

**U.S. GEOLOGICAL SURVEY/EROS CENTER
TECHNICAL REQUIREMENTS DOCUMENT
for
TECHNICAL SUPPORT SERVICES CONTRACT SOLICITATION**

TRD NUMBER

0030

PERFORMANCE PERIOD

Contract Base Year: April 1, 2010 thru March 31, 2011

PROJECT NAME

Evapotranspiration Assessments

1.0 SCOPE

This Technical Requirements Document (TRD) defines requirements for science support for the Evapotranspiration (ET) Assessments Projects at the USGS Earth Resources Observation and Science (EROS) Center to be provided by the Technical Support Services Contract (TSSC) to the USGS EROS staff. Support beyond that identified in this TRD will be addressed by the USGS Project Manager as needed. The Technical Support Services Contractor (TSSC) has corresponding work managers who shall interface with the staff, monitor performance, prepare reports in coordination with the task leads, and report to the USGS Project Manager. This TRD outlines the USGS work requirements that shall be performed during the period of April 2010 through March 2011 by TSSC staff, subject to available funding. The TRD is considered a living document that will be updated to reflect major direction and priority changes throughout this performance period.

Presently we are working with the Water Resources Discipline on three projects that focus on characterizing groundwater conditions associated with three geographic regions: 1) the **Columbia Plateau** groundwater investigation, 2) the **Nevada Transect** of shrub lands, and 3) the **High Plains** groundwater study. This work contributes to providing a comprehensive understanding of the water budget for each of these study areas. Evapotranspiration is a major component of the water budget for these areas and we are using the Simplified Surface Energy Balance (SSEB) model to estimate 8-day and monthly ETa based upon archived historical remotely sensed data. Various data sources are available from different sources to meet the objectives of the different sub-tasks of the project. Work is required to identify and evaluate the best data sources for implementing the SSEB model.

2.0 DELIVERABLES

More specifically, each of the three projects requires:

- The gathering and evaluation of gridded weather datasets to determine the most appropriate weather data sources to use in the Simplified Surface Energy Balance (SSEB) model. Examples include the North-American Land Data Assimilation System (NLDAS) for radiation, wind, relative humidity, etc.
- Completion of the processing of AVHRR data sets for the time period of 1989 – 2007 using existing LAS scripts that perform standard calibration and cloud screening of the original AVHRR data and convert them into Arc/Info GRID layers. The processing of the AVHRR data sets will need to be monitored and the data archived. Missing data sets need to be identified and the scripts will need to be run for the unprocessed timeframes.
- Preparation of a modeling setup to generate standardized reference ET for the US since 1979 at the highest spatial resolution possible.

- Implementation of the SSEB model by combining the weather data sets and remotely sensed data (thermal and NDVI) for the study sites and the US.
- Creation of a final report.

Specific products to be delivered to the USGS Project Manager and will include:

- Arc/Info GRID files that have been derived from Historical AVHRR data.
- Daily Reference ET grids since 1979.
- Actual ET grids for selected study sites from the SSEB model.
- A summary report documenting workflow procedures and activities.

Reports and manuscripts that contain the following:

1. An evaluation report in the comparison between MODIS and AVHRR data sets under different hydro-climatic regions
2. A manuscript in the comparison between coarse-resolution GDAS (global data assimilation system) and fine-resolution NLDAS (North America Land Data Assimilation) reference ET and their respective relationship with station-based ETo.
3. Evaluation of the accuracy and precision of SSEB ET using available field data such as flux-tower and lysimeter in each of the three geographic regions, i.e., “Nevada”, “High Plains” and “Columbia”.

3.0 SCHEDULE

Work will entail gathering and evaluation of gridded weather datasets to determine the most appropriate weather data sources to use in the Simplified Surface Energy Balance (SSEB) model, preparation of a modeling setup to generate standardized reference ET for the US since 1979, implementation of the SSEB model by combining the weather data sets and remotely sensed data (thermal and NDVI) for the study sites and the US, and creation of a final report is expected to take a Summer Intern graduate student working half-time, three months.

4.0 COMMUNICATION

Any problems or questions associated with running the LAS scripts need to be discussed with the Project Manager as soon as possible. Status meetings between the Work Manager and the Project Manager need to occur twice a week at mutually agreeable times.