TECHNICAL SUPPORT SERVICES CONTRACT
TECHNICAL REQUIREMENT DOCUMENT

TRD NUMBER

0010

PERFORMANCE PERIOD

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

PROJECT NAME

Fire Science

1.0 SCOPE

This document defines requirements for science project support for the Fire Science Project at the USGS Center for Earth Resources and Observation (EROS) to be provided by the Technical Support Services Contract (TSSC) to the USGS EROS staff. Support beyond those identified in this TRD will be addressed by the USGS Project Manager as needed.

The scope of the integrated USGS EROS Fire Science Project is to conduct research and development in three business areas: fire fuels mapping, fire danger monitoring, and post-fire mapping and monitoring. The Technical Support Services Contractor (TSSC) and the USGS have divided the Fire Science activities into ten areas of emphasis: Fire Monitoring Research; Fire Danger Monitoring and Forecasting; Wildfire Burn Intensity; LANDFIRE Mapping; LANDFIRE Refresh: LANDFIRE O&M: Monitoring Trends in Burn Severity (MTBS); NPS Burn Mapping; Advancing Data Access and Data Mining Technology; BLM Burn Severity; DOI BARC Support; and BLM Nevada Support. The TSSC work manager will interface with the staff and report to the USGS Project Manager. Fire Science collaborates directly with USFS research organizations and other regional and field offices of the Department of Interior. This TRD outlines the USGS work requirements that shall be performed in the latter half of FY 2009 and first half of FY2010 by TSSC staff, subject to available funding.

2.0 DELIVERABLES

LANDFIRE (Mapping, Refresh, O&M, and Modeling)

- Support project close out for original chartered LANDFIRE national vegetation mapping activities.
- Maintain a web-based data distribution system to deliver LANDFIRE data to users. This includes monthly reports on activity, and recommendations to improve operational reliability and reduction of operating cost. It also includes support for Integrated Vegetation Mapping (IVM) and LANDFIRE Refresh data.
- Provide support for process development and production of LANDFIRE Refresh products including LANDFIRE Fuel canopy characteristics, LANDFIRE Fuel Mapping capabilities, Biophysical Settings (BPS) remaps utilizing a crosswalk between SSURGO Ecological Site data to BpS units, the Vegetation Transition Tool, develop and maintain Refresh Model Tracker, Sclass, derive Surface Fuel Models, conduct Fuel Calibration Workshops, EVT enhancements, and the Vegetation Change Tool derived Remote Sensing of Landscape Change product.
- Provide support to development of LANDFIRE data improvements including improving vegetation map units in LANDFIRE, improving wetland/riparian mapping units, integrating high-resolution imagery for LANDFIRE data improvements, improving vegetation structure data products, and correcting data gaps that exist along international boundaries within the LANDFIRE data layers.
- Provide GIS support for development of GIS tools that are used in field driven applications of LANDFIRE data sets. Including the development of geospatial models that can evaluate the effectiveness of amphibious aircraft wildfire support.

- Provide support to research activities that support evolution in technical concepts, plans, and ultimate establishment of operational capability for update of the LANDFIRE national data set (LANDFIRE Operations and Maintenance, or O&M). This includes the identification and characterization of landscape disturbances and the production of updated geospatial data.
- Support research activities such as accuracy assessment, field vegetation studies, riparian mapping, biomass and carbon (note: requirement ends on or about 15 May 2009), and relationships between existing and potential vegetation.
- Present scientific papers and posters at conferences and meetings
- Draft and submit scientific papers for peer-reviewed journals
- Provide continuity of low LOE IT support to LANDFIRE O&M and Modeling activities

Biological Carbon Sequestration

Database management

- Beta database management framework and system.
- Database management system documentation.
- Plan for software/hardware/infrastructure.
- Plan for 5-year online data product distribution.
- Standard reporting method for deliverables.
- Website for program.

Support disturbance forecasting task

- Technical support for scientists in development of an operational system to forecast wildland fire and other major landscape disturbances for the USGS Biological Carbon Sequestration
- Support coordination between teams of scientists to ensure that disturbance forecasting data products are meeting the needs of the larger program.

Monitoring Trends in Burn Severity (MTBS)

Sponsored by the Wildland Fire Leadership Council, the MTBS project is a 5 year project carried out in collaboration with the USFS Remote Sensing Applications Center (RSAC) in Salt Lake City, Utah. The USGS EROS and RSAC share the responsibility for the completion of the project. The overall project goal is to map and assess the burn severity for all fires that have occurred in the United States since 1984 that are larger than 1000 acres in the west and those greater than 500 acres in the east. A suite of products are generated for each mapped fire which are made available to the public via the internet. To date (since 2006), over 9000 fires have been mapped by USGS/EROS and USFS/RSAC. The project also calls for providing technology transfer opportunities for users of the data.

In FY2009, MTBS was additionally tasked to assist the LandFire Project and provide burn severity assessments for smaller fires (below the MTBS size thresholds) identified by LandFire. Additional MTBS support for LandFire includes accelerating the MTBS

mapping schedule for historical fires (1999 to 2003) in specific regions. All equipment and software for this project is provided by the government.

- Process all Landsat scenes selected by USGS and RSAC for use by the MTBS project and add them to the MRLC image archive. This means processing the freely-available LPGS scenes to the MRLC format: Albers projection, Reflectance, Normalized Burn Ratio, Tassel Cap and Thermal datasets. This requirement includes re-processing scenes selected during FY2009 that did not get added to the MRLC archive. Software scripts to accomplish this (using ERDAS Imagine and ArcGIS) have been developed and installed on several government-supplied computers. Upwards of 1000 Landsat scenes will need to be processed. As of this writing, there are 2100 individual fire occurrence records for the year 2008. Many of the records are duplicate records: the ratio is about 2-3 records for each fire. Numbers may change as more fires are identified.
- For each fire mapped, a product suite is generated by the analyst using a series of scripts and batch files that run ERDAS Imagine and ArcGIS:
  Pre and Post fire Landsat image subsets of the fire
  Differenced Normalized Burn Ratio (dNBR) subset
  Relative Differenced Normalized Burn Ratio (RdNBR) subset
  Thematic Burn Severity (classified dNBR)
  Fire Perimeter (Shapefile)
  Burn Severity Statistics
  Metadata

- Conduct visual QA/QC assessments of all fires mapped at USGS/EROS.
- All mapped fires will be staged on the MTBS Viewer for free download.
- For FY10, USGS will assist the RSAC in the development and presentation of at least one MTBS Workshop and additional web-based MTBS training modules.
- Provide burn severity assessments in support of the LandFire refresh effort.

NPS Burn Severity Mapping

The National Park Service (NPS) provides funding to the USGS to map fires upon request. Funding for this activity is part of the overall MTBS funding allocation. Using the standard MTBS mapping process these fires are mapped outside the usual MTBS schedule. They may be smaller than MTBS size criteria. All fires mapped under this project are delivered on CD to the requestor and staged on the NPS Burn Severity Mapping website. In FY 2009, a total of 13 fire mapping requests covering 30 individual fires were received and fulfilled.

The standard MTBS fire products are generated to fulfill these requests. The products are packaged in an ArcGIS project and delivered on CD along with the full-scene Landsat images (reflectance and NBR).

Data Mining

- Provide readiness or low LOE continuity for IT support upon request.

BLM Burn Severity

- Subject to BLM requests, assist in burn severity related mapping services and research. BLM Alaska may seek support in FY10 depending upon the severity of the 2010 fire season.
- Using post fire burn severity mapping techniques as directed by the USGS lead, map recent and historical wildfires and conduct related research as requested. Travel to Alaska may be required (1-2 weeks field effort, maximum).

DOI BAER Support

- Assist in emergency response burn severity mapping services for Department of Interior (DOI) managed lands. Assist in communication and coordination as needed with US Forest Service (USFS) Remote Sensing Application Center (RSAC), which provides similar services for USFS managed lands.
- Using post fire burn severity mapping techniques as directed by the USGS lead, map recent wildfires as requested by DOI BAER teams and other local land managers (primarily in the western 11 states and Alaska).
- Produce standardized Burned Area Reflectance Classification (BARC) map products, potentially on an emergency response basis. This may require weekend and evening work hours.

BLM Nevada

- Assist in burn monitoring and mapping support to the BLM Ely Field Office in Ely, Nevada as requested and directed by the USGS lead. This work includes monitoring post-fire characteristics and post-fire treatment effectiveness (2005-2008) associated with the 2005 Southern Nevada Complex (SNC) wildfire, along with development of a historical burn severity database for the period of the 1940's to the present for Lincoln and Clark counties of Nevada.
- Using post fire burn severity mapping techniques as directed by the USGS lead, map recent and historic wildfires as required. Landsat MSS, TM, and ETM data sets, as well as historical aerial photography will be used to inventory and map burn areas.
- Assist in communication and cooperation with USGS BRD and BLM as required.

3.0 SCHEDULE

The Fire Science project is a coherent set of technical and support (e.g., IT) activities generally requiring a steady-state LOE, responsive to external customers and stakeholders. As such, many of its activities and milestones are driven by evolving work results; variation in customer and cooperator agency requirements, participation, and reimbursable funding; variation in fire season severity, etc. Planning and understanding of schedule must occur in this context. Where practical, general schedule details and related information are provided below, as applicable. All work is to be performed in a timely manner as determined by the USGS Project Manager working in coordination with the TSSC Management.

LANDFIRE (Mapping, Refresh, O&M, and Modeling)

In FY10 contribute to reports and artifacts for LANDFIRE charter mapping project closeout.

In FY10 maintain a web-based data distribution system (including support for Integrated Vegetation Manning (IVM) and LANDFIRE Refresh); and sustain support for O&M capability development.

In FY10, in accordance with the project schedule, support the completion of the Refresh Geo-Zone production of the updated existing vegetation and wildland fuel layers for the nation.

Biological Carbon Sequestration

USGS Biological Carbon Sequestration methodology will be published in the federal record in the summer of 2010.

Monitoring Trends in Burn Severity

The performance period of this TRD includes parts of two fiscal years: FY10 and FY11. Without an extension, the MTBS project will end at the conclusion of FY10: September 30. 2011. The yearly schedule of deliverables for the MTBS project was originally defined in 2006. Each year, EROS and RSAC decide how to split responsibilities for the upcoming fiscal year. The mapping responsibilities are split 50/50 and adjustments of responsibility are made as-needed based on workloads and deadlines. It is anticipated that each analyst be able to map 3-5 fires per day given availability of suitable imagery. The deliverable schedule below describes the overall FY10 schedule:

- Complete all 2008 fires across all 50 states by September 2010 (EROS & RSAC)
  Current 2008 fire records count: 2100
- Complete South Central (1984 – 1998) by September 2010 (EROS)
  Current fire records count: 1400
- Complete AK and HI (1999 – 2003) by February 2010 (EROS & RSAC)
  Current fire records count: AK 340, HI 5
- Complete AK and HI (1984 – 1998) by September 2010 (EROS & RSAC)
  Current fire records count: AK 1100, HI 11
- Process all Landsat scenes required to map these fires and add to MRLC archive
- Reprocess all Landsat scenes used in FY2009 not previously added to MRLC archive (by September 2010).
- Complete QA/QC for all EROS fires prior to staging on distribution site (quarterly)
- Complete development of web-based training modules (EROS & RSAC)

NPS Burn Severity Mapping

Requested fires are mapped as required based upon the date of the fire and the acquisition of appropriate Landsat imagery. Assessments shall be completed and delivered to the requestor within 3 weeks of acquisition of suitable imagery. Data will be staged on the website by the end of the fiscal year.

BLM Burn Severity

Work requirements will fluctuate dependent upon wildfire activity during the annual fire season and other factors. This work will likely be suitable for “part time” support where 1-2 weeks of “off and on” dedicated support is possible.

Provide approximately 4-8 weeks on intermittent technical support, as required to meet project demands. Primary support is anticipated June – September.

DOI BAER Support

Work requirements will fluctuate dependent upon wildfire activity during the annual fire seasons. This work will likely be suitable for “part time” support where 2-3 days of “off and on” dedicated support is possible.

Work is anticipated to be done in support of the USGS lead, who will generally be the primary contact for DOI personnel requesting service. The USGS lead will provide quality control for BARC products prior to distribution to DOI customers. Contractor support will be required when the task workload exceeds the capabilities or availability of the USGS lead.

Provide approximately 4-8 weeks on intermittent technical support as required to meet the fluctuating demands of the fire season. Primary support is anticipated July – September.

BLM Nevada

Provide approximately 8-12 weeks on intermittent technical support as required to meet project demands. Primary support is anticipated February – September.

4.0 COMMUNICATION

The contractor will understand requirements of the project and ensure expectations are met by:

- Developing the associated work plan and monitoring its execution/progress
- Assisting in the coordination or facilitation of external cooperative agreements
- Assisting in preparation, monthly monitoring, and periodic updating of task-level budgets for TSSC support
- Providing task-level TSSC expense control, tracking, and in accordance with plans, commitments, budgets;
- Providing monthly, task-level TSSC expense projection and reporting commensurate with the USGS EROS and project reporting cycle and requirements;
- Contributing to project management and performance reporting, consistent with funding Program and EROS’ Center-level and requirements, formats, and calendar
- Coordinating and assisting as needed, collecting and /or editing content; and coordinating ad-hoc data calls, presentations, or visitors
- Notifying the Help Desk of changes in ownership of software, desk and laptop systems, servers, etc.
- Identifying and reporting new skill sets or resources required to meet project deliverables
- Identify areas of overall or specific risk and participate in mitigation strategies
- The MTBS has weekly teleconferences with the USFS/RSAC. The TSSC work manager or representative shall attend. The TSSC work manager will maintain

regular communication with the MTBS project lead and provide input on TSSC salaries and other expenses. USGS/EROS requires TSSC inputs for weekly reports regarding production schedule and milestones. The MTBS project manager will communicate concerns to TSSC work manager and occasionally ask for financial information outside the usual reporting schedule.

In addition to the communication deliverables listed, the USGS will meet with TSSC Management quarterly, or at a frequency requested by the USGS, to discuss expenditures and emerging requirements. The contractor shall keep the Government project manager and/or task manager informed of all activities, such as work successes, problems, and potential problems as soon as they are known. The contractor is encouraged to inform the Government project manager and/or task manager of new and innovative work approaches, procedures, and techniques. Other communications required by the USGS in support of work may include quarterly briefings, special reviews, and presentations at key events.

5.0 EVALUATION

Periodic evaluation of contractor performance will be conducted in accordance with the standard process, calendar, and criteria established at USGS EROS (refer to separate, applicable documentation).