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West Wide Wildfire Risk Assessment Project

Project Data Standards

December 18, 2009

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Revision History

This document has undergone the following revisions.

| Date | Revised By: | Description of Revision |
|-----------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21-Sep-09 | Kate Sabourin Darian Krieter David Buckley | Original draft version |
| 30-Sep-09 | David Buckley | Minor updates to fire ignition format description |
| 05-Oct-09 | David Buckley | Insert reference to File GDB usage. |
| 05-Nov-09 | Kate Sabourin | Edit coordinate system for Washington |
| 18-Nov-09 | Kate Sabourin | Edit coordinate system for Oregon to specify International Feet, added approved projections for Wyoming and Idaho |
| 10-Dec-09 | Kate Sabourin | Edited for clarification sections on disturbance data, fire districts, coordinate systems terminology. Edited Fire occurrence data requirements to match fire occurrence data brief. |

Definition of Terms

The following is a list of acronyms used throughout this document:

| Acronym or Term | Definition |
|-----------------|------------------------------------|
| CWSF | Council of Western State Foresters |
| FOA | Fire Occurrence Area |
| ODF | Oregon Department of Forestry |
| PSC | Project Steering Committee |
| SME | Subject Matter Expert |
| WWA | West Wide Wildfire Risk Assessment |

1. Overview

This document describes the data standards to be utilized in the WWA project. This includes the following items:

- Geospatial data formats (vector and raster)
- Data exchange formats
- Coordinate Systems
- Fire occurrence data
- Data partitioning
- Data delivery & File naming conventions

The definition and establishment of data standards is essential to ensure that uniform and consistent datasets (including outputs) are developed for the project. A key element of the WWA project is the provision of data by the partner states and territories. This document establishes the primary standards for this provision and development of data, although it is expected that refinement to these standards will continue to occur during the Component 1 phase of the project.

2. Data Standards

2.1 Geospatial Data Formats

GIS data will conform to standard ESRI data formats. This includes all compiled input data and all project outputs. A brief description of these requirements is provided in this section.

Vector GIS Data

Vector GIS data will be accepted from state partners in either ESRI shapefile format or ESRI featureclass (Personal or File Geodatabase) format. All data will be converted to ESRI feature classes for processing by Sanborn. Any vector outputs derived in the project will also be delivered as ESRI feature classes in Personal GDBs.

For the most part vector data will be used for the following datasets:¹

Data Provided by States/Partners

- Fire ignition locations (points)²
- Fuels updating disturbance (polygons) – provided by states/federal partners³
 - Fire perimeters and/or burn severity

¹ Note that detailed technical briefs on data specifications will be provided for all datasets. State and federal agencies will have the opportunity to provide feedback on these specifications and potential sources.

² Several different data sources are being used to compile this data including state, federal, tribal, military and specific programs. States will be responsible for providing ignition data for non-federal lands within their states. This may require coordination with local government agencies.

³ Several existing data sources have already been identified including MTBS, LANDFIRE program etc. Coordination with these programs is underway.

- Insect survey/damage
- Communities (polygons and perhaps points)
- State fire protection districts (polygons)
- Municipal watersheds (polygons)
- National Fire Plan accomplishments (TBD if this is a GIS layer)

Data Compiled by Sanborn

- Weather Influence Zones (polygons)
- Congressional Districts
- Counties
- Infrastructure
- State & Federal land ownership⁴
- Roads
- Wildland urban interface (polygons)
- Production forests (polygons)
- Communities (polygons/points)

Raster GIS Data

Much of the input and output data to be used in the project will be in ESRI GRID format. GRID data is often referred to as “raster” format.⁵

All data processing in the project will be done using ESRI ArcGIS software. This may include editing of data (vector and raster), reprojection of data to project standards, development of metadata, and the development of new datasets using ESRI GRID modeling capabilities. Custom models have been developed that utilize ESRI data formats and processing objects in concert with an external fire behavior analysis program to develop the outputs for the project.

Any raster data received from the states or federal partners shall be in ESRI GRID format. Since the ESRI GRID format is comprised of a multi-file structure that utilizes a subfolder organization this data will be delivered to Sanborn as zip files. This will aid in posting and delivery of the datasets.

All GRID format data shall be at 30m cell size resolution. Any GRID data shall also include complete metadata and a description of the classification scheme (if discrete classified data).

Metadata

Ideally, each dataset provided by project participants will include FGDC compliant metadata. All outputs will be created and delivered with FGDC compliant metadata.

⁴ State and federal agencies will be contacted to provide support in the compilation of this data from existing data sources.

⁵ Note that ESRI raster format is also known as GRID format. These are simply two different descriptions for GRID format data. ESRI does support other ‘raster’ or ‘image’ format data. For the most part these other raster formats are not required or supported in the project.

Symbology

Standard ESRI format layer files will be utilized to symbolize vector and raster datasets. These layer files will be compatible with ESRI ArcMap v9.3x. All data delivered with the project will be provided with layer files to aid in viewing by project participants. In many cases, a default ArcMap .mxd document will also be provided to supplement viewing of the data.

2.2 Data Exchange Formats and Specifications

In the Component 1 phase of the project, the states and territories will be furnishing several different datasets to Sanborn (see [Vector GIS Data](#) section above). To facilitate a consistent and error free delivery and exchange of this data we propose the following items (for exchange of data between contractor and federal agencies, partner states)

- Data will adhere to the project standards (format, coordinate systems) listed in this document
- Data provided to the contractor shall be in the format designated for that particular data type, according to the “Task Briefing Report” data request document provided by Sanborn.⁶
- Since some data formats, such as shapefiles or grids, incorporate several separate files (and subfolders) it is preferred they be delivered in a compressed format. Acceptable compressed formats are ZIP (i.e. Using Winzip).
- Each individual GRID file shall be placed in a separate folder prior to zipping to ensure all required files are included in the transfer.
- To facilitate the uploading and downloading of data files Sanborn has established a project ftp site. Login info for the site is:
 - Site Name: <ftp://porftp.sanborn.com>
 - Login: *WWA*
 - Password: *Wildfire*

The FTP site has a primary folder for “State Data”. A separate subfolder exists for each state. Data for the individual states and territories should be uploaded to the appropriate folder.

2.3 Coordinate Systems

Table 1 presents a list of coordinate systems and datums currently in use by the participating states and territories. To facilitate consistent data processing during the project and to ensure that fire behavior modeling is correct, a standard coordinate system must be utilized. Unfortunately, due to the project extent being such a large area, it is not possible to utilize a single coordinate system for all states (other than for reference maps). Accordingly, we propose that a standard coordinate system be used for groups of states.

⁶ For each of the specific data collection tasks Sanborn is compiling Technical Briefs that will describe specific data requirements. These briefs will be reviewed with the state/territory representatives using a web meeting so that specifications are well understood prior to data collection.

Items in **bold** are the current standard coordinate systems and datum used within the participating states and territories (as identified by the state representatives). For those states who did not respond to this survey, Sanborn has made suggestions. These are identified in *italics*.

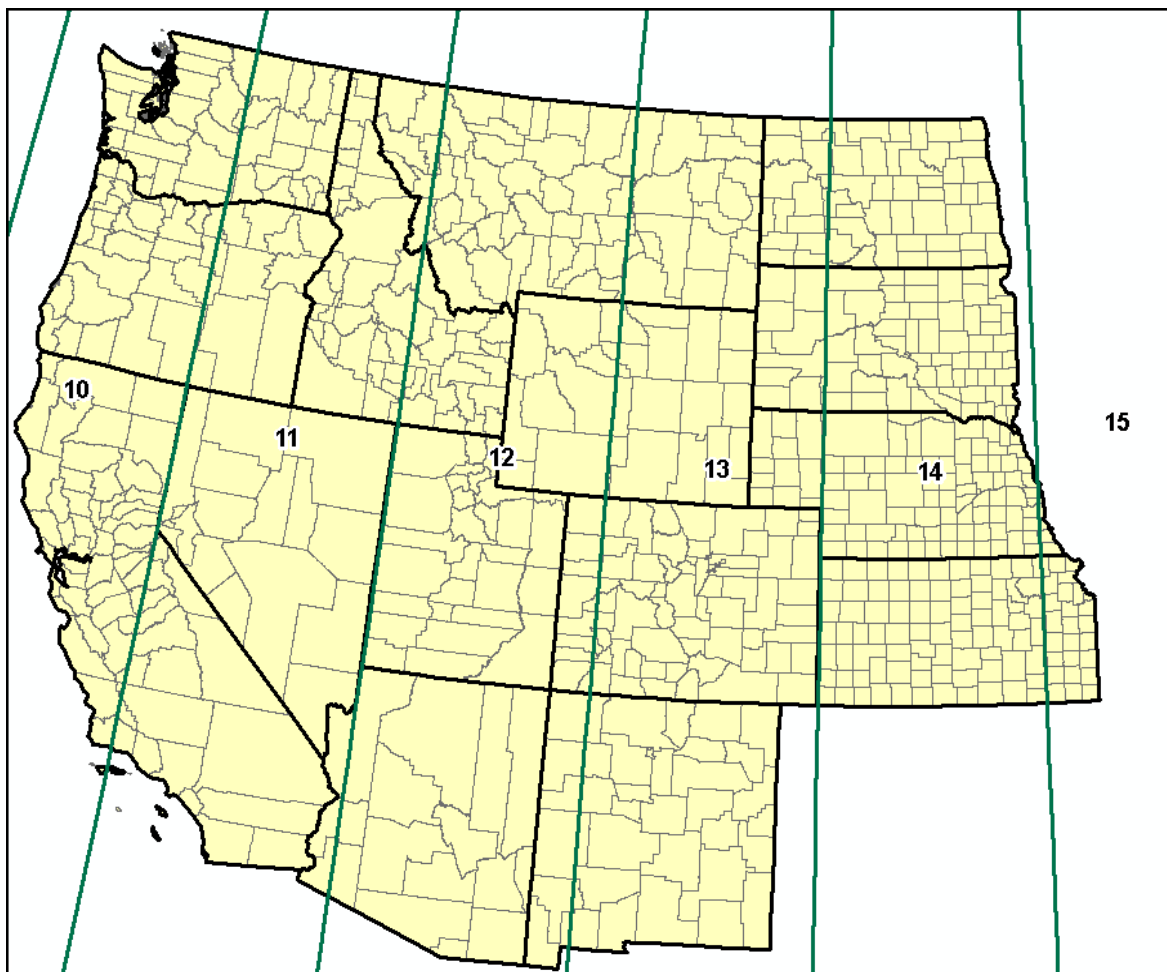
Table 1. Coordinate Systems used by states

| State | Coordinate System | Datum |
|--------------------------|------------------------------------------------------|-------------------|
| Alaska | <i>Alaska Albers Equal Area Conic</i> | <i>NAD83</i> |
| Arizona | UTM Zone 12N | NAD83 |
| California | California Teale Albers | NAD83 |
| Colorado | UTM Zone 13N | NAD83 |
| Hawaii | UTM Zone 4N | NAD83 |
| Idaho | IDTM | NAD83 |
| Kansas | <i>UTM Zone 14N</i> | <i>NAD83</i> |
| Montana | State Plane Montana FIPS 2500 | NAD83 |
| North Dakota | <i>UTM Zone 14N</i> | <i>NAD83</i> |
| Nebraska | UTM Zone 14N | NAD83 |
| New Mexico | UTM Zone 13N | NAD83 |
| Nevada | UTM Zone 11N | NAD83 |
| Oregon | Oregon Lambert Feet International (EPSG 2992) | NAD83 |
| South Dakota | UTM Zone 14N | NAD83 |
| Utah | <i>UTM Zone 12N</i> | <i>NAD83</i> |
| Washington | State Plane Washington South FIPS 4602 | NAD83 HARN |
| Wyoming | UTM Zone 13N | NAD83 |
| FSM (Chuuk) | <i>UTM Zone 56N</i> | <i>WGS84</i> |
| FSM (Yap) | <i>UTM Zone 54N</i> | <i>WGS84</i> |
| Northern Mariana Islands | <i>UTM Zone 55N</i> | <i>WGS84</i> |
| Palau | <i>UTM Zone 53N</i> | <i>WGS84</i> |
| Guam | <i>UTM Zone 55N</i> | <i>WGS84</i> |
| American Samoa | <i>UTM Zone 2S</i> | <i>NAD83</i> |

Since most states utilize a UTM coordinate system we have included a figure that presents the UTM zones for the western states. For most states, a single UTM zone covers the majority of the specific state. For those states where this does not occur (i.e. Montana, California, etc.) other coordinate systems are suggested.

The following map shows state boundaries in black, UTM zones in green and county boundaries in grey.

Figure 1. County map of 15 western states with UTM zone boundaries.



2.4 Fire Occurrence Data

Wildland fire ignition data will be needed for all lands with burnable fuel. For Federal lands, wildland fire ignition data will be gathered from each agency's corporate fire occurrence database. Sanborn has already embarked on this data collection effort and will interact with federal liaisons to address any required corrections to the data. For state and private lands, wildland fire occurrence data will be provided by the state representatives. A separate Task Briefing document will be distributed with the specifications for this data.⁷

Fire occurrence data for the project is required as fire ignition locations and separate fire report attributes. These datasets are used in separate tasks within the project however they must be coincident. For example, for each fire ignition point there must be a set of fire report attributes. General requirements include:

⁷ This document will be sent out in October 2009 to state representatives.

Ignition Location Data

- Data shall be “cleaned” by state representatives in order to remove duplicates locations and erroneous fire locations and related report information (i.e. fire locations outside of the state, fire locations in the middle of lakes, etc.). Sanborn will work with the state representatives and provide guidance and quality control on ignition location data.
- Fire ignition data can be provided in MS Excel spreadsheet, MS Access database, or comma delimited text file if fire ignition location attributes are included as latitude/longitude (decimal degrees). The latitude/longitude can represent the actual location of the fire, or if spatially referenced by Township/Range/Section, the center coordinates of the section. If a state records fire ignition locations (origin points) as lat/long attributes of a fire report record, a separate attribute field must be included for both the latitude and longitude of the fire ignition location.
- Fire ignition data can also be delivered in ESRI featureclass format (Personal or File Geodatabase) or ESRI shapefile format. All ignition locations shall be defined as point features. Linear or polygonal data will not be accepted. All requested data need to be part of the Attribute Table in the format requested.
- Data shall include metadata with spatial information and attribute descriptions.

Fire Report Attributes

For each wildland fire ignition, the following data fields are requested:

- Discovery date
- Unit Organizational Code
- Fire number or ID
- Total acres burned
- Fire CauseCode
- DATUM
- Latitude
- Longitude
- Discovery time
- Contained Date
- Contained Time
- Control Date
- Control Time

Specifications on the fire report attributes listed above will be provided in the Task Briefing document to be provided to state representatives in October 2009.

2.5 Data Partitioning

To optimize data processing and modeling a data partitioning approach will be used. This will involve breaking data into subsets to optimize processing and development of final outputs. This will be conducted by Sanborn.

We propose to utilize county boundaries as the primary scheme for partitioning the data.⁸ A buffer distance of 3 kilometers surrounding each county will be used to ensure that no data seams or abrupt breaks occur in the data outputs at county boundary extents. This buffer data accommodates adequate data for future use by project stakeholders.

Note that for some areas, such as counties in Alaska, some additional partitioning may be required (i.e. some counties may be broken into subsets). This may be required due to grid processing limitations that exist within ESRI's ArcGIS software.

While counties will be the primary partitions for delivery of project data, we will also be delivering statewide grids for all key datasets. These statewide datasets will be compiled from final county deliverables. These statewide grids will provide greater utility to the states for other future non-WWA uses. For territories, we will also provide single grids for those land ownerships.

2.6 Data Delivery and File Naming Conventions

Data for the WWA will follow a standard naming convention for all layers and all states. A standard file naming convention will be employed to uniquely identify counties within states and the specific datasets (i.e. surface fuels, canopy cover, etc.). Counties will be assigned a three-character abbreviation that will be used in conjunction with standard abbreviations for specific datasets. For example, the aspect grid for Alameda County in California would be named *asp_ala*, with *asp* being the assigned abbreviation for the aspect grid and *ala* being the assigned abbreviation for Alameda County. The WWA data will be delivered by state, by county, so unique county names are only required within a single State. Adherence to the character limitations for ESRI GRID formats will be followed.

2.7 Digital Maps

As data is compiled throughout the project, digital map images will be generated and provided to participants for review and feedback. The specific format and methods are being investigated. Throughout the project, small size digital maps will be generated and posted to the web site to depict status of the project. These digital maps will be provided in PDF and/or JPEG format.

⁸ This was successfully implemented in the Western Colorado Wildfire Risk Assessment project in 2007, and has subsequently been implemented in the Southern Wildfire Risk Assessment project.