposals (related to food security) from CTU or other members of the University Network. Coordinate with WISDOM program to identify opportunities for collaboration.

Subtasks:

1. Participate in “Integrated Coastal Management in the Mekong Delta” conference organized by WISDOM partnership October 12-13, 2010 in Can Tho.
2. Meet with CTU representatives October 11-14, 2010 to plan for collaborative work in support of FY-11 Forecast Mekong activities and CTU science themes, and discuss POPs/wetland mapping project to understand training needs for December workshop.
3. TDY assignment of geospatial scientist to CTU (CTU requests two 6-week assignments, can be same individual or different individuals, requires two R/T airfares.
4. \$30K to fund mini-proposals from CTU or other member of the University Network.

Task Lead: **Jim Stefanov** and USGS TDYer to be determined

Task Schedule/Deliverables:

- October 2010, attend CTU meetings and WISDOM conference at Can Tho.
- May, 2011, begin CTU TDY assignment.
- Continuous, fund university mini-proposals.

Task #6 Groundwater Scientist detail to Mekong River Commission

Task Summary: The USGS will provide a senior level groundwater scientist for a 90 day detail in Phnom Penh. to advise the MRC on a variety of groundwater issues and will have a primary geographic focus on the Mekong Delta region.

Task Lead: **Jim Stefanov** and USGS TDYer to be determined

Task Schedule/ Deliverables:

- TDY assignment to MRC by 3rd Quarter FY-11(for 90 days).

Task #7 Maintain Communications about Forecast Mekong

Task Summary: Improve communications about the Forecast Mekong project with US Department of State, Ambassadors in Viet Nam, Cambodia, Lao, and Thailand, and with Can Tho University, the University Network, USAID, Mekong River Commission, and NGOs.

Task Lead: **Max Ethridge**

Subtasks:

1. Establish ongoing communications contacts with appropriate offices in DOS.
2. Establish ongoing communications contacts with Ambassadors and science officers.
3. Establish ongoing communications contacts with MRC, USAID, Can Tho University, the University Network, and NGOs.
4. Distribute Forecast Mekong video to interested organizations and individuals in SE Asia and the U.S.
5. Update Forecast Mekong brochure (3Q).
6. Provide information about Forecast Mekong activities and project deliverables to communications contacts.

Task Schedule/Deliverables:

- Establish ongoing communications contacts with appropriate offices in DOS (ongoing throughout FY2011).
- Establish ongoing communications contacts with Ambassadors and science officers (ongoing throughout FY2011).
- Establish ongoing communications contacts with MRC, USAID, Can Tho University, the University Network, and NGOs (ongoing throughout FY2011).
- Jan, 2011, Distribute Forecast Mekong video to interested organizations and individuals in SE Asia and the U.S.
- Aug, 2011, Complete update of Forecast Mekong brochure.
- Provide information about Forecast Mekong activities and project deliverables to communications contacts (ongoing throughout FY2011).