

Department of the Interior  
U.S. Geological Survey

## **EARLY WARNING, ENVIRONMENTAL MONITORING, AND HAZARDS MITIGATION**

### **Famine Early Warning System (FEWS) and Drought Monitoring**

**September 2009**



Early warning, Environmental Monitoring, and Hazards Mitigation Branch  
FY 2010 Task Order

**A. Background:**

The U.S. Geological Survey's Earth Resources Observation and Science (EROS) Center conducts a broad suite of research and applications projects in support of international and domestic partners. The goals and objectives of the EWEM project are to acquire remote sensing satellite data and monitor the Earth's surface, create derivative imagery and other geospatial data sets for characterizing various aspects of the environment, identify and monitor drought events, and mitigate their impact by providing early warning to user communities, and transition research techniques into operational monitoring. One of these projects is concerned with phenology and drought information for the conterminous United States and involves collaboration with both the National Drought Mitigation and the High Plains Regional Climate Centers of the University of Nebraska-Lincoln, and the U.S. Department of Agriculture's Risk Management Agency.

**B. Scope of Work:**

This scope of work focuses on the EROS Early Warning and Environmental Monitoring Part 1 project which has a requirement for timely, high quality technical support for acquiring, custom processing, maintaining, and providing timely access to satellite and other geospatial data sets through web resources. The contractor will maintain existing nodes infrastructure and functionality, and will also develop new capabilities and datasets that support evolving requirements.

**C. Description of Tasks:**

Phenology/Drought

1. Update MirAD-US irrigation with 2008 MODIS peak and 2008 USDA NASS irrigation statistics (as soon as they are available from USDA).
2. Design and perform traditional accuracy assessment on the 2003 MODIS irrigation map.
3. Contribute writing content and graphics to a MirAD-US irrigation manuscript for journal publication, and implement USGS FSP review process.
4. Support USGS publication (Open file or science investigations map) of U.S. irrigation (MirAD) map (provide content and graphics as requested).
5. Update content, edit, and design for the Drought fact sheet, implement USGS FSP review process.
6. Update remote sensing phenology (RSP) web site with new content and graphics.
7. Update RSP web site to include 2009 phenology metrics, metadata, and graphical maps.
8. Load VegDRI and other products to drought viewer on the product schedules determined by USGS (e.g., weekly, bi-weekly, and daily).

9. Apply the automated process for AVHRR and MODIS NDVI or VegDRI statistics calculation from selected targets (related to the Platte River Basin pilot study but extensible to other targets) and develop reporting statistics.

#### U.S. Drought Monitor

10. Calculate and assess start of season metrics from MODIS and AVHRR NDVI for sites (for multiple years, e.g., 2005-2009).
11. Assist USGS in developing and implementing an experimental design for phenologic metrics intercomparison to ground (flux) data.

#### NASA JPL Yr2/Yr3

12. Implement eMODIS VegDRI system in near real time every Sunday starting May3, 2009.
13. Automate ranking code process and integrate code within the VegDRI system and produce rank seasonal greenness products as a regular output of the system each week.
14. Implement process to provide an off season mask into VegDRI products – provide software code (modeled from research code/analysis steps) and integrate code into VegDRI system.
15. Track VegDRI system operational processing (in the form of an automated log) and provide service to system if products fail.
16. Develop automated production of kml format VegDRI and PASG from eMODIS VegDRI system and web enable through Drought Monitoring web map service.
17. Develop and test automated production of NDVI change from VegDRI system (e.g., output formats tif and kml, TBD).
18. Provide reports of test results (e.g., processing times for VegDRI and other metric products) for NASA annual and semi-annual reviews, as requested.

#### USDA RMA

19. Run AVHRR VegDRI operationally every two weeks on Tuesday, deliver to collaborators.
20. Continue testing VegDRI models for 48 states.
21. Provide updated historical metrics for VegDRI models.

### **D. Delivery of Performance:**

#### Phenology/Drought

1. Start 4/1/10, Finish on or before 3/31/11
2. Start 4/1/10, Finish on or before 3/31/11
3. Start 4/1/10, Finish on or before 3/31/11
4. Start 4/1/10, Finish on or before 3/31/11
5. Start 4/1/10, Finish on or before 3/31/11
6. Finish on or before 3/31/11
7. Start 4/1/10, Finish on or before 3/31/11
8. Ongoing for Option Year 2, year long service (products load daily, weekly, and bi-weekly)
9. Start 4/1/10, Finish on or before 3/31/11 (but may be extended to add additional targets)

U.S. Drought Monitor

10. Start 4/1/10, Finish on or before 3/31/11

11. Start 4/1/10, Finish on or before 3/31/11

NASA JPL Yr2/Yr3

12. Ongoing for Option Year 2, Finish on or before 3/3/11

13. Finish on or before 6/30/11

14. Start 4/15/10, Finish on or before 7/15/11

15. Ongoing Option year 2, as needed

16. Start 10/1/09, Finish on or before 3/31/11

17. Start 4/1/010, Finish on or before 3/31/11

18. As requested per NASA review schedule

USDA RMA

19. Ongoing Option Year 2, every Tuesday

20. Start 4/1/10, Finish on or before 3/31/11

21. Start 4/1/10, Finish on or before 3/31/11