Geographic Information System

Standard Operating Procedures on Incidents

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FIELD REVIEW

GIS Standard Operating Procedures (GSTOP) on Incidents

Contents

Executive Summary

Standard Operating Procedures (SOP) are necessary for clarifying the Geographic Information System (GIS) business needs and functional standards for GIS in support of wildland fire incidents. These SOPs were developed to provide consistency in delivery of GIS products and services. These SOPs focus on the GIS work performed by a GIS Specialist (GISS) to fulfill the GIS needs for the Planning Section of the Incident Management Team (IMT). The SOPs may be useful for all hazard incidents.

These SOPs were reviewed and updated in 2012, from the 2006 publication, by the National Wildfire Coordinating Group (NWCG) Geographic Information System Standard Operating Procedures (GSTOP) on Incidents Revision Unit. Guidance was under the Information Technology Committee and the Geospatial Subcommittee. The SOPs that are covered in this document pertain to GIS data management, map product development, incident GIS documentation and archiving, team transition and general guidance for the GISS, or those who are performing the mapping function at the incident. The SOPs also provide guidance for individuals, with whom the GISS cooperates, such as Long Term Fire Analysts (LTANs), Geographic Area Coordination Centers (GACCs), and users of the file transfer protocol (FTP) site, ftp://ftp.nifc.gov.

This document contains SOPs that will be met by all NWCG participating agencies. It is acknowledged that under some extenuating circumstances, compliance with these standards may not be possible. Guidelines are also specified throughout the SOPs and are strongly encouraged.

Introduction

In 2004, the Geographic Information System Standard Operating Procedures (GSTOP) on Incidents Project was chartered by the National Wildfire Coordinating Group (NWCG). The primary objective of the GSTOP was to create standard operating procedures (SOPs) for the use of Geographic Information Systems (GIS) on wildland fire incidents. That coincided with NWCG formal acceptance and development of the Geographic Information System Specialist (GISS) position task book and training. Since the completion and adoption of this document wildland fire management, policies and associated technologies have changed considerably.[1] The NWCG Geospatial Subcommittee (GSC) recognized the need for publication review and revision and in 2011; the GSC conducted a field survey and solicited review and change requests by the user community. The GSC asked the field to consider all aspects of geospatial technologies, processes, and data management, as well as current fire policy when submitting change requests and comments. The GIS Standard Operating Procedures on Incidents (GSTOP) Revision Unit was formed and chartered under the direction of the GSC, under the authority of the NWCG. Unit membership is comprised of a wide representation of NWCG member agencies and geographic areas. Members are experts in the implementation of GSTOP, ArcGIS, and associated geospatial data, applications, tools, and processes. The GSTOP Revision Unit reviewed change suggestions, provided recommendations as subject matter experts, and made edits to the publication.

This document, GIS Standard Operating Procedures on Incidents (GSTOP) 2012, is an update of the 2006 publication. The SOPs are taught in S-341, *GIS Specialist for Incident Management* and other NWCG sanctioned geospatial training, and implemented on all wildland fire incidents.

The purpose of this document is to standardize GIS products and methods and improve service to decision makers, including Incident Management Teams (IMTs) and others who rely on this critical information.

The primary audience for this document is the GISS performing GIS work on a wildland fire incident, other positions (e.g., other members of the Planning Section) supporting the IMT who use incident data and products, and personnel reliant on Planning Section products; for example, Public Information Officers and Operations Section personnel.

These SOPs address national interagency GIS information management issues and are intended to provide a technology-independent standard. While changes in technology may lead to different implementation over time, the design parameters that represent business needs should remain constant. References to commonly-used software may exist in some chapters (e.g., chapter 2). This was necessary to provide guidance for specific issues related to implementing GSTOP. Tools (i.e. job aids) for implementation of GSTOP using a variety of software, including web and mobile applications, may be found at http://gis.nwcg.gov/links_tools.html.

The SOPs within this document have been specifically developed to:

[1] NWCG#001-2009, Update on the Modifications to the Interagency Strategy for the Implementation of Federal Wildland Fire Management Policy; Guidance for the Implementation of Federal Wildland Fire Management Policy (February, 2009).

- provide people with the safety, health, environmental, and operational information necessary to perform a job properly;
- ensure that production operations are performed consistently;
- maintain quality control of processes and products;
- ensure that processes continue uninterrupted and are completed on an established schedule, especially during incident transition periods;
- serve as a training document for teaching users about the process for which the SOP was written;
- serve as a historical record of the "how, why, and when" steps in an existing process, so there is a factual basis for modifying or updating those steps; and
- ensure the future utility of data generated on wildland fire incidents.

This document is aimed at the GIS function on IMT Type 1 or IMT Type 2 wildland fire incidents. As the size or complexity of a wildland fire incident increases, the mapping demands often expand in order to adequately portray information relevant to the protection of life, property, and resources. These SOPs are also appropriate to assist local resources (from the home unit or a nearby unit) in the use of GIS for IMT Type 3 wildland fire incidents and the application of as much GSTOP as possible is encouraged. There are many key elements within this document that will assist resources if the incident expands in size and will help with archiving data for future needs.

In this document, SOPs have been developed for the following application areas:

1. GISS Minimum Expectations—describes the requirements for the fulfilling of the minimum GIS function on an incident, including a discussion of hardware, software, infrastructure needs, and GISS knowledge, skills, and abilities, as well as a brief overview of incident procedures.
2. File Naming and Directory Structure—provides guidance on establishing and maintaining an efficient and consistent file naming and directory structure for incident geospatial data, including common abbreviations.
3. Documentation and Metadata—provides procedures for the daily documentation of incident GIS data.
4. Minimum Essential Datasets—describes the minimum base datasets needed for incident mapping and analyses and how to obtain that data and evaluate it.
5. Map Symbology—provides standard map symbology guidance and examples for incident mapping
6. Map Products—provides guidelines for the creation of six standard GIS map products used on incidents: Incident Action Plan Map, Situation Unit Map, Planning Map, Transportation Map, Air Operations Map, and Fire Progression Map. Also includes guidelines for additional common map products produced at wildland fire incidents.
7. Data Sharing, Backup, and Archiving—provides procedures for the sharing, backing up and archiving of GIS data developed on an incident, including the handling of sensitive data.
8. Team Transition—provides procedures for an effective and consistent method of transitioning from one GISS to another, including procedures, responsibilities, and communication guidance.

9. A list of acronyms and a glossary of terms important for the GISS on wildland fire incidents.

Although the SOPs are applicable for many types of incidents, it is recognized there are potential differences in GIS support for Burned Area Emergency Response (BAER) and all hazard incidents[2] (particularly those managed by DHS/FEMA[3]). The specifications for hardware, software, and skill set for GIS expertise for these incidents may be different from those needed for wildland fire incidents and may require a higher technical skill level in environmental modeling and image processing to adequately support specific needs.

These SOPs do not cover specific information about technology issues (i.e., hardware, software, and networking) and do not endorse or recommend any commercial hardware or software products.

SOPs are subject to review and modification. See the Change Management page on GSC Web site at http://gis.nwcg.gov/gstop_changerequest.html. Change requests will be evaluated annually. This review is necessary to verify that the SOPs continue to meet the needs of the incident management teams and the GISS in the field.

[2] NWCG#001-2012 Memorandum, NWCG's Role in Support, Coordination, and All-Hazards Response by Wildland Fire Agencies; NWCG#001-2012 Attachment A, NWCG All-Hazards Intent Document
[3] NWCG#017-2011, NWCG and FEMA National Integration Center (NIC): Collaboration and Coordination

Acronyms

The following acronyms are used in the SOP:

ANSI	American National Standards Institute
API	Application Program Interface
ArcGIS	A suite of GIS software produced by Esri
ARCH	Architectural Series Map Size
BAER	Burned Area Emergency Response
BLM	Bureau of Land Management
CD	Compact Disk
COTS	Commercial off-the-shelf software
CSDGM	Content Standard for Digital Geospatial Metadata
CTSP	Computer Technical Specialist
DAFIF	Digital Aeronautical Flight Information File
D-Size	Paper Size: ANSI D = 22”x34”, ARCH D = 24”x36”
DHCP	Dynamic Host Configuration Protocol
DHS	Department of Homeland Security
DOC	(file format) Microsoft Word Document
DOCL	Documentation Unit Leader
DOCX	(file format) Microsoft Word 2007 (and later) Document
DOQ	Digital orthophoto quadrangle
DOQQ	Digital orthophoto quarter-quadrangle
DP	Drop Point
DPRO	Display Processor
DRG	Digital Raster Graphics
DVD	Digital Video Disc
DVOF	Digital Vertical Obstruction File
EOC	Emergency Operations Center
E-Size	Paper Size: ANSI E = 34”x44”, ARCH E = 36”x44”
EPS	(file format) Encapsulated Postscript
FAA	Federal Aviation Administration
FARSITE	Fire Area Simulator
FBAN	Fire Behavior Analyst
FEMA	Federal Emergency Management Agency
FGDB	File Geodatabase
FGDC	Federal Geographic Data Committee
FIMT	Fire Incident Mapping Tools
FOBS	Field Observer
FSPro	Fire Spread Probability
FTP	File Transfer Protocol
GACC	Geographic Area Coordination Center
GAO	Government Accountability Office
GeoMAC	Geospatial Multi-Agency Coordination Group
GDB	(file format) Geodatabase
GIS	Geographic Information System

GISS	Geographic Information System Specialist
GNIS	Geographic Name Information System
GPS	Global Positioning System
GPX	GPS eXchange Format
GSAN	Geospatial Analyst
GSC	Geospatial Subcommittee of the NWCG IT Committee
GSTOP	Geographic Information System Standard Operating Procedures on Incidents
HTML	Hypertext Markup Language
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
IR	Infra-Red
IRIN	Infrared Interpreter
ISO	International Organization for Standardization
IT	Information Technology
JPEG	(file format) Joint Photographic Experts Group
KML	(file format) Keyhole Markup Language
KMZ	(file format) Compressed Keyhole Markup Language File
LTAN	Long Term Fire Analyst
LYR	(file format) Esri layer file
MAP	Management Action Point
MED	Minimum Essential Dataset
MOA	Military Operation Area
MS-DOS	Microsoft Disk Operating System
MTR	Military Training Route
MXD	(file format) Multiple XML Documents
NAIP	National Agriculture Imagery Program
NFES	National Fire Equipment Systems
NICC	National Interagency Coordination Center
NIFC	National Interagency Fire Center
NIMO	National Incident Management System
NIMS	National Incident Management System
NTM	National Technical Means
NOTAM	Notices to Airmen
NWCG	National Wildfire Coordinating Group
PDF	(file format) Portable Document Format
PLSS	Public Land Survey System
PMS	Publication Management System
PSC	Planning Section Chief
PTB	Position Task Book
PMS	Publication Management System
RAM	Random Access Memory
SHP	(file format) Esri Shapefile
SITL	Situation Unit Leader

SOP	Standard Operating Procedure
SOPL	Strategic Operational Planner
STANDLSGD	Scale bar, Title, Author, North Arrow, Date of Publication, Legend, Source, Graticule/Grid, Datum
STPS	Structure Protection Specialist
TB	Terabyte
T&E	Threatened and Endangered
TFR	Temporary Flight Restriction
TXT	(file format) Text only
UDF	Universal Disk Format
UPS	Uninterruptible Power Supply
UNC	Universal Naming Convention
USB	Universal Serial Bus
USGS	United States Geological Survey
USNG	United States National Grid
UTM	Universal Transverse Mercator
WFDSS	Wildland Fire Decision Support System
WMS	Weather Management System
WUI	Wildland Urban Interface, may be referred to alternatively as UWI
XLSX	(file format) Microsoft Excel 2007 (and later) Document

Chapter 1 GISS Minimum Expectations

Purpose

Describes the requirements for fulfilling the minimum expectations of a GIS Specialist (GISS) on an incident including:

- Knowledge and abilities required of the GISS
- Procedures the GISS can be expected to follow
- Field conditions affecting the work environment of the GISS
- Equipment needed for a GISS to function at a basic level

Critical Items for GIS Operations

If incident personnel utilize their home unit electronic devices (cell phones, laptops, GPS units, etc.) they are responsible for obtaining a resource order for documentation and must adhere to property management procedures. Incident personnel are responsible for the care, use, and custody of property (government and private) and for promptly reporting lost or damaged property. The Incident Management Team (IMT) cannot authorize replacement of non-standard cache items. The IMT provides documentation to the incident agency for review and determination. The incident agency may authorize, through written documentation to the home unit, replacement of government property items.[4]

Current information for tools and software are located at http://gis.nwcg.gov

Hardware

- PC or laptop with DVD writer, USB ports and sufficient RAM to run GIS software
- Appropriate output device (e.g., 11″ × 17″ printer with paper and inks, large-format (minimum 36″ wide) plotter with sufficient paper and inks, projector)
- Appropriate connection cables, hubs, power supplies
- External portable hard drive

Software

- Standard current versions of commercial off-the-shelf (COTS) GIS software installed and operational on the computer and capable of working with shapefiles
- Any required and appropriate licensing activated on the local machine for use on incident
- Appropriate software extensions and tools, including installation media and install privileges/passwords

Infrastructure

- Internet connection, if available
- Power to the work site
- Uninterruptible Power Supply (UPS) with battery backup–surge protection (recommended)

[4] NWCG Interagency Incident Business Management Handbook (February 2008), PMS902/NFES2160, Chapter 30 pp. 2-8

Media

- USB jump drives or memory sticks of adequate size to store incident data or plotter files
- Blank CDs or DVDs

Data

- Refer to Chapter 4

GISS Knowledge, Skills, and Abilities

Specific tasks are outlined in the GIS Specialist Position Task Book (PTB). Recommended training is outlined in the Qualifications Guidelines (PMS 310-1). Please note, some agencies or disciplines may require additional training or experience for deployments outside of the NWCG specifications.

GISS must be able to:

- Effectively use the standard commercial off the shelf GIS software.
- Work with a variety of spatial data types (raster and vector), including knowledge of various data types such as geodatabases and shapefiles.
- Understand Global Positioning System (GPS) data collection methods and be able to download, process, and incorporate the data.
- Understand the use of a variety of projections and datums including geographic coordinates (latitude–longitude) and be able to re-project data in multiple formats.
- Answer questions such as number of acres burned, acres by ownership or other questions requiring basic GIS analysis and geoprocessing skills.
- Troubleshoot hardware and software problems sufficient to keep the GISS operational. This may include basic software installs, ensuring the license managers are functioning, installing print drivers, or connecting a plotter to a computer.
- Communicate effectively with people inside and outside the Situation Unit (e.g., GISS, Situation Unit Leaders (SITL), Infrared Interpreters (IRIN), Field Observers (FOBS), Display Processors (DPRO), Long Term Fire Analyst (LTAN), Geospatial Analyst (GSAN), local hosting agency personnel or cooperating agency personnel to
    - explain technical issues or concerns
    - train others in basic map reading
    - exchange technical information
- Perform the role of GISS in "incident conditions," which may include
    - long hours (12- to 16-hour operational periods, day and night)
    - close quarters shared with other personnel
    - working in stressful conditions
    - traveling (away from home base) for 14 days or longer
    - primitive fire camp conditions (sleeping on the ground, exposure to dust and smoke, and limited food choices)
    - working around fire camp personnel, which may include agency, contract, military, or prison crews

GISS must have knowledge of:

- Basic Incident Command System (ICS) structure and procedures which are part of the National Incident Management System (NIMS), as outlined in the self-study courses ICS

Orientation I-100 or NIMS An Introduction IS-700. Knowledge should be sufficient to operate within the chain of command on a wildland fire incident. For example
    - Knowledge of the organizational structure, and whom to go to for issues or support
    - Familiarity with the fire camp operations
    - Understanding of the expectations of the assigned supervisor (typically the SITL)
- Work and Rest standards and other pertinent standards as outlined in the Interagency Standards for Fire and Fire Aviation Operations manual.
- A GISS must understand that firefighter and public safety is the first priority of the fire management organizations. "The commitment to and accountability for safety is a joint responsibility of all firefighters, managers, and administrators. Every supervisor, employee, and volunteer is responsible for following safe work practices and procedures, as well as identifying and reporting unsafe conditions."[5] For the GISS, this means that each individual must demonstrate the maturity and judgment to:
    - Keep firefighter and public safety in mind with respect to all products created and all data collected and maintained.
    - Recognize when there might be too much work. The individual must be able to communicate to the assigned supervisor the need to prioritize, to adjust workloads, or to bring in additional staffing.
    - Monitor one's own physical, emotional, and mental limits.
    - Follow safe work practices and procedures, as well as identify and report unsafe working conditions through the appropriate chain of command.
- The complexity of the GIS demands on an incident is independent of the complexity level of the incident. It is possible to have a very complex GIS situation on a fire of minimal complexity.

Incident Procedures

At the time of dispatch, prior to arriving at an incident:
Follow the mobilization tasks in the GISS PTB

- If possible, contact the SITL or a GISS currently assigned to the incident to inquire about the current situation. Inquire about hardware and software currently operating, any special needs or conditions, what data are already available, and any transition needs (media, timing, and others). Try to find out what peripheral devices are being used (e.g., printers/plotters) and check for driver and operating system compatibility.
- Recognize what resources are lacking (e.g., is there a plotter available?) and provide a solution to the need. This could include such things as obtaining permission and logistics for using the hardware and software network of a local unit. It may be necessary to rent a plotter or other necessary equipment. Use the proper chain of command (i.e. SITL or Planning Section Chief (PSC)) and proper ordering processes they have established.
- Test Administrative privileges if bringing a laptop computer. Administrator rights are needed to install software, drivers, and create or connect to networks. Agency IT specialists may require weeks/months' notice of that need to get it approved.

[5] Interagency Standards for Fire and Fire Aviation Operations, January 2011, NFES 2724, Page 07-1

Setting up the GIS operations and running through the first operational period:

- Check in—follow incident check-in procedures.
- Conduct a briefing with SITL to establish ground rules and expectations, as well as the planning timeline for map production.
- Work with SITL to establish an appropriate physical work space.
- Analyze the data, hardware, personnel, and supplies available. If additional hardware, supplies or personnel are needed for effective GIS productivity, follow incident ordering procedures. Orders for supplies or additional resources are submitted through the supervisor (SITL), using an ICS Form 213, General Message Form (Appendix A). The approved request is then delivered to the Ordering Manager.
- Set up network and shared drives and electronic workspaces, coordinating with the Computer Technical Specialist (CTSP).
- Set up the file directory structure in accordance with Chapter 2.
- Document work for ICS Form 214, Unit Log (Appendix B) in accordance with Chapter 3.
- Insert base data into directory structure.
- Establish which coordinate system and units will be standard for the incident data.
- Establish outer extent of the incident's area of interest.
- Gather incident data; collect hard-copy maps already in use.
- Generate map products according to the SOP for Standard Map Products and the SITL timelines and priorities.

Responsibilities

The GISS is responsible for the following:

- Understanding the chain of command, which may mean reporting directly to the SITL, PSC, or a lead GISS assigned to an Incident Management Team or other appropriate personnel
- Collecting, processing, and disseminating incident-related spatial data
- Maintaining the standardized filing structures (Chapter 2)
- Collecting and maintaining the Minimum Essential Datasets (Chapter 4)
- Creating new data as needed for incident operations
    - Incorporating data from GPS units and other sources
    - Digitizing fire perimeter and other incident data
- Creating necessary products (Chapter 6) using the defined Map Symbology (Chapter 5) within the agreed-upon time
- Providing maps as requested by the SITL, emphasizing the standard maps
- Properly documenting data and archiving work (Chapter 3; Chapter 7)
- Complying with security data management agreement(s) (Chapter 7; Chapter 8)
- Confirming which products are approved with the supervisor or designated personnel within the chain of command
- Effectively transferring the approved products, projects, and data created in GIS to other personnel on the incident or to the hosting unit (Chapter 8)
- Transferring GIS data to and from various locations, which may include map services, FTP sites, or Web sites as requested by the SITL (Chapter 7)

- Keeping the SITL (or supervisor) informed of any known hardware, software, or data difficulties and concerns
- Complying with demobilization procedures

With regard to the GISS, the SITL is responsible for the following:

- Directing and prioritizing all tasks within the Situation Unit including the GIS functions, making assignments that allow for individual strengths
- Coordinating and prioritizing incoming requests—especially those by public information officers, cooperators, and others
- Requesting map products
- Monitoring the workload of the unit in compliance with the work and rest standards as outlined in the Interagency Standards for Fire and Fire Aviation Operations manual.
- Authorizing the distribution of data or products related to the incident
- Ordering the necessary equipment or people to accomplish the GIS work most effectively (computer support, power, equipment)

Other personnel collecting geospatial data on the incident are responsible for the following:

- Knowing how to use GPS units and providing GPS download cables to the GISS.
- Knowing coordinate system format and datum in use for the incident for reporting and communicating geographic locations.
- When providing spatial data files, adhering to file naming standards in chapter 2, allowing for easy integration into the standard directory structure.

Communications

The GISS must maintain timely and effective exchange of information between the Situation Unit and all affected agencies and organizations. When communicating with incident personnel and technical staff from outside the incident, it is imperative that the GISS maintain a professional demeanor. When communicating within the incident, it is essential that the GISS follow the ICS chain-of-command at all times. Incident communications, such as requests for materials, maps, or information, are tracked using the ICS 213, General Message Form (Appendix A).

Whenever there is more than one GISS on an incident, one of them may be designated as the "lead" to coordinate and communicate with the SITL. Some Incident Management Teams have a GISS as part of the team; this individual may be designated as the "GIS Lead" by the SITL.

Chapter 2 File Naming and Directory Structure

Purpose

This chapter provides the GIS Specialist (GISS) with guidelines for standardized file naming and directory structure for GIS data and related documents created and used on incidents managed under the Incident Command System (ICS). The structure is intended to lead to an efficient method of work and provide a consistent file naming and directory structure that is repeatable, clear, and enables consistent archiving of incident geospatial data. The intention is to allow some scalability while still meeting the business needs such as number of personnel, hardware, software, data, and physical location and those with whom the specialist cooperates, such as Long Term Analysts (LTAN), Geographic Area Coordination Centers, and users of the file transfer protocol (FTP) site, **ftp://ftp.nifc.gov**.

The incident directory structure provides a framework for efficiently storing and using GIS data and documents in an organized fashion. Ensuring that all incident GIS files are stored in the proper location within a standardized directory structure promotes an efficient workflow, reduces ambiguity, allows for easier relocation of data or products, ensures a smooth incident transition between GIS Specialists, and greatly assists in the data archival process. Typically, this structure would be established and used by incident GIS Specialists, but could also be used by GIS professionals at the home unit of the incident or other organizations after incident operations are over and the GIS data has been archived.

Specifications:

The File Naming and Directory SOP are designed to serve as metadata; the file and folder names include incident-specific identification information.

- File names are limited by the Windows operating system and cannot be longer than 255 characters. Note: Some software may not allow backup onto CD or DVD for long folder and file names (more than 128 characters for path name and file name).
- File and folder names must not contain spaces, special characters or periods, aside from file extension delimiters.
- The underscore "_" is the only allowable character for delimiting name elements.
- File names for specific layers include descriptive data about the incident.
- File names must be complete and stand on their own outside of the file structure.
- File names are concise, use clear text communication and avoid ambiguous terms.
- File names and directory structure lead to efficient methods of work.
- Feature classes within a file geodatabase must start with a letter (i_)
- Capital letters may be used to make names easier to understand.
- The format for dates is 8 digits in year, month, day order (yyyymmdd).
- The format for time is 4 digits in a 24 hour format (hhmm).

Responsibilities and Communications
It is the responsibility of the GISS to communicate the file naming and directory structure used on an incident to other GISS, including the hosting unit GIS staff and regional GIS staff.

On an incident, the Situation Unit Leader (SITL) is responsible for ensuring that positions working in the Situation Unit follow NWCG standards, including GSTOP. On some incidents without a SITL this could be a Planning Section Chief or even a type III or IV Incident Commander. This chapter specifies a national interagency standard, which should not be overridden at the incident level.

Methods of work
Sound methods of work for a GIS Specialist, whether working alone or with a group, will save time, reduce errors, produce more consistent products, and will make the task of archiving and documentation easier. It is especially important at the start of an incident to establish good methods of work following the file naming and directory structure standards to avoid many wasted hours later in the incident. In the same way that firefighters need to control their reactions in critical situations, a GISS must avoid the temptation to rush file management in order to make something "quick and dirty". The time for cleanup of poorly named files and folders almost never happens. Staying organized and encouraging others to work the same way will reduce tensions and avoid potentially serious problems.

Organization:
- Copy a blank directory template and change the incident name
- Name the first map document following the File Naming SOP (typically the IAP Master Map document). By using the *"Save As"* tool other master map documents can be easily created following the naming convention.
- Create and name the master geodatabase files following the File Naming SOP, this leads to easy naming of backup files.
- Use the "*Save a Copy"* tool to save backup copies of the master map documents in the *\projects\backups* folder each operational period or as necessary. The previous back up files can be used as a pattern for the name by clicking on the file and then changing the date and time.
- The name of the map product files will be based on the map document name and can be completed by inserting the appropriate date and time.
- Make a backup copy of the master incident geospatial geodatabase in the *\incident_data\backups* folder each operational period or as necessary.
- An additional tool available at **gis.nwcg.gov** is a file naming spreadsheet that automatically creates text including date and time for the various files created on an incident. To use the tool the GISS enters the key incident information and product type and then copies the resulting name from the spreadsheet to the file dialog box.

Working with File Geodatabases:
- A file geodatabase (FGDB) is a public Application Program Interface (API) spatial data format published by Esri. A FGDB can contain vector, raster, annotation, tables, and

other types of data. The ***Master incident geospatial geodatabase,*** often a FGDB, contains the primary geospatial database containing incident feature classes such as the fire perimeter, fire line, drop points, etc. When a FGDB is used on an incident the file naming standard should be applied to the FGDB itself.

- It is strongly recommended to use FGDB over personal geodatabases (.mdb) due to their stability and the ability to handle larger amounts of data.
- Feature classes within a FGDB should be named with a leading i_ (before creation date) because FGDB feature classes cannot begin with a number.
- Feature classes created and managed by the Fire Incident Mapping Tool (FIMT) have names like FirePolygon that cannot be edited to meet the standard. FIMT exports shapefiles from the "master incident geospatial geodatabase" that are automatically named following the standard. Standard file naming must be done manually for other file types.
- When the ***Master incident geodatabase*** is created and maintained by FIMT, the best practice is to create a second FGDB for feature classes not created and maintained using FIMT. The ***Other incident data geodatabase*** could include other incident-specific feature classes such as Temporary Flight Restriction (TFR), multi-page index, evacuation routes, and management action points. This FGDB is stored in the root of the *incident_data* folder. See Figure 2.4.

Capitalization Guidelines:

- first letter of proper names, (Jones)
- first letter to delimit multiple words (ClearCreek, IntenseHeat)
- letters that stand for something such as GPS

Incident Identification:

Unit ID and ***Local Incident ID*** each have NWCG data standards. This element is a concatenation of two letter state or country abbreviation, three or four character Unit Identifier (ID) plus two to ten character (letters or numbers) Local Incident Identifier (ID) which is assigned by the local unit.

File Types:

Each bullet point in Figure 2.1 under each file type represents a specific element listed in the sequence they should be placed in the file name. Each element is separated with an underscore and no other special characters or spaces are allowed in the file name:

Master map documents and **master incident geospatial geodatabases** are the working files used for creating and editing the current incident map documents and data.

Master map documents are created for each map product and are the working files for creating and updating maps for each operational period. These files are stored in the root of the *projects* folder. Instead of including the date and time in master files, only the year is included where the date and time would normally be placed. The year serves as a placeholder and when these files are backed up, it will be supplemented with the date and time the backup files are saved.

Backups are made for the master files in the *projects**backups* folder each operational period or when deemed necessary just in case the master files become corrupted.

The **master incident geospatial geodatabase** is the primary geospatial database containing incident feature classes symbolized following NWCG standards, often referred to as "ICS data". This file is stored in the root of the *incident_data* folder. As with the master map document files, the file names only contain the year and are backed up on a similar schedule to the *incident_data**backups* folder.

The **other incident geospatial geodatabase** is the geospatial database that contains incident-specific feature classes feature classes not created and maintained in the master incident geospatial files. This file is stored in the root of the *incident_data* folder. As with the master incident geospatial geodatabases, the file names only contain the year and are backed up on a similar schedule to the *incident_data**backups* folder.

In addition to the **master incident geospatial geodatabase** and the **other incident data geodatabase** the directory \ *incident_data* structure contains working folders for *gps, ir, modified base data*, and *progression*. These folders allow multiple individuals to be working on various aspects of incident GIS support without causing permissions or software conflicts.

Export files are stored in\ *incident_data**exports* folder, the location for sharing via ftp or other means.

See Figure 2.2 to view the file name components and Figure 2.3 for example file names.

The general format followed for file naming is:
{date and time}_{incident information}_{other information}.

The **Incident Directory Structure** can be stored in any location, however the following describes the core directories to be present for every incident and does not preclude other folders being added. See Figure 2.4 for a description of the standard directories and Figure 2.5 for a graphical example of the standard directory structure template. See Figure 2.6 for a graphical example of implementation of the standard directory structure and files within it, named according to the file naming standard.

Note: According to agency needs, files for multiple incidents may be stored under an optional root folder named: *[yyyy]_incidents*.

Figure 2.1. Required File Name Elements:

Master map documents (could be an MXD file)

- Year (*yyyy*) (year the incident started)
- Incident name (the name of the incident)
- Unit ID + Local Incident ID
- Type of map (the standard map product description abbreviation)
- Page size (in inches or ANSI size – A-E)
- Orientation of page (landscape or portrait)
- *Optional:* Tool or software version used to produce data (if created by a tool)

Map document backup files (could be an MXD file)
This file is stored in the *projects\backups* folder

- Date including year (*yyyymmdd*) (the date the file was saved)
- Time the file was saved (*hhmm* 24-hour clock)
- Incident name
- Unit ID + Local Incident ID
- Type of map
- Page size
- Orientation of page
- *Optional:* Tool or software version used to produce data (if created by a tool)

Master incident geospatial geodatabases (often a FIMT-created FGDB)

- Year (*yyyy*) of the incident
- Incident name
- Unit ID + Local Incident ID
- Tool and version used to produce data (if created by a tool)

Incident geospatial data backup files (often a FGDB). Stored in *incident_data\backups* folder

- Date including year (*yyyymmdd*) (when the file was backed up)
- Time the file was saved (*hhmm* 24-hour clock)
- Incident name
- Unit ID + Local Incident ID
- Tool and version used to produce data (if created by a tool)

Figure 2.1 Required File Name Elements (continued)

Other Incident Data geospatial geodatabase (often a FGDB)

- Year (*yyyy*) of the incident
- Incident name
- Unit ID + Local Incident ID
- *Other_Incident_Data*
- Software version used to produce data

Incident Data feature classes within a FGDB

- Letter prefix i_ (to denote incident-specific feature).
- Date including year (*yyyymmdd)* (when the data was collected)
- Time of data collection (*hhmm* using 24-hour clock)
- Incident name
- Unit ID + Local Incident ID
- Incident data type (the type of data portrayed by the data layer)
- Feature type (line, point, polygon)
- Coordinate system and datum

Incident geospatial data or export files (shapefile (SHP), layer file (LYR), exchange format, KML, KMZ, or compressed file).

- Date including year (*yyyymmdd)* (when the data was collected)
- Time of data collection (*hhmm* using 24-hour clock)
- Incident name
- Unit ID + Local Incident ID
- Incident data type (the type of data portrayed by the data layer)
- Feature type (line, point, poly)
- Coordinate system and datum

GPS data files (GPS Exchange file (GPX), text file (TXT), shapefile (SHP), or other data type) This file is stored in the *incident_data\gps* folder

- Date including year (*yyyymmdd)* (when the data was collected)
- Time of data collection (*hhmm* using 24-hour clock)
- Incident name
- Unit ID + Local Incident ID
- GPS feature type (GPS_feat, GPS_lin, GPS_pnt, GPS_pol). GPX contain all types
- Source of data (the ICS position and\or name of person who collected the data)
- Coordinate system and datum

Figure 2.1 Required File Name Elements (continued)

Map product files (any map produced) (PDF, JPG, EPS). Stored in *products\{date}* (intended date of use) folder

- Date including year (*yyyymmdd*) (when the map was produced)
- Time the map was produced (*hhmm*, for IR products this is the time of collection)
- Incident name
- Unit ID + Local Incident ID
- The operational period for which the map is produced, if appropriate. (*mmdd*+ day or night, the last product produced is labeled *final*)
- Type of map
- Page size
- Orientation of page (landscape or portrait)
- *Optional:* dpi value
- *Optional:* Multi Page map page number or index

Other supporting documents, spreadsheets, and other non-geospatial files (XLSX, DOCX, etc.) This file is stored in the *documents* folder

- Date including year (*yyyymmdd*)
- Incident name
- Unit ID + Local Incident ID
- Document contents

Figure 2.2. File Name Components

Master map document files
{year}_{incident name}_{Unit ID+ Local Incident ID}_{map type}_{page size}_{page orientation}.mxd
Optional: {tool or software version}

Map document backup files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{ map type}_{page size}_{page orientation}.mxd
Optional: {tool or software version}

Master Incident geospatial data files
{year}_{incident name}_{Unit ID+ Local Incident ID}_{tool & version used to produce data}.gdb

Incident geospatial data backup files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{tool & version used to produce data}.gdb

Incident data or export files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{data type}_{feature type}_{coordinate system & datum}.shp

GPS data files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{GPS feature type}_{data source}_{coordinate system & datum}.shp

Map product files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{Operational period if appropriate}_{map type}_{page size}_{page orientation}.pdf
Optional: {dpi value}

Other Incident Data FGDB
{year}_{incident name}_{Unit ID+ Local Incident ID}_Other_Incident_Data_{software and version}.gdb

Temporary Flight Restriction features within the Other Incident Data FGDB
i_{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_tfr_{tfr size}_{ feature type}_{coordinate system & datum}

Multi-Page index features within the Other Incident Data FGDB
i_{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{ feature type}_{number of pages}_{size of pages}_{page orientation}_ {coordinate system & datum}

Multi-Page Map product files
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{Operational period}_{ map type }_{page size}_{page orientation}_MP{page number}.pdf

Other Supporting Documents
{date}_{time}_{incident name}_{Unit ID+ Local Incident ID}_{document contents}.docx or .xlsx

All files
Optional: {additional information} added at end of name

Figure 2.3. File Name Examples

Example from Playa Incident of May 2011:

Master map documents:
2011_Playa_AZHVR503_iap_11x17_land_FIMT100011.mxd
2011_Playa_AZHVR503_brief_ansi_e_land.mxd

Map document backup files:
20110516_2120_Playa_AZHVR503_iap_11x17_land_ FIMT100011.mxd
20110515_1530_Playa_AZHVR503_brief_ansi_e_land.mxd

Master incident geospatial geodatabases:
2011_Playa_AZHVR503_fimt100011.gdb

Incident geospatial data backup files:
20110515_0830_Playa_AZHVR503_fimt100011.gdb
20110516_2230_Playa_AZHVR503_fimt100011.gdb

Other incident data geodatabase (non-FIMT created and maintained):
2011_Playa_AZHVR503_Other_Incident_Data_Arc10.gdb

Incident data feature classes within a FGDB (non-FIMT created and maintained):
i_20110514_0800_Playa_AZHVR503_tfr_5nm_pol_u11n83
i_20110514_0930_Playa_AZHVR503_MP_Grid_Index_4_pg_letter_port_pol_u11n83
i_20110516_1720_Playa_AZHVR503_MP_Grid_Index_6_pg_11x17_land_pol_u11n83

Incident geospatial data or export files:
20110515_0940_Playa_AZHVR503_ics_flin_u11n83.shp
20110516_2230_Playa_AZHVR503_ics_pnt_u11n83.zip
20110515_0940_Playa_AZHVR503_per_pol_u11n83.kmz
20110516_1912_Playa_AZHVR503_USFS_roads_u11n83.lyr

Incident GPS data files:
20110516_0930_Playa_AZHVR503_GPS_feat_fobs_Lewis_llw84.gpx
20110516_1540_Playa_AZHVR503_GPS_lin_divs_Clark_u11n83.shp

Map product files:
20110514_2023_ Playa_AZHVR503_0515Day_iap_8x11_land.pdf
20110516_2120_ Playa_AZHVR503_0517Day_trans_letter_land_150dpi.jpg
20110517_0420_ Playa_AZHVR503_0517Day_plans_ansi_d_land.pdf

Multi-page IAP map product files:
20110516_2120_ Playa_AZHVR503_0517Day_iap_11x17_land_MPall.pdf
20110516_2120_ Playa_AZHVR503_0517Day_iap_11x17_land_MPindex.pdf
20110516_2120_ Playa_AZHVR503_0517Day_iap_11x17_land_MP2.pdf

Non spatial Documents:
20110514_1420_Playa_AZHVR503_GIS_practices.docx
20110516_1923_Playa_AZHVR503_ownership.xls

Figure 2.4. Incident Directory Structure:

[yyyy]_incidents (*at the root level, where yyyy = the current calendar year*)

[yyyy_incident_name]*(i.e., 2011_maple, where yyyy = the year the incident started)*

- **base_data** *(base data not created on the incident, which do not need to have backup copies made daily)*
  - **dem** *(digital elevation model data and derived products)*
  - **logos** *(agency logos, typically in non-geospatial raster format)*
  - **orthoimagery***(ortho corrected imagery)*
  - **other_maps** *(scanned maps such as visitor or district maps)*
  - **topo_maps** *(scanned USGS quad maps, known as DRG's)*
  - **vector** *(vector data file types)*
- **documents** *(spreadsheets, text documents, unit log, digital photos used on maps, etc.)*
- **incident_data** *(data created on or for the incident)*
  - **incident spatial geodatabase** *(the master incident geospatial geodatabase which contains the incident feature classes)*
  - **other incident data spatial geodatabase** ***(****an additional database that contains incident-specific feature classes not created and maintained by FIMT, such as Temporary Flight Restriction (TFR) or escape routes)*
  - **backups** *(contains date and time stamped backup incident spatial geodatabases from incident geospatial geodatabase for disaster recovery purposes)*
  - **exports** *(contains date and time stamped incident spatial data export files for exchange via ftp or other means)*
  - **final** *(contains final date and time stamped incident spatial data export files for use by the hosting agency or other local organizations)*
  - **gps** *(optional, contains GIS data from field GPS downloads)*
  - **ir** *(optional, contains spatial data created by infrared interpreters (IRIN))*
  - **modified_base_data** *(base data edited for the incident, i.e. roads, ownership & structures)*
  - **other optional folders** *(such as BAER, FARSITE, Sensitive Data, etc.)*
  - **progression** *(workspace to create progression data)*
- **products** *(contains GIS map and other product files produced on the incident)*
  - [**yyyymmdd**] *all map products for the intended date of use, not the date of creation*
  - **final** *(contains copies of all final map products for the incident)*
- **projects** *(GIS product tasks, daily map document files)*
  - ***master map document files*** *(the master map document files, one for each map product)*
  - **backups** *(contains backup map document files copied from master map document files)*
- **tools** *(extensions, tools or other software tools and used on the incident)*

Figure 2.5. Directory Catalog Template Example

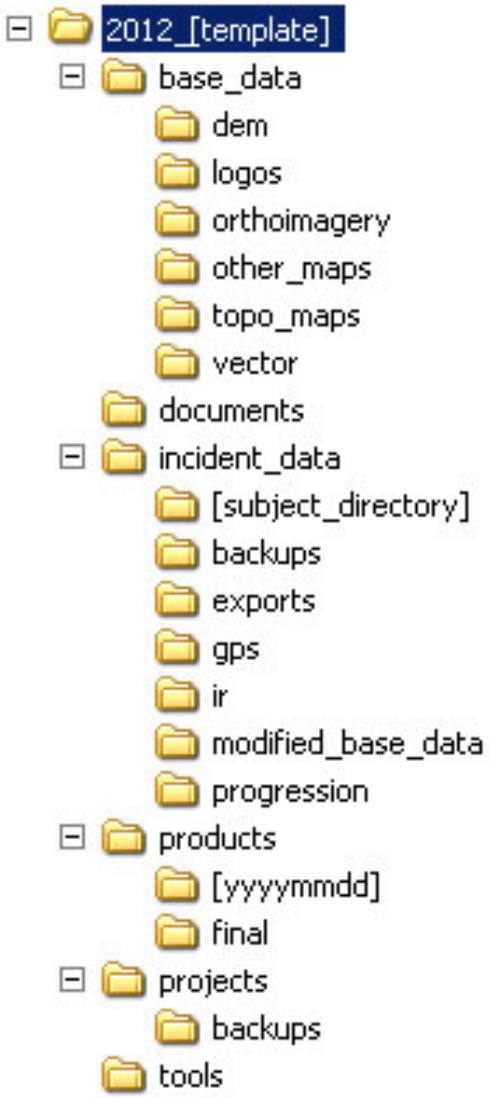

Figure 2.6. Directory Catalog and File Names Example

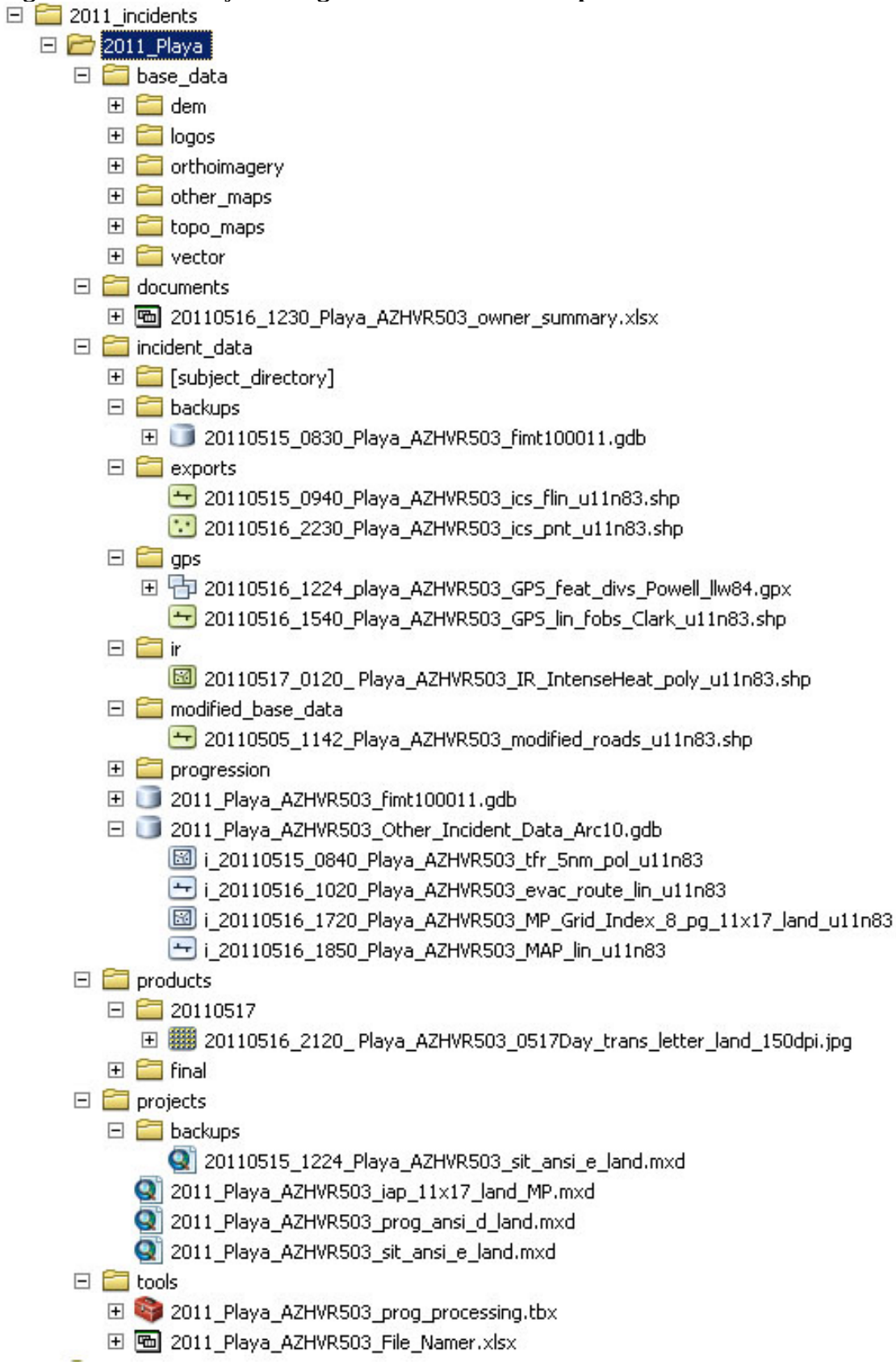

Figure 2.7. Common Abbreviations Used in File Names (not all-inclusive):
This is a list of standard abbreviations for file naming. For other elements, select an unambiguous term to avoid confusion.

Date & Measurement Format
yyyy = Year in which incident began, e.g., 2011
yyyymmdd = year, month, day, e.g., 20111207
ft = feet
hr = hours
mt = meters
nm = nautical miles

Incident Data Types
contin = Contingency Line
cpx = Complex
ctlflin = Controlled Fireline
damage = Damage caused by incident or suppression efforts
div = ICS division break locations
dzr = Dozer Line
flin = Fireline
hand = Handline
icp = Incident Command Post
ics = Incident Command System, features specific to ICS

Source Codes
gps_*feature_name* = Global Positioning System (add collectors name) i.e., "gps_lin_jones"
ir = Infrared
divs = Division Supervisor
fobs = Field Observer
sitl = Situation Unit Leader

Feature Types
lin = line or polyline
pnt = point
pol = polygon
ras = raster

WFDSS Terms
fl = flame length
fli = fireline intensity
fspro = fire spread probability
ntfb = near term fire behavior
ros = rate of spread
stfb = short term fire behavior

Figure 2.7 Common Abbreviations (continued)

Product Type
airops = Air Operations Map
areasc = Areas of Special Concern Map
brief = Briefing Map
dam = Damage Assessment Map
facil = Facilities Map
fhist = Fire Perimeter History Map
fuels = Fuels Map
iap = Incident Action Plan Map
ir = Infrared Information Map, also
ir_topo = IR map with USGS topographic base or
ir_ortho = IR map with ortho base
ops = Operations Map
owner = Ownership-Land Status Map
prog = Progression Map
rehab = Rehabilitation Map
sit = Situation Unit Map
struct = Structure Protection Map
trans = Transportation Map
veg = Vegetation Map
wfdss = Wildland Fire Decision Support System Map

Page Orientation
land = landscape
port = portrait
MP = Multi Page (such as IAP map), add the appropriate page number, “all”, or “index”

Page Size
ansi_a or letter or 8x11 or 85x11 or 8_5x11 = 8½” X 11” paper
ansi_b or tabloid or 11x17 = 11” X 17” paper
ansi_c or 17x22 = 17” X 22” paper
ansi_d or 22x24 = 22” X 34” paper
ansi_e or 34x44 = 34” X 44” paper
arch_c or 18x24 = 18” X 24” paper
arch_d or 24x36 = 24” X 36” paper
arch_e or 36x48 = 36” X 48” paper
super_b or 13x19 = 13” X 19” paper

Figure 2.7 Common Abbreviations (continued)

Coordinate System Abbreviations (for data exchange files, feature classes, not appropriate for geodatabase names)
(coordinate system, datum)

Albers Equal-Area Conic Projection = Alb
Lambert Conformal Conic Projection = Lam
Latitude/Longitude (Geographic) = ll
State Plane Coordinate System (SPCS) = s + zone identifier
Transverse Mercator Projection = TM
Universal Transverse Mercator Grid System (UTM) = u + zone number

Datum Abbreviations
NAD 1927 = N27
NAD 1983 = N83
NAD 1983 CORS96 = CORS96
NAD 1983 HARN = HARN
NAD 1983 NSRS2007 = NSRS2007
WGS 1984 = W84

Statewide Systems Abbreviations
NAD 1983 Alaska Albers (Meters) = AKAlb
NAD 1983 California (Teale) Albers (Meters) = Teale
NAD 1983 Florida GDL Albers (Meters) = FLGDL
NAD 1983 Georgia Statewide Lambert (US Feet) = GALam
NAD 1983 Idaho TM (Meters) = IDTM
NAD 1983 Michigan GeoRef (Meters) = GeoRef
NAD 1983 Mississippi TM (Meters) = MSTM
NAD 1983 Oregon Statewide Lambert (Intl Feet) = ORLam
NAD 1983 Texas Centric Mapping System Albers (Meters).prj = TCMSLam
NAD 1983 USFS R6 Albers (Meters) = R6Albers
NAD 1983 Virginia Lambert (Meters) = VALam
NAD 1983 Wisconsin TM (Meters) = WTM83
NAD 1983 WyLam (Meters) = WYLam

UTM, State Plane, and Geographic examples
u13n83 = Universal Transverse Mercator (UTM) Zone 13, NAD 1983
u17n27 = UTM Zone 17, NAD 1927
lln83 = Latitude/Longitude; i.e., geographic NAD 1983
llw84 = Latitude/Longitude; i.e., geographic WGS 1984
{st}sp5n83 = {state abbreviation} State Plane Zone 5, NAD 1983

Chapter 3 Documentation and Metadata

Purpose

This chapter specifies responsibilities and outlines procedures for daily incident documentation and for creating metadata for the geospatial data sets created or modified to support the IMT.

Specifications

On-incident documentation refers to all records—including, but not limited to, word processing documents, spreadsheets, telephone and e-mail messages, tabular information, GPS-gathered files, KML/KMZ files, geospatial data sets, maps, and other output products—saved as official incident records. This information is compiled, for the entire incident, by the Documentation Unit Leader (DOCL) in the Planning Section, and turned over to the host unit at the conclusion of the incident. As the official record, all information can potentially be used for investigations and lawsuits. It should provide an accurate record of what information was available to support decisions and actions by overhead/line personnel.

Metadata is a form of documentation, specific to GIS data layers. The purpose of metadata is to provide information about the data layer to (a) allow end-users to understand the content and appropriate uses, and (b) preserve the long-term usability of the data layer. Generally, a metadata record contains information about the content, purpose, quality, lineage, point of contact, and attributes of the data layer it describes.

Chapter 3 will not address the details of how the metadata can be stored, except for the use of the embedded-in-filename metadata detailed in Chapter 2. Further details for metadata standards beyond the scope of this SOP are available through the Geospatial Subcommittee (GSC) Web site (http://gis.nwcg.gov/).

Responsibilities

The DOCL is responsible for establishing, maintaining and storing incident files and as such is a customer of the Geographic Information System Specialist (GISS). The DOCL is responsible for communicating documentation needs (hardcopy and/or digital) to the SITL.

The SITL is responsible for (a) authorizing what documentation the GISS will provide to the managing agencies and the DOCL, (b) communicating these needs to the GISS, and (c) ensuring that the GISS has the resources needed to fulfill these obligations.

The GISS is responsible for (a) using standard file naming as metadata for incident data layers, (b) creating brief metadata for any modified base data, and (c) providing agreed-upon documentation to the DOCL and managing agencies as directed by the SITL. On incidents that do not have a SITL, the GISS should work through the ICS chain of command to determine what documentation will be required.

Procedures

Documentation

Documentation starts as soon as work begins on the incident. The Unit Log (Appendix B, ICS Form 214) is critical for tracking significant events occurring in an operational period. The Unit Log may be hardcopy or a digital file and may include attachments. Often, one Unit Log is kept for the Situation Unit as a whole, but occasionally they may be kept by each GISS. The SITL will determine what the GISS is required to provide for the Unit Log.

The Unit Log includes events such as:

- Track of products with dates created, due and delivered
- Notation of personnel transition and special assignments
- Record of backup/archiving of data
- Any issues or events that impact the GISS's capability to deliver products

Since the General Message Form (Appendix A, Form ICS 213) is a common communication tool among units, it should be used and kept as an attachment to document events listed in the Unit Log. Other attachments may include a copy of the types of maps produced or any special products requested during an operational period. Unit Logs and attachments from the GISS should provide a chronological, comprehensive, and accurate record of events related to geospatial support for the incident and significant changes to the incident data and the products produced. Following the map element guidelines (STANDLSGD) in Chapter 6 allows products to better serve as official record of GISS work, and can be used to create the Unit Log and team transition/close-out documentation.

In addition to daily documentation, the SITL, and therefore the GISS, is responsible for delivering a digital copy of the incident GIS data and deliverables to the DOCL (see Chapter 7) at team transition.

Metadata

File-Naming Specifications:

Metadata for specific files is embedded in the file name. This is a practical necessity due to stringent time constraints common during incident operations. File-naming standards are detailed in Chapter 2. Note that the general format consists of {(date)_(incident information)_(other information)}. Chapter 2 outlines rules for different types of files (map documents, data files, export files, GPS-gathered files, and map products), so that the naming is consistent and quickly confers information about the file by viewing the name. Figure 2.3 in Chapter 2 lists sample file names for products and data sets common on an incident. The various files created during an incident are required to be adequately and accurately named according to the standard to enable easy recognition of the file content without opening it or exploring more detailed metadata. Also, the metadata-embedded name reduces the need for additional metadata elements.

For incident data:

By using standard file naming conventions (see Chapter 2) the embedded metadata may be adequate considering other factors/explanations. The file naming convention in this SOP makes incident data easily identifiable and eliminates the need for other forms of metadata.

For modified base data:

Base data used for incident support sometimes requires modification to be suitable for incident products. When this happens modification to existing metadata should be done to document the changes, so that subsequent team(s) and/or the host unit personnel can understand how and why the data were changed and evaluate the long-term utility of the modified data. At a minimum metadata should include:

- Why data was modified
- Contact information for who made the changes
- Description/name/path of any source data used
- Names/contact information for subject matter experts who directed the changes
- General description of processing steps
- Description of new attributes/coding schemes

The Content Standard for Digital Geospatial Metadata (CSDGM), Vers. 2 (FGDC-STD-001-1998) is the current US Federal Metadata standard. The Federal Geographic Data Committee (FGDC) originally adopted the CSDGM in 1994 and revised it in 1998. According to Executive Order 12096, all Federal agencies are ordered to use this standard to document geospatial data created as of January 1995. The standard is often referred to as the 'FGDC Metadata Standard' and has been implemented beyond the federal level with State and local governments adopting the metadata standard as well. This SOP recognizes the severe time limitations under which both a GISS and the Situation Unit as a whole operate, while providing adequate geospatial support, and that metadata creation takes a secondary priority. It is usually impossible to fully encode all the entries required for FGDC-compliant metadata (http://www.fgdc.gov/metadata/geospatial-metadata-standards). However, taking a minute or two to add a paragraph describing the above items enables others to understand what was done to the data to accomplish the mission. Providing this information, as well as following the file naming standard for all incident data, are vital for FGDC-compliant metadata that may be created post-incident.

Chapter 4 Minimum Essential Datasets

Purpose

Minimum essential datasets are the minimum base datasets (other than incident data) needed to meet the business needs of maps and analyses on wildland fire incidents. This chapter also addresses where to obtain data and how to evaluate whether the data are suitable for use.

Procedures

Datasets are vital to incident mapping. They are used to develop standard and optional maps (Chapter 6) and to develop other products, deliverables and analyses.

This chapter distinguishes three classes of datasets:

- Required datasets for one or more Standard Maps (A)
- Required datasets for one or more Optional Maps (B)
- Optional datasets (C)

(See Table 4.1. Minimum Essential Datasets for map products)

The GIS Specialist (GISS) is responsible for gathering and evaluating all datasets to be used on an incident. The required datasets (A) should be gathered or pre-ordered before arrival on an incident, along with as many of the required datasets for optional map products (B) as possible. If there is already a GISS assigned to the incident this may already be accomplished. Check with the Situation Unit Leader (SITL) and/or GISS assigned.

Specific information regarding preordering is provided on the GSC Web site at http://gis.nwcg.gov/. See Table 4.2 *Essential and Optional Datasets Specifications* for recommendations for obtaining base data, including possible data sources and required fields. Some datasets may be obtained from the local unit.

In all cases, these datasets must be evaluated to determine if they are adequate for use on the incident. The evaluation of the datasets should include a review of the following elements:

- *Coordinate system and datum information.*
  This can be in the form of a file containing coordinate system information for vector data and a world file for images, or documentation associated with the dataset.
- *Scale*.
  Datasets designed for use at one scale may not be suitable for use at other or differing scales (i.e., roads digitized off small-scale State transportation maps may not be usable at the 1:24000-scale used for IAP maps).
- *Currency*.
  Determine whether the dataset is the most current dataset available. For example, For example, aviation sectionals are updated at six month intervals and old versions should not be used. If newer data cannot be located and the older data is being requested on maps, a source statement including date is needed on the map.
- *Attributes*.
  Datasets should contain meaningful attributes as per *Table 4.2. Essential and Optional Dataset Specifications.* Use caution with datasets with incomplete or undocumented attribution.

- *Coded Attributes.*
  Lookup–translation table for codes should be available.
- *Security of Data*.
  Some datasets may contain sensitive or proprietary information and should not be distributed. Other datasets may have been procured under the premise that the data will be used only on the incident and should not be copied or distributed. Seek agreement from source of data on its use and disposition. Ensure further information about the use of sensitive data is included in the transition briefing (see Chapter 8 Transition).
- *Spatial Accuracy*.
  The dataset must meet locally acceptable accuracy requirements for a particular use. Marginal datasets may be used if a disclaimer is placed on the output product. Source statements in these situations are critical. (e.g., 1:24K Digital Line Graph (DLG) road data)

Each dataset obtained from a Federal source should contain metadata per Executive Order 12906 (http://www.fgdc.gov/metadata/contstan.html)

Responsibilities
The GISS works with other personnel or teams (Infrared Interpreters (IRIN), Fire Behavior Analysts (FBAN), Burned Area Emergency Response (BAER) teams, Area Command) to obtain, evaluate, and provide datasets needed for job functions.

Communications
Important contacts:
- SITL regarding available map layers, needed map layers, potential sources, etc.
- Computer Technical Specialist (CTSP) to obtain internet access (if available) for downloading datasets.
- Local unit (agency), state, county, and city GIS staff for obtaining best available versions of local datasets relevant to the incident.

Table 4.1. Minimum Essential Datasets for Map Products.

	Standard Map Products						Optional Map Products												Other	
DATASET	Incident Action Plan (IAP) Map	Briefing Map	Situation Unit Map	Transportation Map	Air Operations Map	Progression Map	Areas of Special Concern Map	Damage Assessment Map	Facilities Map	Fire Perimeter History Map	Fuels Map	Infrared Information Map	Operations Map	Ownership/Land Status Map	Public Information Map	Rehabilitation Map	Structural Protection Map	Vegetation Map	Evacuation Plan	FARSITE/ FSPro Layers
Class A - Datasets Required for One or More Standard Maps																				
Administrative Boundaries	O	O	R	O		O	O	O		O			R	R	O					
Airports-Helibases		O		O	R															
Aviation Hazards (including DADIF and DVOF)		O	O		R															
GNIS Geographic Names Information System				O	R	O		O						R	O	O	O			
Hydrography (rivers-lakes)	O	O	O	O	R	O							R	O	O	O	O			O
Key Landmarks				R	R	R														
Ownership-Land Status	O	O	R	O		O	O	O		O			R	R	O					
Political Boundaries (City-County-State-Nation)		O	R	O		O	O	O	O			O	O	O	O	O	O			
Roads	O	R	R	R	R	R		R		O			R		R		R		R	O
Shaded Relief			O		R	R	O	O		O	O	O	O	O	O	O		O		
Temporary Flight Restrictions (TFR) (Scale Permitting)					R															
Topographic Base (e.g., DRG)	R	O	O		O	R	O	O		O	R	R	R	O	O	O	O	R		
Class B - Datasets Required for One or More Optional Maps																				
Archaeological Sites*							O						O							
Communities (GNIS Populated Places)				O			O						R		R					
Cultural Resources*							O						O							
DEMs (Elevation, Slope, Aspect)																				R
Fire History Polygons							O			R										O
Fuels											R									R
Land Parcels								O						R			O			
Structures	O		O				O	R					O		O		R		R	
Subdivisions			O										R				O		R	
Vegetation							O										O	R		
Class C - Optional Datasets																				
Aviational Sectional					O															
Canopy Characteristics											O							O		R
Military Training Routes-Op Areas (MTR/MOA)					O															
National Grid**	O	O	O										O				O			
Orthoimagery (e.g., DOQQ, NAIP)	O		O				O	O		O		O	O	O	O	O	O			
Other Scanned Maps		O		O					O				O							
Public Land Survey		O	O	O				O					O							
Response Areas (Direct protection Areas)			O										O							
Retardant Exclusion Areas			O		O															
Schools															O		O			
Threatened, Endangered and Sensitive Species*							O						O				O			
Wilderness	O	O	O		O	O							O				O			
Wildland Urban Interface													O				O			

Legend **R - Required Layer for Product** **O - Optional Layer - May be added if available and requested**

* These datasets may be used for land manager planning, but may not be displayed on the final map as the sites are sensitive and not for public display. These data should not be shared without the permission of the source agency.

** National Grid may be used on All-Hazard DHS/FEMA Incidents

Table 4.2. Essential and Optional Dataset Specifications.

	DATASET	Data Content and Specifications	Suggested Acquisition
Datasets for Standard Maps	Administrative Boundaries	Adminitstrative Agency	Prearrival
	Airports–Helibases	Name, Type, Latitude, Longitude	Local Unit
	Aviation Hazards (including DAFIF and DVOF)	Hazard Type, Elevation, Latitude, Longitude	Local Unit
	GNIS Geographic Names Information System	Name, Type	Prearrival
	Hydrography (rivers–lakes)	Name (Optional)	Prearrival
	Key Landmarks	Name, Type	Local Unit
	Ownership–Land Status	Agency–Owner Name, contact info	Prearrival
	Political Boundaries (City-County–State-National)	Name	Prearrival
	Roads	Road Names, Road Class, Road Surface, Lookup tables with descriptions of coding. Accurate for use at 1:24000 scale.	Prearrival
	Shaded Relief	Not applicable	Prearrival
	Temporary Flight Restrictions	TFR Number, Elevation, Frequencies	Prearrival
	Topographic Base (e.g., DRG)	Source Date, USGS Standard Color scheme—13 or 256 colors, Revision Date, Collar removed, scan resolution 200–1,000 dpi	Prearrival
Datasets for Optional Maps	Archaeological Sites	Contact info	Local Unit
	Communities (GNIS Populated Places)	Name	Prearrival
	Cultural Resources	Contact info	Local Unit
	DEMs (Elevation, Slope, Aspect)	Resolution	Prearrival
	Fire History Polygons	Fire Name, Year	Local Unit
	Fuels	Fire Behavior Fuel Model	Local Unit
	Land Parcels	Parcel ID, Contact info (Optional)	Local Unit
	Structures	Address, Risk Assignment (Optional)	Prearrival
	Subdivisions	Name	Prearrival
	Vegetation	Forest Type, Age, Basal Area, Height	Local Unit
Optional Datasets	Aviation Sectional	Source Date	Prearrival
	Canopy Characteristics	Crown Base Height, Crown Bulk Density, Height to live crown base	Local Unit
	Military Training Routes – Ops Areas (MTR/MOA)	Number, Elevation	Local Unit
	Orthoimagery (e.g., DOQQ, NAIP)	Source Date, Resolution	Prearrival
	Other Scanned Maps	Source, Source Date	Local Unit
	Public Land Survey	Township, Range, Section	Prearrival
	Response Areas (Direct Protection Areas)	Name	Local Unit
	Retardant Exclusion Areas		Local Unit
	Schools	Name	Local Unit
	Threatened, Endangered, and Sensitive Species	Type	Local Unit
	Wilderness	Name	Local Unit
	Wildland Urban Interface (WUI)	Type	Local Unit

Chapter 5 Map Symbology

Purpose

The use of standard symbols in mapping wildland fires facilitates fast and consistent interpretation of mapping products. Standard map symbols are required to avoid ambiguous map interpretation, which can become a safety issue during an incident.

Symbols that are used by anyone who may create maps digitally or who may hand draw maps on an incident are addressed in this SOP to encourage safety, consistency, and readability.

Procedures

The NWCG Fireline Handbook (PMS 410-1) map symbols are the primary standards. This document presents additional standard map symbols.

Accompanying text (labels or annotation) must be given for Drop Point ("DP") and Helispot ("H"). These map symbols look identical when displayed in black and white. The text is used not only as a designator of the symbol type, but also as an identifier of a particular feature (e.g., DP-1, DP-2, H-5, etc.). Hot Spot symbols also look like Drop Points and Helispots when displayed in black and white. Care should be taken to place the identifying text close enough to the map symbol to avoid confusion with nearby symbology.

Although the symbols are evaluated individually and thus technically stand on their own as standards, it is best to assemble the standard symbology as a set of symbols for distribution.

This SOP is intended to be technology independent. Standard symbols sets for presently accepted GIS software packages (i.e., ArcGIS style set), along with instructions for loading the symbology, can be found on the GSC Web site (*http://gis.nwcg.gov*). The symbols are also be available individually as graphics files to be incorporated into any GIS software that allows custom symbols.

Choice of symbol size is left to the discretion of the GIS Specialist (GISS) and the Situation Unit Leader (SITL). More cartographic recommendations can be found in Chapter 6.

General symbology is not included as a standard for mapping wildland fires. However, to ensure clear communication, common map conventions (e.g., blue for hydrologic features) should be observed if possible, and national symbology standards should be used where appropriate (e.g., BLM Ownership, Figure 5.5 Suggested Ownership Color Ramp). A suggestion for Aviation Elevation color ramp can be found in Figure 5.6.

Specifications

The following acceptance criteria were used for symbol selection:

- GIS symbols should represent features that are incident-related.
- Standard GIS symbols must relate to the standard map products under the SOP for Standard Map Products.
- Symbols should be easily and quickly identifiable when displayed in color and black and white.

- Symbols should be clearly distinguishable between other ICS symbols when displayed in color and in black and white.
- Symbols in the Fireline Handbook (PMS 410-1) shall be included and are not subject to modification with the exception of symbol size and optional halo.

Note: The symbols for Fire Origin, and Fire Spread Prediction (from the Fireline Handbook) do not satisfy the GSTOP symbology acceptance criteria defined for digital symbols. But while these symbols cannot be modified, the symbol size or use of halo borders can be adjusted.

Figure 5.1 Map Symbology Samples.

Special Consideration: Safety Symbols
When there is an occasion to map important safety features, the use of these standard map symbols is recommended. Field conditions can change, making locations outdated and dangerously misleading. These symbols should only be displayed on maps at the direction of the SITL.

Safety Zone (point)— 

Several variations of Safety Zone symbols have been created and used on incidents. A standard Safety Zone symbol will facilitate safety through universal symbol recognition. The triangle shape is unique in ICS symbology. This makes the Safety Zone symbol easy to identify and distinguish between other ICS symbols.

Lookout (point)— 
Lookout symbols represent the locations of Lookouts posted to facilitate safety of operations. They are not intended to locate lookout towers or other fixed locations. This map symbol may be used in the rare situations where a Lookout position is determined in advance for planning purposes, or for showing where Lookouts were posted after the fact.

Escape Route (line)— 
Escape Route map symbols represent corridors of passage to safety zones. These features would most likely be determined in the field. However, in some instances, escape routes could be identified in advance and mapped accordingly.

Responsibilities
The (SITL is responsible for ensuring that standard map symbology is used for mapping wildland fire incidents.

The GISS, in turn, is responsible for using the standard GIS map symbology. However, the GISS has the cartographic license to adapt (e.g., enlarge, use halo) the symbology for map readability while maintaining the essential design of the standard symbols. Map symbol colors, if applicable, will be maintained.

Communications
The GISS should communicate with the SITL regarding the use of standard mapping symbology on an incident. This is especially important when the GISS uses cartographic license to enhance map symbols.

Definitions
Active Burnout: The location where burnout operations are occurring.

Aerial Hazard: A hazard for aircraft, such as towers and power lines.

Aerial Ignition: Ignition of fuels by dropping incendiary devices or materials from aircraft. This is most often displayed as a line feature, but may be represented as a point.

Branch Break: A location where Branches adjoin. Branches are identified by roman numerals or by functional name (service, support).

Camp: A geographical site(s) within the general incident area, separate from the incident base, equipped and staffed to provide sleeping, food, water, and sanitary services to incident personnel.

Completed Burnout: An area inside a control line where fire has been set to consume fuel between the edge of the fire and the control line.

Completed Dozer Line: Completed fireline constructed by the front blade of a dozer. The map symbol for this line is often interpreted to encompass fireline created by all mechanical means.

Completed Line: Completed Line refers to any completed fireline type that serves as a Control Line that is not constructed through hand or mechanical means.

Control Line: An inclusive term for all constructed or natural barriers and treated fire edges used to control a fire.

Division Break: Location of Division boundaries. Divisions are identified with alpha characters. The naming scheme is created to allow for the addition or subtraction of Divisions. For example, when a fire has two Divisions they are often designated as Division A and Division Z. Lettering is designated from A to Z, clockwise from the fire origin.

Drop Point: A predefined location where personnel, equipment, and supplies are to be delivered or picked up.

Escape Route: A preplanned and understood route firefighters take to move to a safety zone or other low-risk area.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a Control Line from which to work.

Fire Origin: A location that describes the best known location of an incident origin.

Fire Spread Prediction Line: A line used to show the predicted fire edge at a certain date and time.

Fire Station: A structure or other area set aside for storage of firefighting apparatus such as fire engines and related vehicles, personal protective equipment, fire hoses and other specialized equipment. It may also have dormitory living facilities and work areas for the use of fire fighters.

Fireline: The part of a control line that is scraped or dug to mineral soil. Also called fire trail.

First Aid Station: A station providing emergency care or treatment before regular medical aid can be obtained

Foam Drop: The location where foam is dropped from aircraft during fire suppression operations.

Hand Line (handline): Fireline constructed with hand tools.

Heat Perimeter: perimeter of heat area as interpreted by infrared interpreters (IRINs), from data derived from infrared sensors.

Helibase: The main location within the general incident area for parking, fueling, maintenance, and loading of helicopters. It is usually located at or near the incident base.

Helispot: A natural or improved takeoff and landing area intended for temporary or occasional helicopter use.

Highlighted Geographic Features: Significant geographic features that are highlighted on maps.

Highlighted Manmade Features: Significant human-constructed features that are highlighted on maps.

Hot Spot: The location of a particularly active part of a fire. The map symbol for Hot Spot is similar to Drop Points and Helispots, but it is slightly larger.

Incident Base: Location at the incident where the primary logistics functions are coordinated and administered. (Incident name or other designator will be added to the term "Base.") The Incident Command Post may be collocated with the Base. There is only one Base per incident.

Incident Command Post (ICP): Location at which primary command functions are executed. The ICP may be co-located with the Incident Base or other incident sites.

Intense Heat Area: An area of intense heat as interpreted by IRINs from data derived from infrared sensors.

Isolated Heat Source: A single heat source isolated from areas of intense or scattered heat as interpreted by IRINs from data derived from infrared sensors.

Line Break Completed: A constructed barrier used to stop or check fires that may occur, or to provide a Control Line from which to work.

Lookout: (1) A person designated to detect and report fires from a vantage point. (2) A location from which fires can be detected and reported. (3) A fire crew member assigned to observe the fire and warn the crew when there is danger of becoming trapped.

Management Action Point (MAP): Geographic point on the ground or specific point in time where an escalation or alternative of management actions is warranted. These points are defined and the management actions to be taken are clearly described in an approved Fire Management or Land Management Plan. Also called Trigger Points.

MediVac Site: A mobile medical treatment and transportation site.

Mobile Weather Station: A special weather station for forecasting weather for a specific incident, prepared by a meteorologist on site at or near the incident area.

Planned Fire Line: An inclusive term for all planned constructed barriers used to control a fire.

Planned Secondary Line: Any fireline planned for construction at a distance from the fire perimeter concurrently with or after a line already constructed on or near the perimeter of the fire, generally constructed as an insurance measure in case the fire escapes control by the primary line.

Proposed Burnout: A proposed area inside a control line where fire has been set to consume fuel between the edge of the fire and the control line.

Proposed Dozer Line: Proposed fireline constructed by the front blade of a dozer.

Pump: Location where a pump or pumps are established during fire suppression activities.

Repeater: A radio signal station that automatically relays a radio transmission, sometimes over a different frequency, thereby increasing the range of transmission. Repeaters are often named for

the mountaintops or peaks where they are installed.

Retardant Drop: The location where fire retardant cascaded from an air tanker or helitanker.

Road as Completed Line: Used to delineate when a road is used as a fuel break in fire suppression activities. This can include roads that have had the adjacent fuels modified to improve the ability to stop the spread of the wildfire.

Safety Zone: An area cleared of flammable materials, where shelter deployment is not necessary, used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety Zones may also be constructed as integral parts of fuel breaks.

Scattered Heat Areas: An area with scattered heat as interpreted by IRINs from data derived from infrared sensors.

Segment Break: The location of a Segment boundary. A Segment may be a portion of a Division or an area inside or outside the perimeter of an incident. Segments are identified with Arabic numerals (A-1) and so forth.

Spot Fire: The location of a fire ignited outside the perimeter of the main fire by a firebrand. The arrow of the Spot Fire symbol should be rotated to point in the direction the spot fire is spreading.

Staging Area: A location set up at an incident where resources can be placed while awaiting a tactical assignment on a three-minute available basis. Staging Areas are managed by the Operations Section.

Temporary Flight Restriction (TFR): A restriction requested by an agency and put into effect by the Federal Aviation Administration in the vicinity of an incident which restricts the operation of nonessential aircraft in the airspace around that incident

Uncontrolled Fire Edge: A fire edge that is actively burning and spreading across the landscape.

Water Drop: The location where water is dropped from aircraft during fire suppression operations.

Water Source: Any strategically located supply of water that is readily available for pumps, tanks, trucks, helicopters, or fire camp use.

Wind Speed Direction: Compass direction from which wind is blowing

Zone Break: Location of Zone boundaries. Zones are the highest order in dividing an incident into geographic areas of operation.

Figure 5.2 Standard Point Map Symbols.

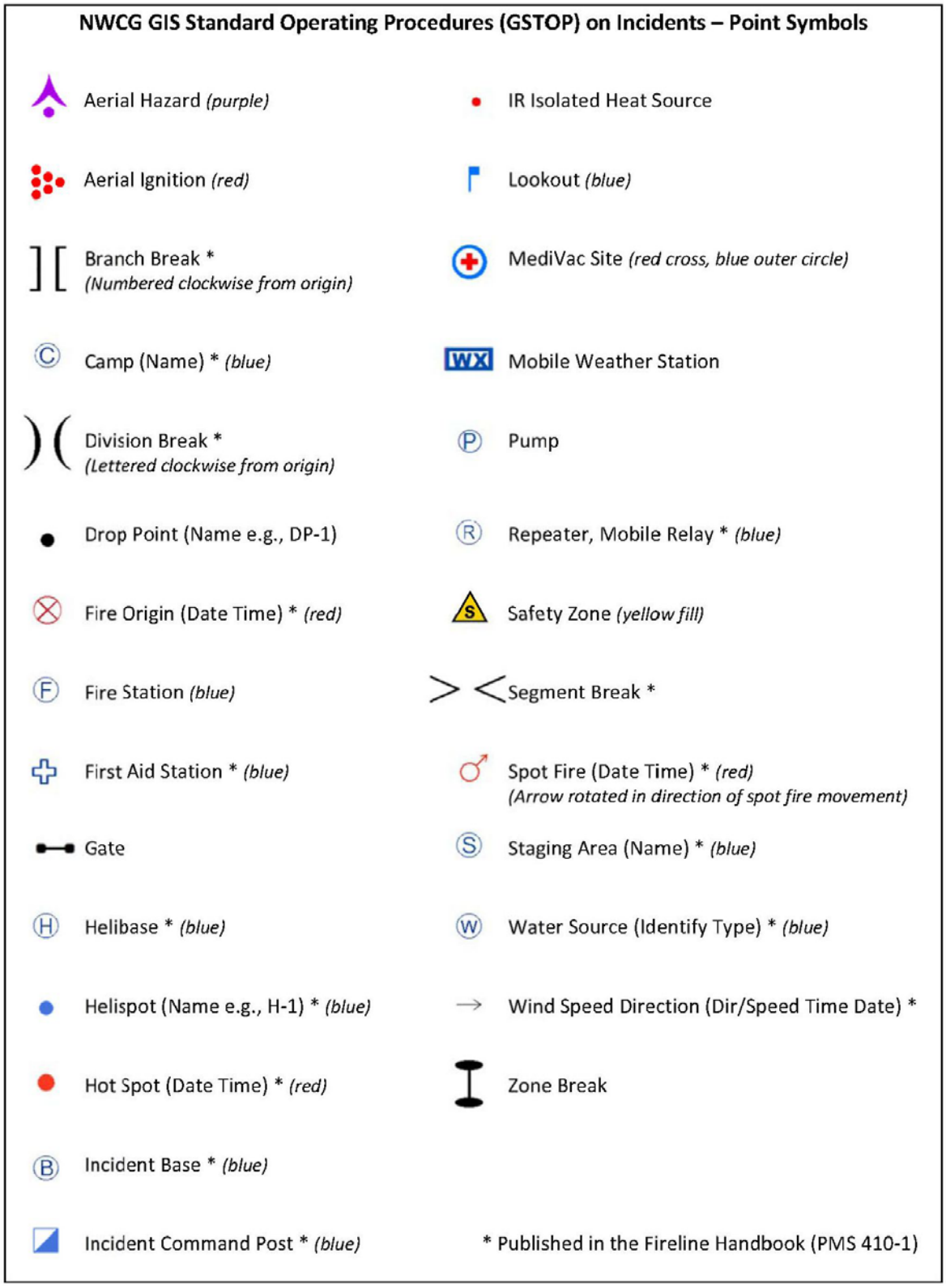

Figure 5.3 Standard Line Map Symbols

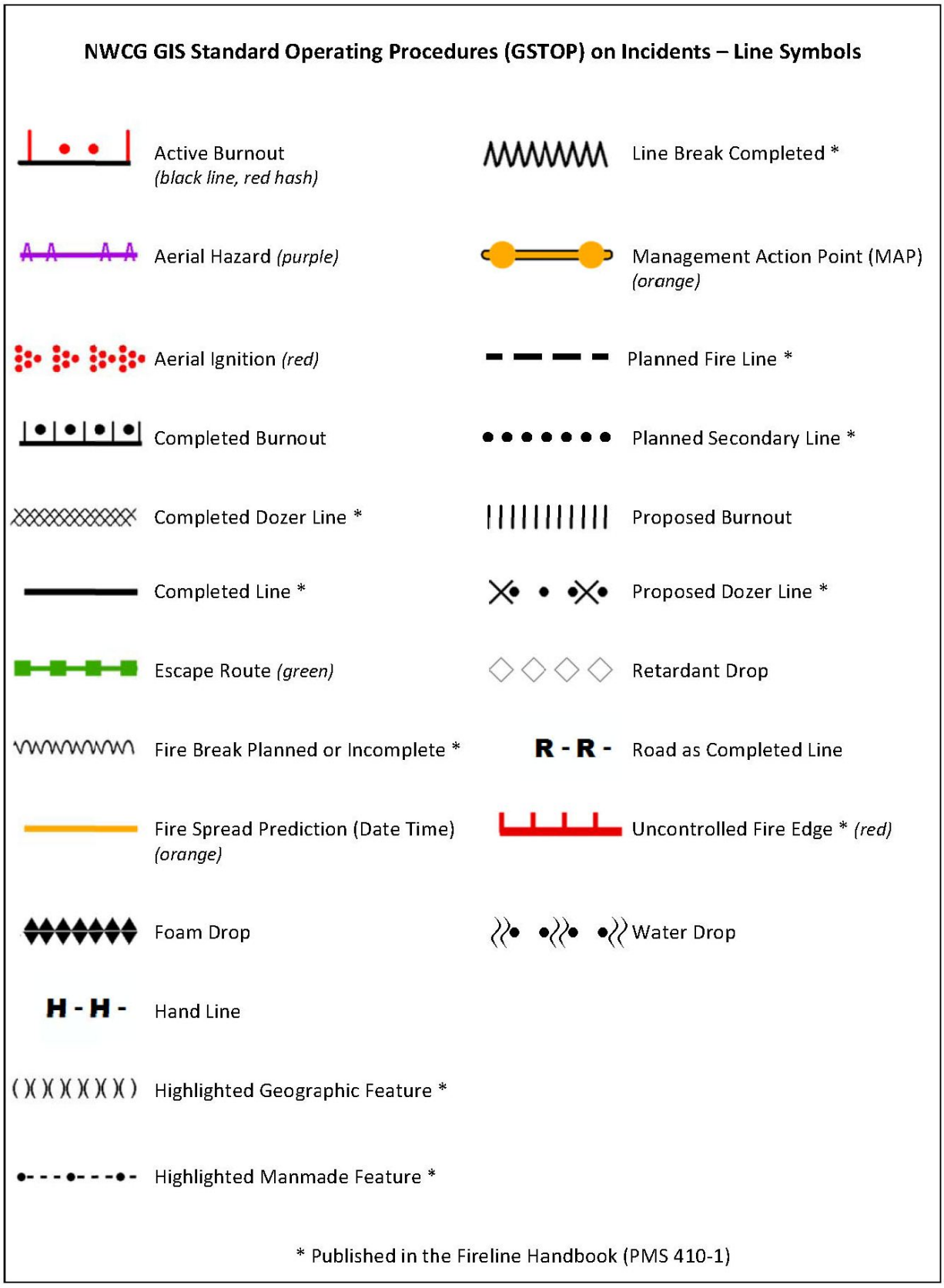

Figure 5.4 Standard Map Polygon Symbols

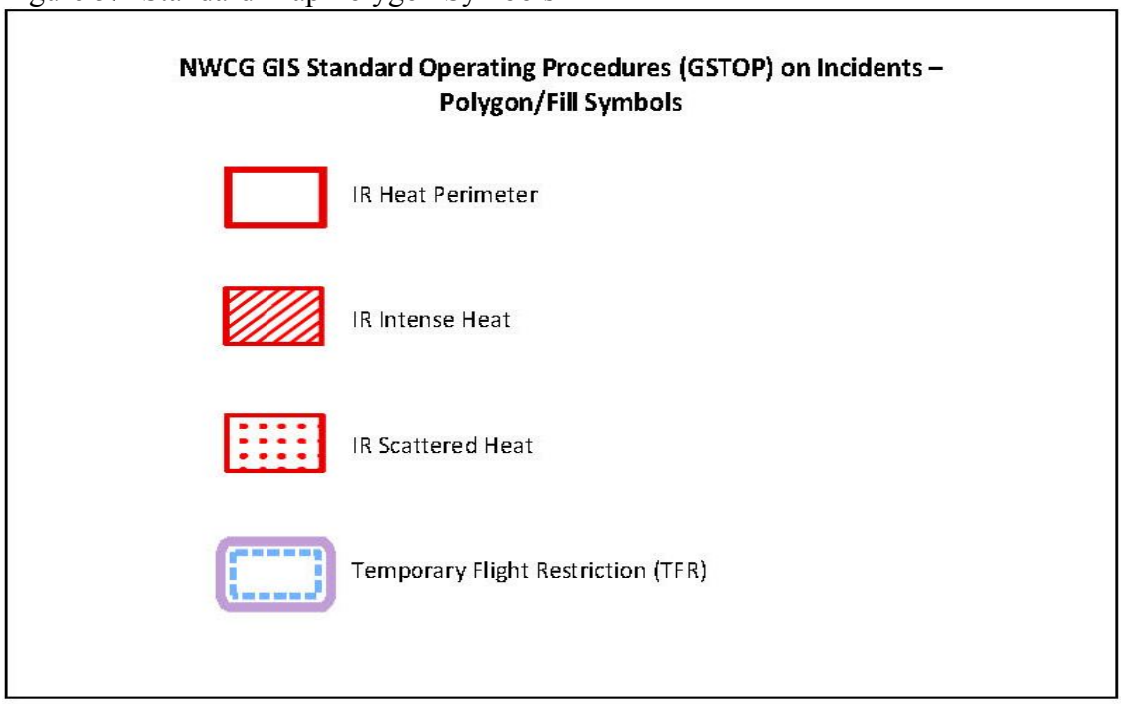

Figure 5.5 Suggested Aviation Elevation RGB Color Ramp & FAA Legend Example

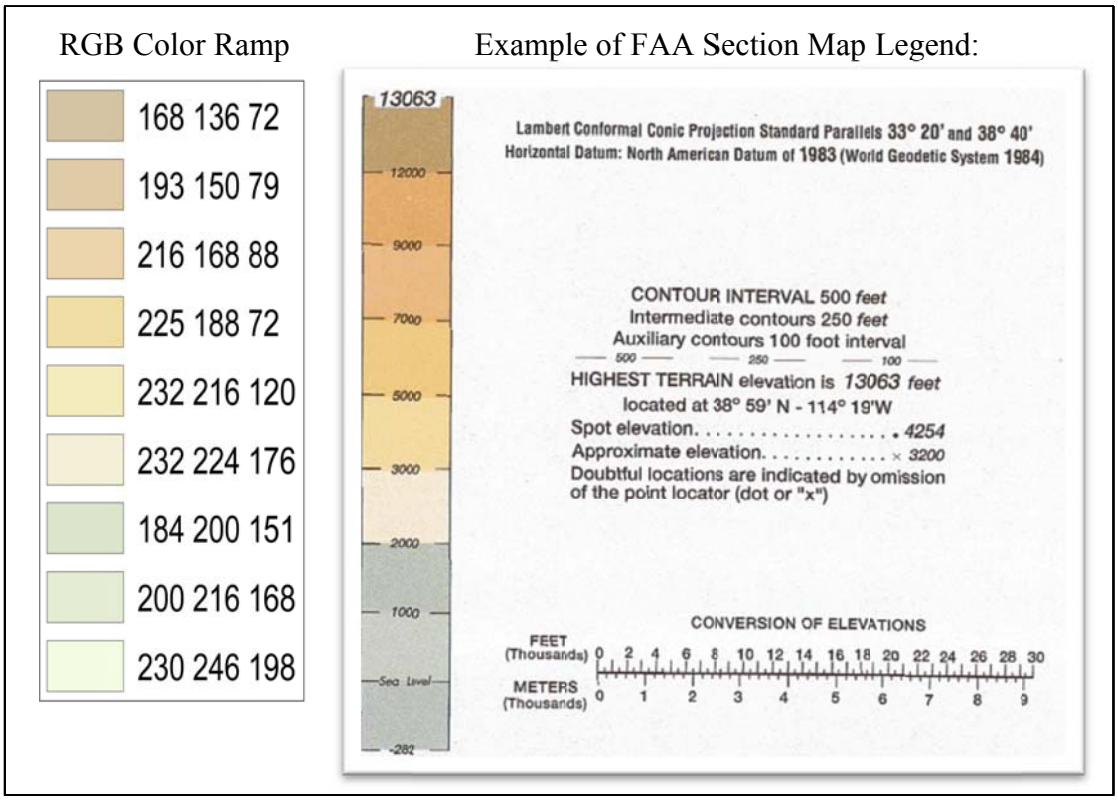

Figure 5.6 Suggested Ownership Color Ramp

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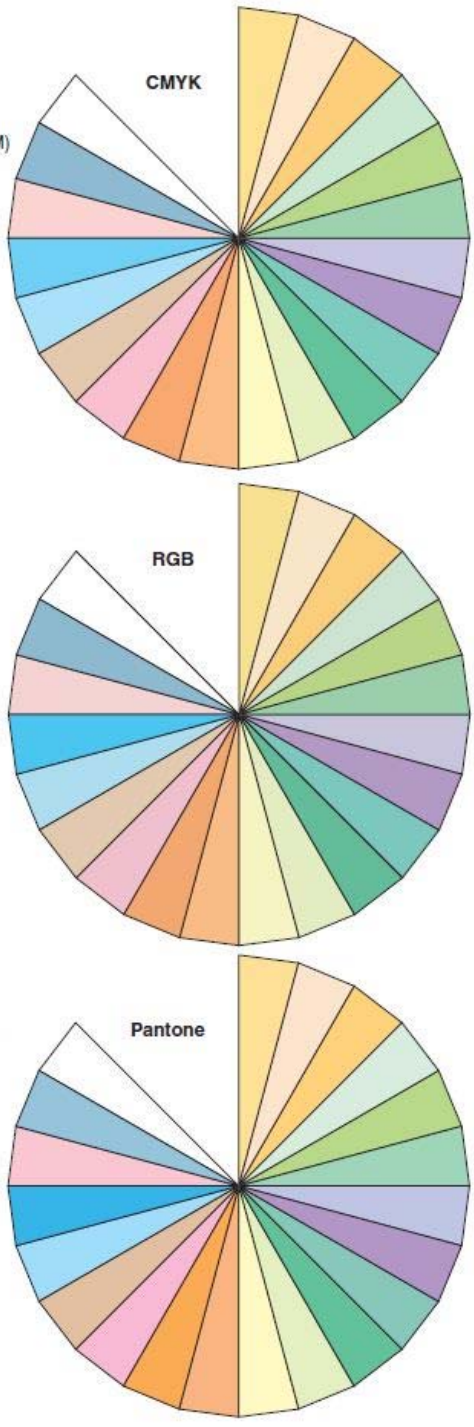
Map Ownership Matrix

CMYK	RGB (ArcView HSV)	Pantone	
0-10-50-0	254-230-121 (34-134-254)	141C	Bureau of Land Management (BLM)
0-10-20-0	254-230-191 (26-64-254)	475C	BLM Oregon and California Lands (O&C)
0-20-60-0	254-204-92 (29-163-254)	135C	BLM Wilderness Area
20-0-20-0	204-235-197 (77-41-235)	351C	US Forest Service (USFS)
30-0-60-0	179-222-105 (58-134-222)	367C	USFS O&C
40-0-40-0	153-213-148 (82-78-213)	345C	USFS Wilderness Area
20-20-0-0	202-189-220 (188-36-220)	665C	National Park Service (NPS)
30-40-0-0	177-137-193 (201-74-193)	2563C	NPS Wilderness Area
50-0-30-0	127-204-167 (107-96-204)	563C	US Fish and Wildlife (USFW) National Wildlife Refuge
60-0-50-0	102-191-127 (97-119-191)	346C	USFW Wilderness Area
10-0-30-0	230-245-177 (52-71-245)	365C	National Grasslands
0-0-30-0	255-255-179 (42-76-255)	601C	Bureau of Reclamation
0-30-50-0	253-180-108 (21-146-253)	472C	Indian Reservation (IR)
0-40-60-0	253-154-82 (17-173-253)	157C	IR Wilderness Area
0-30-5-0	251-180-206 (240-72-251)	203C	Military Reservations and Corps of Engineers
10-20-30-0	228-196-159 (22-77-228)	4665C	Other Federal
30-0-0-0	179-227-238 (135-63-238)	2975C	State
50-0-0-0	107-207-226 (134-134-226)	2915C	State Wilderness Area
0-20-10-0	252-205-207 (254-47-252)	196C	Bankhead-Jones Land Use Lands
30-0-0-20	143-181-190 (136-63-190)	551C	State, County, City; Wildlife, Park and Outdoor Recreation Areas
0-0-0-0	255-255-255 (0-0-255)		Private

Colors on a printed product may differ from the colors shown above; colors may be affected by any combination of variables inherent to four-color process printing. These variables include, but are not limited to, film and plate registration, plate quality, type and weight of paper stock, different types of process color ink, printing press dot gain, print run color sequence, press color control, and pressmanship.



Chapter 6 Map Products

Purpose

Standard Map Products are the maps frequently used during wildland fire incidents. This chapter provides guidelines for the creation of GIS map products during an incident. Optional map definitions have also been developed for other GIS maps that are less regularly requested during an incident.

The objective was not to create an impossible standard, nor create a standard for every possible product. These "standards" are intended to be used as guidelines. Flexibility will need to be applied to these standards as the Situation Unit Leader (SITL) and other end-users may have specific needs or preferences. The most important criteria in preparation of a map product are the operational business drivers (i.e. primary use) for the cartographic products. The primary use should drive the focus of the maps, but once the operational period is over there may be other business drivers (i.e. secondary uses) that need to be considered. Information from incidents must be archived as a historical record. Archive requirements may supplement the operational needs of the map to ensure that the information on the map has adequate documentation. See chapter 7 of further guidance on archiving data and products.

Map examples are available on the GSC website (http://gis.nwcg.gov).

Responsibilities

Timelines for map production need to be established with the Situation Unit Leader (SITL), Planning Section Chief (PSC), or the assigned supervisor. It is the responsibility of the GIS Specialist (GISS) to produce all products on time for scheduled briefings and other meetings. Map definitions should be used as general guidelines; the SITL or PSC has the authority to deviate from the standards.

Communications

All incident map requests go through the SITL or PSC. This keeps the SITL or PSC informed of the GISS workload and helps prioritize needs. The SITL or PSC may instruct the GISS to work with the end-user of the map to clarify map product requirements. Final map products are approved by the SITL or PSC (or assigned supervisor) before release, unless otherwise arranged.

Procedures

The map products defined later in this document are classified as either standard or optional. Standard maps are those that are commonly produced on incidents. The GISS Position Task Book lists the standard maps as those in which a GISS Trainee must successfully produce in order to become fully qualified as a GISS. Optional maps are additional maps that may be requested. The optional list is not all inclusive and other special map products may be requested. The desired elements for these maps are typically provided by the person requesting the map through the Situation Unit Leader, and if not, the GISS should request additional guidance.

Other Procedural Considerations

- The SITL (or equivalent) approves all maps
- Use of logos shall be directed by the SITL

- Placement (and total reported) of fire acreage on maps is at the discretion of the SITL
- Consider page size and whether color is needed; many maps are reproduced on black-and-white copy machines and may need specific formatting
- North arrow may need to be rotated to correctly indicate true north
- May include "DRAFT" on maps that are for review only
- Sensitive Information—maps may need labels defining the sensitivity of the data (e.g., "For Official Use Only," "Not for Public Distribution or Use"). Distribution of these maps should be restricted and tracked.
- Any other disclaimers, if requested or required under delegated authority (e.g., "For Reference Only")
- Proprietary Information—cite source
- Planning Cycle Timeline—schedule map production to meet specific deadlines (refer to the Fireline Handbook)

Specifications
Map products should adhere to:

- ICS symbology standards (refer to Chapter 5 or the Fireline Handbook)
- Use of standardized colors for maps printed in color (refer to USGS standards); blue for water, green for vegetation, and so forth.

Maps produced on an incident should communicate the intended message clearly.

All standard map products produced should follow these standards and include the following cartographic elements:
STANDLS (**S**cale, **T**itle, **A**uthor, **N**orth Arrow, **D**ate of preparation, **L**egend, **S**ource Statement) map elements should be on all maps produced.

- **Scale**. A graphical expression of a fixed distance such as 1000 feet or 1 mile. A textual description such as 1:24,000 or 1" = 1 mile is useful if the map is printed at the desired output size, however, digital maps such as PDF can be printed at various sizes. Because of changing page sizes as printed it is best to use a graphical scale bar.
- **Title.** The basic description of the map including items such as incident name and map type. The Unit Identifier and the Local Incident Identifier should also be included (for example: ID-BOF-0095). The title may also include the operation date the map was prepared for and operational period (day-night).
- **Author.** The person or group that prepared the map.
- **North Arrow.** The graphical display used to orient the map correctly. This element could also include additional direction indicators for magnetic declination or grid angle.
- **Date** of preparation. This should be near the author's name on the map. Software tools allow the automatic insertion of this element onto the map with minimal effort.
- **Legend.** The key that describes the meaning of the symbols found on the map.
- **Source Statement(s)**. Date and time that key elements on the map were collected. May be embedded in the legend or in title box. Other citations for data and/or features on a map may be included, such as: source, collection method, accuracy, coordinate system/projection, etc.

GD (**G**raticule/Grid**, D**atum) map elements should be on all standard maps and are recommended for optional maps, as appropriate.

- **Graticule/Grid.** This element is a typically a graticule of latitude and longitude marks and numbers that allows referencing of the mapped area to the specific area on the earth. This element can also be in the form of other grid coordinates such as UTM, State Plane, Public Land Survey (PLSS), or USNG.
- **Datum.** The datum must be noted on the map when a graticule/grid is used or if coordinates are displayed. The correct datum is critical for Global Positioning System (GPS) use.

Accuracy and Completeness

- Data should be current
- Features are in correct location
- Map scale is accurate
- Map should be complete and readable

List of Standard and Optional Maps

The standard maps, as listed in the GISS position task book, are (listed in order of typical workflow):

- Incident Action Plan Map
- Briefing Map
- Situation Unit Map
- Transportation Map
- Air Operations Map
- Progression Map

Additional optional maps include, but are not limited to (listed alphabetically, not in order of importance or demand):

- Areas of Special Concern Map
- Damage Assessment Map
- Facilities Map
- Fire Perimeter History Map
- Fuels Map
- Infrared Information Map
- Operations Map
- Ownership/Land Status Map
- Public Information Map
- Rehabilitation Map
- Structure Protection Map
- Vegetation Map

Product Name
Incident Action Plan (IAP) Map STANDARD

Product Description
The IAP Map is the primary map used by operations personnel and is included in the Incident Action Plan.

Typical Map Requester
Planning Section Chief, Operations Section Chief

Target Audience
Incident Commander, Planning Section, Operations Section, Incident personnel, Safety Officer

Objective
The IAP Map effectively communicates geographic feature relations and incident management objectives on an incident. This map is the highest priority. The IAP Map is a tool used by operations staff to display field assignments, crew instructions, and division safety concerns at the operational period briefings and breakout meetings. The IAP Map is a tool for firefighter safety.

Guidelines
- Standard ICS symbology
- Black and white to enable clear duplication
- Letter (8½″ × 11″) or tabloid (11″ × 17″) size
- Mapped area should cover the incident area and predicted spread.
- Generally 1:24,000 scale; 1:63,360 scale in Alaska. SITL may direct other scales.

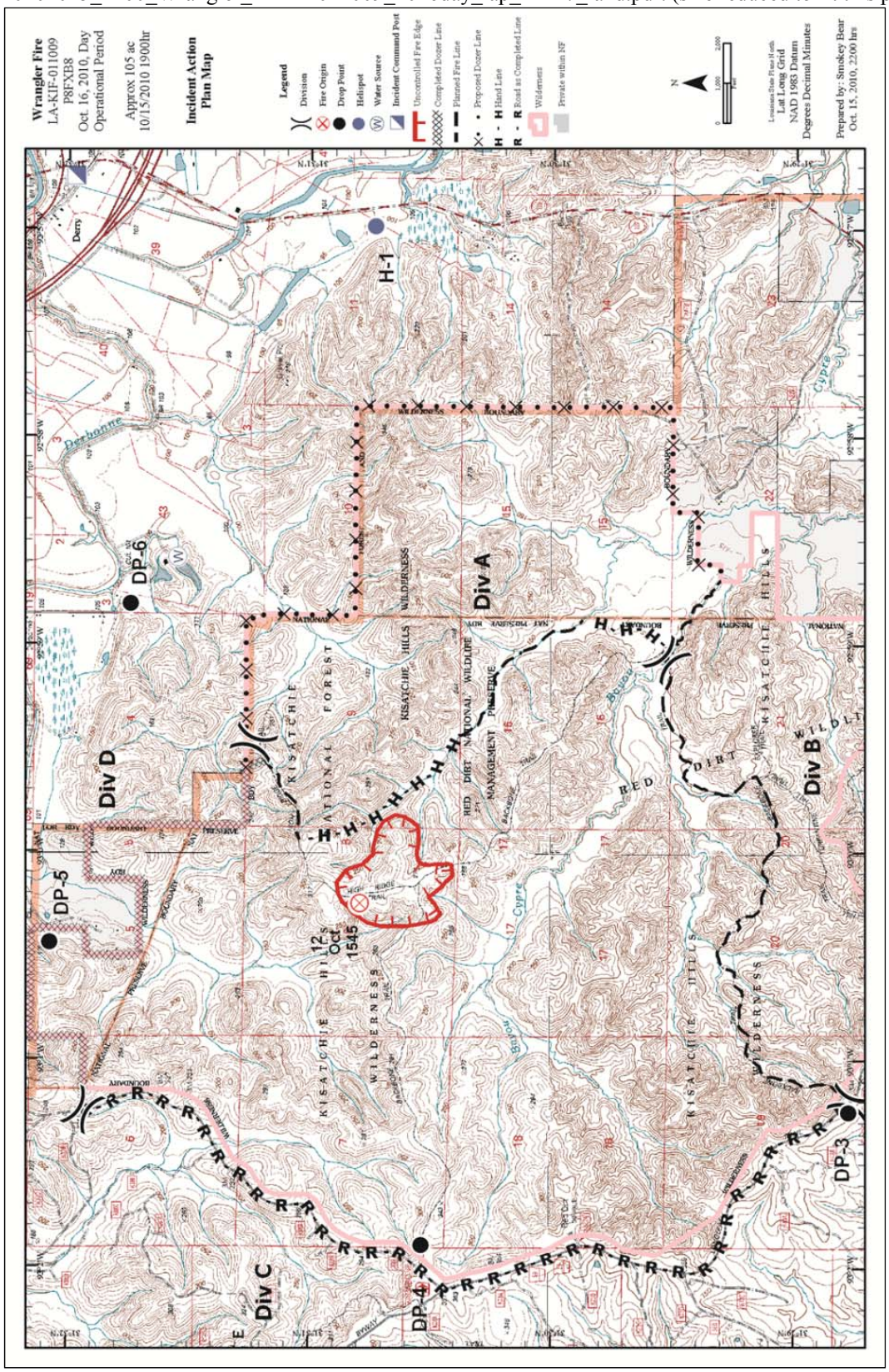
Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier with the Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum.

Data
- Incident perimeter and ICS line features
- Division–Branch breaks and labels
- Topography (DRGs with the green turned off usually produce the best topographic line quality)
- ICS features (Drop Points, aviation features, camps, ICP, spot fires, safety zones, and others)

Optional Elements
- Index map (when multiple sheets are required)
- Structures
- Roads and road hazards (4wd only, one-way, etc.)
- Safety Hazards
- Hydrography
- Wilderness boundaries
- Disclaimer language (use when incident information is estimated, changing quickly, or upon request)
- Magnetic declination and date
- MAPs Orthophotography

Figure 6.1. Incident Action Plan (IAP) Map Example.
20101015_2200_Wrangler_LAKIF011009_1016day_iap_11x17_land.pdf. (size reduced to fit this page)



Product Name

Briefing Map STANDARD

Product Description
The Briefing Map is displayed in the briefing area and used during operational briefings. It is a simplified, large-format map of the incident area that is used to discuss work assignments and other details.

Typical Map Requester
Operations Section Chief, Planning Section Chief, Safety Officer

Target Audience
Incident personnel at the operational briefing - Incident Commander, Command Staff (Public Information Officer, Safety Officer, Liaison Officer), General Staff (Operations Section Chief, Planning Section Chief, Logistics Section Chief, Finance/Administration Chief), Fire Behavior Analyst, Strategic Operational Planner, Operations Overhead

Objective
The Briefing Map communicates sufficient incident detail to brief personnel on the upcoming operational period.

Guidelines
- Standard ICS symbology
- Simple fonts and symbols, large enough to be read from the back of the briefing area
- Reduced clutter to enable clear communication
- Printed as large as possible to serve a large crowd and be visible from a distance. "E" size (34″ × 44″) or larger.* May be tiled and assembled

*Often created using a page size that is smaller but with similar aspect ratio. The file is scaled up when printing.

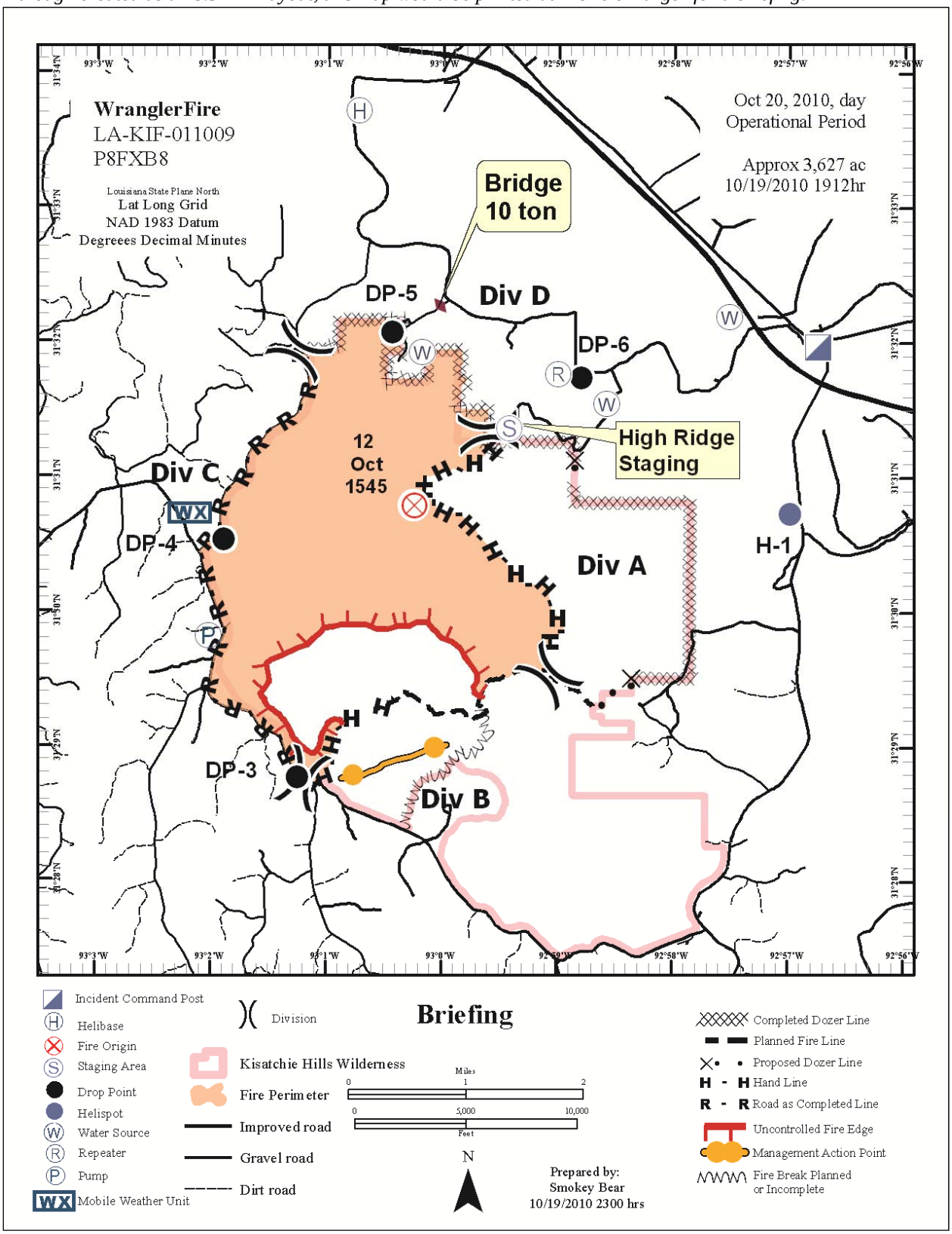
Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier with the Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience)
- Datum.

Data
- Incident perimeter, ICS line and point features (e.g., Completed Line, Drop Points, Camps, ICP)
- Division–Branch breaks and labels
- Major transportation routes to incident

Optional Elements
- Safety Hazards
- Escape Routes
- Topography or other scanned background map
- Administrative boundaries (e.g., Jurisdiction), Political boundaries (City-County-State-National)
- Ownership-Land Status
- Wilderness
- Airports–Helibases
- Public Land Survey
- Hydrography (e.g., rivers, lakes)
- MAPs

Figure 6.2. Briefing Map Example. 20101019_2300_Wrangler_LAKIF011009_1020day_brief_letter_port.pdf
Although created as an 8.5 x 11 layout, this map would be printed at E-size or larger for a briefing.



Product Name
Situation Unit Map STANDARD

Product Description
The Situation Unit Map is large-format map with an accurate, current, and detailed record of the incident information and is displayed in or near the Situation Unit area.

Typical Map Requester
Situation Unit Leader, Planning Section Chief, Incident Commander

Target Audience
Incident Commander, Command Staff (Public Information Officer, Safety Officer, Liaison Officer), General Staff (Operations Section Chief, Planning Section Chief, Logistics Section Chief, Finance/Administration Chief), Agency Reps., Situation Unit Leader, Fire Behavior Analyst, Strategic Operational Planner

Objective
The Situation Unit Map provides a geographic tool for the Plans Meeting to develop incident strategies and alternatives. It is frequently used as the master map for tracking incident intelligence. Often used for debriefing.

Guidelines
- Standard ICS symbology
- Feature symbology discernible from the back of the meeting area
- Usually "D" size (22″ × 34″) or larger
- Usually 1:24,000 scale; 1:63,360 scale in Alaska

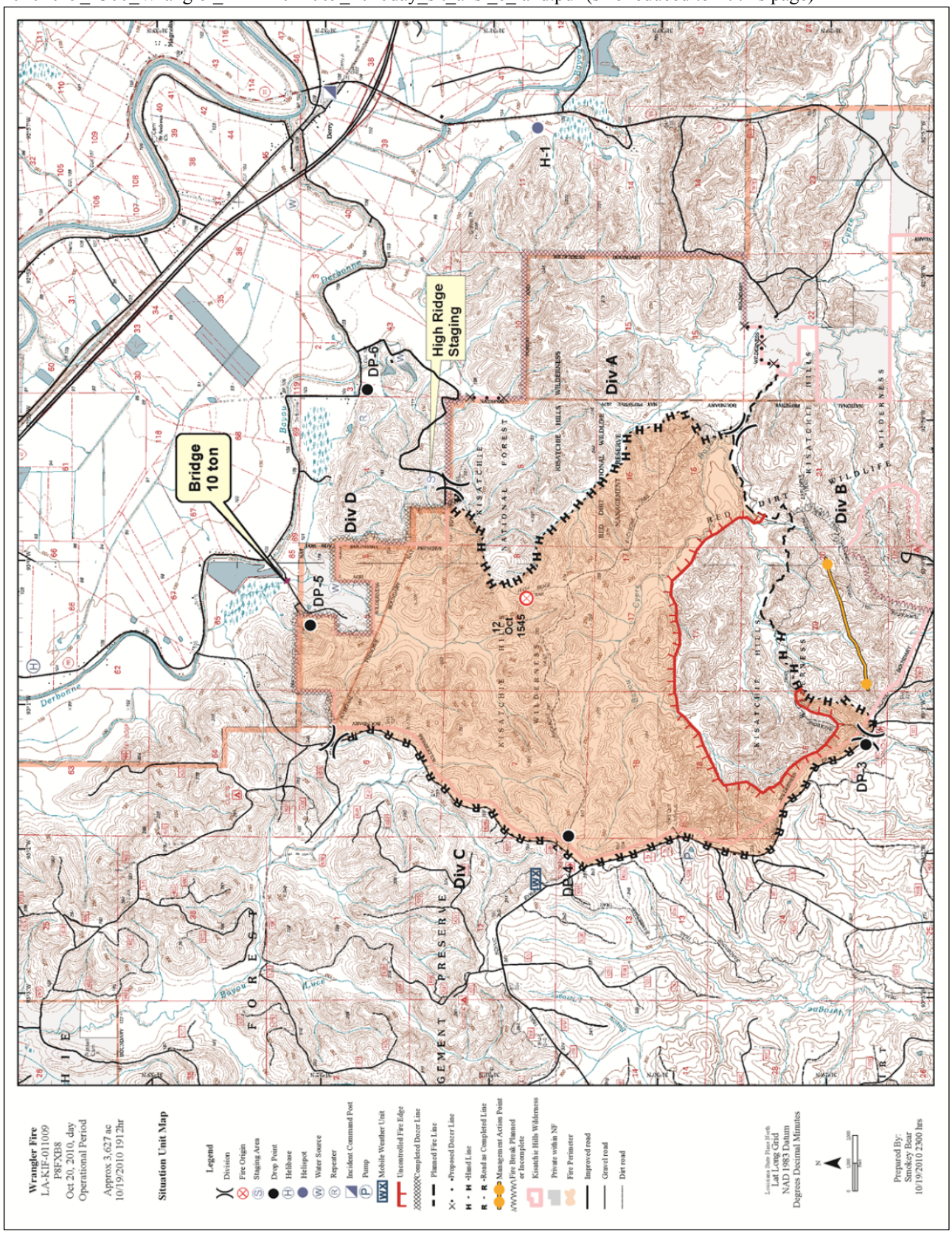
Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier with the Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum.

Data
- Incident perimeter, ICS line features (e.g., Dozer Line) and ICS point features (e.g., ICP, helispots)
- Division–Branch breaks and labels
- Transportation routes
- Safety hazards, if available
- Administrative boundaries (e.g., Jurisdiction), Political boundaries (City-County–State-National)
- Ownership-Land Status
- Appropriate base background such as Topographic (with or without shaded relief) or Orthoimagery

Optional Elements
- Escape routes, Safety zones
- Vicinity map(s)
- Hydrography
- Wilderness
- Structures
- Subdivisions
- Response areas (Direct Protection Areas)
- Retardant Exclusion Areas
- MAPs
- Public Land Survey

Figure 6.3. Situation Unit Map Example.
20101019_2300_Wrangler_LAKIF011009_1020day_sit_ansi_c_land.pdf (size reduced to fit this page)



Product Name

Transportation Map STANDARD

Product Description

The Transportation Map shows the access routes to the incident and is included in the IAP.

Typical Map Requester

Planning Section Chief, Logistics Section Chief, Safety Officer

Target Audience

Safety Officer, Operations Section, Logistics Section, incident personnel

Objective

The Transportation Map provides an overview of the transportation network in the incident vicinity to support safe transportation. This map is used to facilitate land-based delivery of equipment, supplies, and personnel to and from the incident location.

Guidelines

- Standard ICS symbology
- Generally Letter (8½″ × 11″) or tabloid (11″ × 17″) size
- Black and white to enable photocopying and faxing
- Prepared for operational period briefings—insert into IAP

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum.

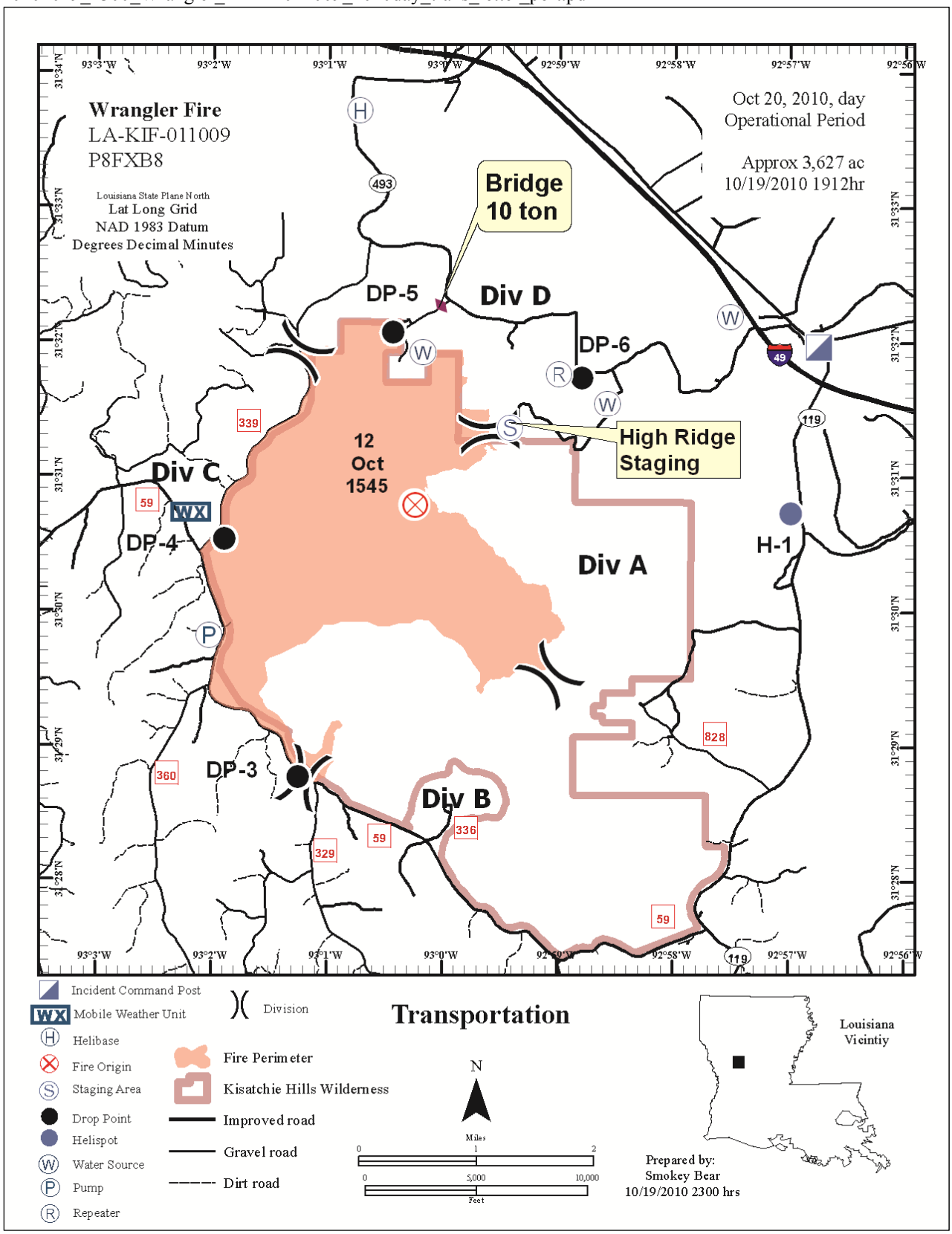
Data

- Incident Perimeter
- Division–Branch breaks and labels
- Major roads and names, type of route (dirt, 4wd only, one-way, etc.)
- Route restrictions (e.g., bridge weight limits)
- ICS point features (e.g., Drop Points, Camps, ICP)
- Key Landmarks

Optional Elements

- Incident line features
- Vicinity maps
- Label distances along travel routes
- Mile markers
- Disclaimer language
- Administrative boundaries, Political boundaries (City-County-State-National)
- Hydrography, such as rivers and lakes
- Communities (GNIS populated places)

Figure 6.4. Transportation Map Example.
20101019_2300_Wrangler_LAKIF011009_1020day_trans_letter_port.pdf



Product Name

Air Operations Map STANDARD

Product Description

The Air Operations Map is a map that displays features important for air operations.

Typical Map Requester

Air Operations Branch Director

Target Audience

Air Operations Branch, pilots

Objective

The Air Operations Map provides air operations with enough detail to aid in locating key features on an incident.

Guidelines

- Standard ICS symbology
- Minimal clutter on map
- Small size for lap reading in aircraft

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time key features were collected. May be embedded in the legend.
- Graticule/Grid. (Latitude-Longitude Graticule should be in Degrees, Decimal Minutes unless other speciation requested by Air Operations)
- Datum.

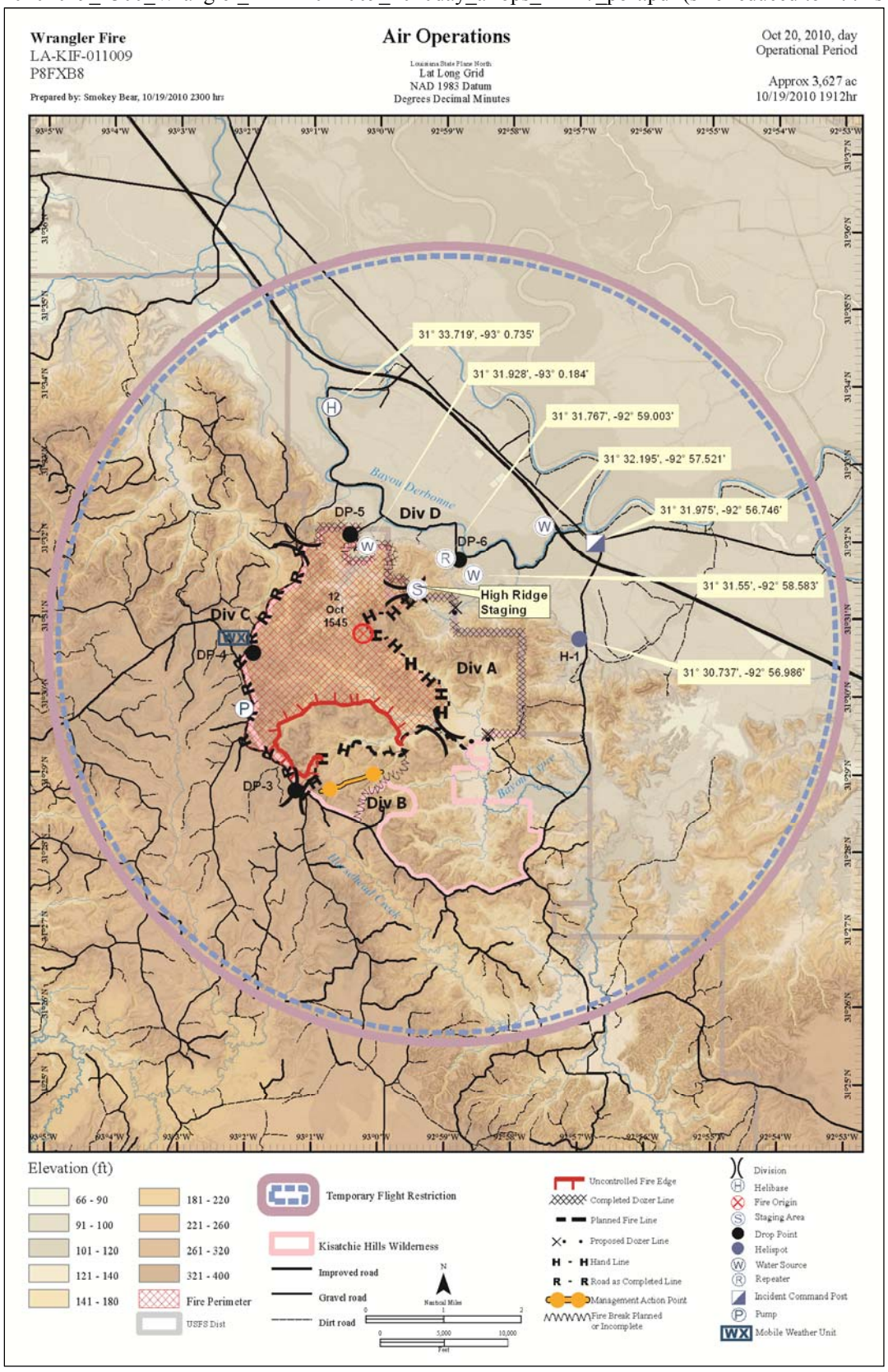
Data

- Incident perimeter, ICS line features and ICS point features
- Division–Branch breaks and labels
- Airports–Helibases
- Aviation hazards (e.g., transmission lines, mountain peaks with elevation labels, towers)
- Roads
- Key landmarks
- Hydrography
- Temporary Flight Restrictions (TFR) (when in place) and TFR Number, Height, and frequency, if available
- Elevation Shaded Relief or FAA Sectionals (see Figure 5.5 for suggested color ramp)

Optional Elements

- Table or labels showing latitude and longitude of key locations. Latitude-Longitude coordinates should be in Degrees, Decimal Minutes unless other speciation requested by Air Operations.
- Topographic Data
- Wilderness boundaries
- Frequency Table
- Retardant Exclusion Areas
- Military Training Routes (MTR) and Military Operations Areas (MOA)
- MAPs

Figure 6.5. Air Operations Map Example.
20101019_2300_Wrangler_LAKIF011009_1020day_airops_11x17_port.pdf (size reduced to fit this page)



Product Name

Progression Map STANDARD

Product Description

The Progression Map shows the areas affected by the incident over time and is displayed in the Operations Section and Situation Unit.

Typical Map Requester

Planning Section Chief, Incident Commander, Public Information Officer, Fire Behavior Analyst/Long Term Analyst, Strategic Operational Planner

Target Audience

Planning Section, Incident Commander, Host Agencies, Public

Objective

The Progression Map graphically displays the progression of the incident over the landscape.

Guidelines

- Can be scalable from letter size to "E" size
- If more than five time periods are shown, standardized color ramps are effective in showing trends rather than discrete values.
- Distribution through the Web should be considered.

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected and acreage for each time period. May be embedded in the legend.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning)
- Datum.

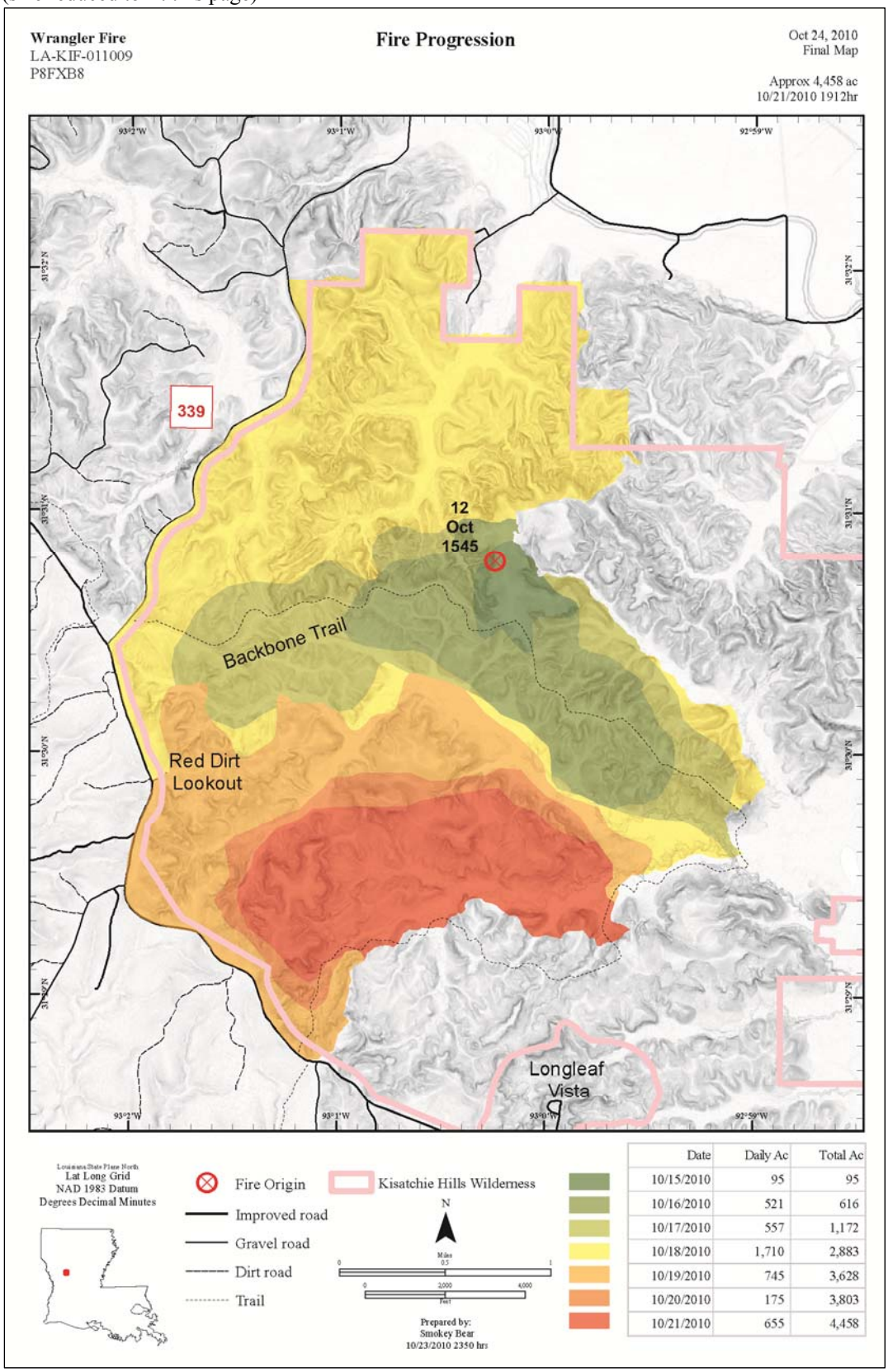
Data

- Point of Origin
- Shaded relief base–topography base
- Key geographic features, such as mountains, valleys, peaks, major roads
- Perimeter for each time period – differing by color

Optional Elements

- Administrative boundaries (e.g., Administrative, Jurisdiction)
- Ownership-Land Status
- Political boundaries (City-County-State-National)
- Vicinity maps
- Hydrography
- Wilderness

Figure 6.6. Progression Map Example. 20101023_2352_Wrangler_LAKIF011009_final_prog_11x17_port.pdf (size reduced to fit this page)



OPTIONAL MAPS

Product Name
Areas of Special Concern Map OPTIONAL

Product Description
The Areas of Special Concern Map shows sensitive cultural or environmental areas in the vicinity of the present incident.

Typical Map Requester
Planning Section Chief, Operations Section Chief, Liaison Officer

Target Audience
Operations Section, Resource Advisor, Archaeologist

Objective
The Areas of Special Concern Map is used in operational planning to identify sensitive areas such as Endangered Species habitats or locations, Cultural Resources, and other areas at risk.

Guidelines
- Standard ICS symbology
- Coordinate symbology for areas of concern with local resource advisor
- Not for public distribution

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Cultural or environmental areas of concern
- Present fire perimeter and ICS line and point features

Optional Elements
- Topographic base or Orthoimagery base
- Shaded relief
- Structures
- Communities (GNIS Populated Places)
- Ownership-Land Status
- Schools
- Administrative boundaries (e.g., Jurisdiction), Political boundaries (City-County-State-National)
- Archaeological Sites**
- Cultural Resources**
- Threatened, Endangered & Sensitive Species**
- Vegetation
- Wildland Urban Interface (WUI)
- MAPs
- Fire history perimeter polygons—perhaps colored by decade with year labels

**These datasets may be used for planning, but should not be displayed on the final map as the sites are sensitive and not for public display. These data should be shared without the permission of the source agency.

Product Name

Damage Assessment Map OPTIONAL

Product Description

The Damage Assessment Map displays the structures damaged by the incident.

Typical Map Requester

Planning Section Chief, Operations Section Chief, Liaison Officer, Structure Protection Specialist, Information Officer

Target Audience

Planning Section, Operations Section, Liaison Officer, Structure Protection Specialist, Public

Objective

The Damage Assessment Map tracks structures and resources damaged in the incident. This product will be used in operational planning and public meetings.

Guidelines

- Should be made at a scale to distinguish individual structures.
- May be made early in an incident to serve as a triage tool.

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data

- Incident perimeter
- Structures symbolized based on type or extent of damage
- Roads—including names and addresses

Optional Elements

- Land Parcel Data
- Administrative boundaries (e.g., Administrative, Jurisdiction)
- Ownership-Land Status
- Political boundaries (City-County-State-National)
- Topographic base (with or without shaded relief)
- Vicinity maps
- Orthoimagery base
- Key Landmarks

Product Name
Facilities Map OPTIONAL

Product Description
The Facilities Map shows the layout of the incident facilities at the Incident Command Post (ICP) or Incident Base/Camp and is included in the IAP.

Typical Map Requester
Logistics Section Chief, Safety Officer

Target Audience
Logistics Section, incident personnel, law enforcement, visitors to or inhabitants

Objective
The Facilities Map assists individuals in locating various resources and support functions in and around the ICP.

Guidelines
- Standard ICS symbology
- May be schematic

Standard Elements

Cartographic
- Scale. Often not to scale. In this case, use that statement instead of scale bar.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate.
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Locations of ICP resources and support functions

Optional Elements
- Vicinity maps
- Political boundaries (City-County–State-National)
- Orthoimagery base or other scanned map

Product Name
Fire Perimeter History Map OPTIONAL

Product Description
The Fire Perimeter History Map shows the areas of previous fires in the area of the present incident.

Typical Map Requester
Planning Section Chief, Operations Section Chief

Target Audience
Fire Behavior Analyst, Long Term Analyst, Strategic Operations Planner, Operations Section

Objective
The Fire Perimeter History Map is used in fire behavior and operational planning to determine where fires have burned in the past and where the present active fire may progress based on the history of the area.

Guidelines
- Standard ICS symbology

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date of features on map. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate.
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Fire history polygon perimeters—perhaps colored by decade with year labels
- Present fire perimeter and ICS line features

Optional Elements
- Topographic base
- Shaded relief
- Orthoimagery base
- Roads
- Administrative boundaries

Product Name
Fuels Map OPTIONAL

Product Description
The Fuels Map displays the surface fuels in the area of the present incident.

Typical Map Requester
Planning Section Chief. Operations Section Chief

Target Audience
Fire Behavior Analyst, Long Term Analyst, Strategic Operations Planner, Operations Section

Objective
The Fuels Map shows the fuels in the area of the present fire perimeter. It may be used by fire behavior analysts to help predict fire behavior, to develop suppression strategies. It may also be used to develop rehabilitation strategies.

Guidelines
- Standard ICS symbology
- Color fuel types

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date of features on map. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate.
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Fire Behavior Fuel Models
- Present fire perimeter and ICS line features

Optional Elements
- Topographic base
- Shaded relief
- Fuel model canopy characteristics

Product Name
Infrared Information Map OPTIONAL

Product Description
The Infrared Information Map is a large format topographic map showing the interpretation of remotely sensed infrared imagery of the entire incident.

Typical Map Requester
Planning Section Chief, Operations Section Chief

Target Audience
Planning Section, Operations Section

Objective
The Infrared Information Map provides a geographic tool for the Situation Unit to determine the incident perimeter, and key areas of operational focus.

Guidelines
- Standard ICS symbology
- May be produced by the Infrared Interpreter (IRIN)
- Usually 1:24,000 scale; 1:63,360 scale in Alaska

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Heat perimeter, isolated heat sources, heat areas by intensity (these may not all be available)
- Incident Perimeter, ICS line features, and ICS point features

Optional Elements
- Topographic base
- Shaded relief
- Vicinity maps
- Orthoimagery base
- Political boundaries (City-County–State-National)

Product Name
Operations Map OPTIONAL

Product Description
The Operations Map is used by Operations personnel for strategy, tactics and planning purposes.

Typical Map Requester
Operations Section Chief, Planning Section Chief

Target Audience
Operations Section, Planning Section, Safety Officer

Objective
The Operations Map effectively displays geographic and incident features for used by operations personnel (Operations Section Chief, Branch Directors, Division/Group Supervisors) either in ICP or out in the field.

Guidelines
- Standard ICS symbology
- Printed in color to enable clear depiction of incident and map features
- Size varies but usually anywhere from Tabloid (11"x17") to E Size (34"-44")
- Scale varies based on request and area covered and map size.
- May be one map for the entire incident or multiple maps for various areas of interest, such as Divisions.

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier with the Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time key features were collected. May be embedded in the legend.
- Graticule/Grid. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum.

Data
- Incident perimeter and ICS line and point features
- Division–Branch breaks and labels
- Transportation routes
- Safety hazards, if available
- Administrative boundaries, Political boundaries (City (e.g., subdivisions)-County-State-National)
- Ownership-Land Status
- Appropriate base background, such as Topographic or Orthoimagery base

Optional Elements
- Roads and Road Hazards (e.g., 4wd only, one-way), if available
- Hydrography
- Wilderness
- Structures
- Shaded relief
- Data source citation (if data are special or requested)
- Disclaimer language (use when incident information is estimated, changing quickly, or requested)
- Magnetic declination and date
- MAPs

Product Name

Ownership/Land Status Map OPTIONAL

Product Description

The Ownership–Land Status Map shows the ownership or land status for the areas impacted by the incident. It graphically depicts the land ownership or fire protection responsibility in the area of the incident.

Typical Map Requester

Planning Section Chief, Incident Commander, Finance Section Chief, Liaison Officer, Information Officer

Target Audience

Plans Section, Incident Commander, Finance Section Chief, Liaison Officer, Agency Representatives, Public

Objective

The Ownership–Land Status Map is used in operational planning, public meetings, and for cost apportionment.

Guidelines

- Can be scalable from letter size to "E" size
- If the ownership is public it is best to use a standardized color palette to avoid confusion (e.g., Figure 5.4, BLM land status).

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data

- Incident perimeter and ICS line features
- Ownership or land status (see Figure 5.6 for suggested color ramp)
- Key landmarks
- Data source citation
- Incident origin (may be sensitive information so may not be shown on draft maps until authorized)

Optional Elements

- Total acres or percentage of area affected, by owner
- Vicinity maps
- Topographic base (with or without shaded relief)
- Orthoimagery base
- Administrative boundaries, if different from ownership
- Political boundaries (City-County–State-National)
- Hydrography
- Disclaimer (if requested, or if accuracy issues with data sources)
- MAPs

Product Name
Public Information Map OPTIONAL

Product Description
The Public Information Map shows the area affected by the incident.

Typical Map Requester
Information Officer

Target Audience
Public

Objective
The Public Information Map keeps the public informed of the location of the incident. This product will be used in public meetings and for bulletin boards and displays. Many different types of public information maps may be requested to fit specific needs of the public for information.

Guidelines
- Should be made at a scale large enough for public meetings, where key landmarks (e.g., cities, highways) help with incident orientation.
- Also may need smaller copies for handouts at meetings.

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate.
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Incident perimeter
- ICP location
- Major towns
- Roads and road names
- Communities (GNIS Populated Places)

Optional Elements
- ICS line features
- Public meeting places, Schools, campgrounds or lodges , other Structures if available
- Evacuation areas if established
- Roadblocks if established
- Information board locations
- Hydrography
- Administrative boundaries (e.g., Jurisdiction), Political boundaries (City-County-State-National)
- Ownership-Land Status
- Topographic or Orthoimagery base
- Vicinity map(s)
- Shaded relief
- Key landmarks

***Never include archaeological, cultural, or T&E point data on this map

Product Name

Rehabilitation Map OPTIONAL

Product Description

The Rehabilitation Map shows the rehabilitation requirements, and progress of rehabilitation efforts for the areas impacted by the incident.

Typical Map Requester

Planning Section Chief, Operations Section Chief, Burned Area Emergency Response (BAER) Team, Liaison Officer, Resource Advisor

Target Audience

Resource Advisor, Burned Area Emergency Response (BAER) Team, Information Officer, Operations Section, Planning Section, Public

Objective

The Rehabilitation Map assists in the rehabilitation efforts in the area of the incident. This product will be used in operational planning and public meetings.

Guidelines

- Should be made as a tool to be used long after the Incident Management Team (IMT) has left.

Standard Elements

Cartographic

- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Planning or Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data

- Incident perimeter and ICS line features
- Treatments—uniquely symbolized

Optional Elements

- Acreage affected for each treatment
- Shaded relief base
- Topographic base
- Orthoimagery base
- Vicinity map(s)
- Key landmarks
- Political boundaries (City-County–State-National)
- Hydrography (rivers and lakes)
- ICS point features

Product Name
Structure Protection Map OPTIONAL

Product Description
The Structure Protection Map shows the buildings potentially threatened by the incident.

Typical Map Requester
Operations Section Chief, Safety Officer, Liaison Officer, Structure Protection Specialist, Information Officer

Target Audience
Operations Section, Safety Officer, Liaison Officer, Structure Protection Specialist, Public

Objective
The Structure Protection Map tracks structures and resources that could be impacted by the incident. This product will be used in operational planning and public meetings.

Guidelines
- Should be made at a scale to distinguish individual structures.
- May be made early in an incident to serve as a triage tool.

Standard Elements

Cartographic
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095), the operation date the map was prepared for and operational period (day-night).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date and time features were collected. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate. (Latitude-Longitude graticule should be in format used by target audience, specified by Operations)
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data
- Incident Perimeter
- Structures symbolized based on type or triage
- Structure addresses or ID numbers
- MAPs – Management Action Points
- Evacuation routes
- Roads—including names and addresses

Optional Elements
- Land Parcel Data
- Topographic base
- Vicinity map(s)
- Orthoimagery base
- Key geographic features
- Administrative boundaries (e.g., Administrative, Jurisdiction)
- Ownership-Land Status
- Political boundaries (City-County-State-National)
- Road blocks
- ICS features

Product Name
Vegetation Map OPTIONAL

Product Description
The Vegetation Map displays the vegetation in the area of the present incident.

Typical Map Requester
Planning Section Chief, Operations Section Chief

Target Audience
Fire Behavior Analyst, Long Term Analyst, Strategic Operations Planner, Operations Section

Objective
The Vegetation Map shows the vegetation in the area of the present fire perimeter. It may be used by fire behavior analysts to help predict fire behavior and to develop suppression strategies. It may also be used to develop rehabilitation strategies.

Guidelines
- Standard ICS symbology
- Color vegetation types (suggest grasses = yellow, brush = orange, oak woodlands = blue-green or light green, conifers = green, alpine species = purple, barren = gray, water = blue)

Standard Elements

Cartographic Elements
- Scale.
- Title. Include Unit Identifier and Local Incident Identifier (e.g., ID-BOF-0095).
- Author.
- North Arrow.
- Date of preparation.
- Legend.
- Source statement. Include date of features on map. May be embedded in the legend or in title box.
- Graticule/Grid, if appropriate.
- Datum. Required if Graticule/Grid or coordinates are displayed.

Data Elements
- Vegetation
- Present fire perimeter and ICS line features

Optional Elements
- Topographic base
- Shaded relief

Chapter 7 – Data Sharing, Backup and Archiving

Purpose:

This chapter provides procedures for the sharing, backing up and archiving of GIS data developed on an incident. Data sharing ensures that all inidividuals involved on an incident have the information needed to do their job and that team transitions are effective and efficient. The purpose of backing up data is to ensure that the work of the GIS Specialist (GISS) is not excessively impacted by computer failures or data corruption and to protect incident data for the preservation of the incident record. The purpose of archiving data is to protect incident data for the preservation of the incident record while maintaining an efficient workflow in the GIS function of the Situation Unit.

Specifications:

The primary datasets that need to be shared on a daily basis are the fire perimeter and the fire line features (e.g., uncontrolled fire edge, dozer line) but may also include ICS data point features (e.g., water sources, helispots), Management Action Points, Division Breaks and any other dynamic data. The GISS should post these data in the incident's folder on the National Interagency Fire Center (NIFC) File Transfer Protocol (FTP) site (ftp://ftp.nifc.gov) and the incident web site (if one exists). The data on the NIFC FTP site is used by the Geospatial Multi-Agency Coordination (GeoMAC) Group (http://www.gomac.gov), an internet-based mapping application and Inciweb (http://www.inciweb.org), an interagency web site to provide the public with incident-related information. All incident vector data layers should be exported to shapefiles to allow for compatibility of data among software versions and vendors.

Incident data and modified base data must be backed up daily and eventually archived. Backups and archives should be stored on a computer or media that is kept separate from the working GIS directory.

Procedures:

Data Sharing: Three types of data sharing are typically required on incidents:

- data uploads to NIFC ftp site,
- incident data sharing with authorized users,
- transfer of data at team transitions.

Unless otherwise specified, the shapefile is the preferred transfer format, to allow compatibility between many software types and versions. Note that sensitive data and data subject to the Privacy Act *should not be shared* with those not involved with managing the incident. Certain agencies may be more restrictive with sensitive data and place extreme restrictions upon its use. Adhere to agency requests while on the incident. Sensitive data should be removed from hardware that leaves the incident.

By the end of each operational period, the current fire perimeter and fire line features (uncontrolled fire edge, dozer line, etc.) data layers should be uploaded to the incident's folder on the NIFC ftp site (ftp://ftp.nifc.gov). Sharing data this way allows other data users and interested parties (host agency, cooperating agencies, IRINs, GACC or regional command personnel, etc.) to easily access current incident information. Note that a password is required in order to upload data to the FTP site. Directions for acquiring a password and using the FTP site

are provided at the NIFC FTP help site (http://ftpinfo.nifc.gov/help.html) or on the GSC website (http://gis.nwcg.gov/data_nifcftp.html). *Never post any sensitive data on the NIFC FTP site as this data is publicly accessible.*

Data is occasionally shared directly (by USB drive, upload to GPS units, disk, or as an email attachment) with other authorized users. The Situation Unit Leader (SITL) should be consulted if there is any question of whether a request for data should be fulfilled.

Any incoming team will need a copy of the incident data and working files. Often this is accomplished by directly copying the incident's GIS subdirectory to an external hard-drive, which the incoming team will keep. Good communication is needed between the outgoing GISS and the incoming and/or host agency GIS to ensure complete and useful incident data transfer. Complete procedures for team transition are outlined in Chapter 8.

Sensitive Data: This includes but is not limited to cultural and archeological resources and/or sensitive, threatened, and endangered species and data subject to the Privacy Act (containing personally identifiable information). These data are usually obtained from the local agency and are returned to the agency at the end of the incident—sensitive data should not be retained with the incident archive. GISS should check with SITL in regard to the labeling of these data on incident map products; maps containing these data are for incident operational purposes only and must not be shared or posted to public facing ftp sites or websites.(Note: Sensitive data that is not to be shared should be flagged in some manner, possibly by naming convention, that it is not to be shared or archived. By keeping sensitive data in a folder separate from the base data, it would be easier to keep this data out of the archived dataset.)

Data sharing with State or Local entities: On certain incidents (non-Federal), the incident GIS data and maps may need to be shared with state or local EOCs (Emergency Operation Centers). An EOC focuses on public safety such as evacuations, shelter for displaced homeowners, and disaster declarations. As such, the EOC needs maps and/or data on the current situation in order to coordinate emergency support functions. This may include such information as the location of the current affected area, the extent of damage within that area or roadblocks and affected transportation routes.

Data Backup and Archiving:
GIS data are in a digital format that requires constant maintenance. Part of this maintenance involves backing up and archiving the data. For the purpose of the SOP, "backing up" refers to frequently saving a short-term, separate copy of incident data for the purpose of recovery in the event of computer failure or data corruption. The term "archiving" is used for the process of moving data to a separate data storage device or media for long-term retention. Data archives consist of older data that are still important and necessary for future reference, as well as data that must be retained for regulatory compliance.

Data backups should be done daily, at a minimum, and should be stored on different hardware or media than the working GIS subdirectory. See the Guidelines section, below, for more specific information

If an incident has been going on through several team transitions, the GIS files structure may get unmanageable with older daily folders. In this case, an archive of the older folders and data can be made and filed with the DOCL. Subsequently, older folders and data can then be deleted from the working GIS subdirectories. Sensitive data *should not* be retained with the incident archive. A copy of the archived information should be filed in the incident documentation held by the Documentation Unit; a copy may also be kept with backups in case it is needed for reference.

In addition, when a team transitions out, an archive copy of all the working data and files should be made and filed in the incident documentation held by the Documentation Unit (see Chapter 3 and Chapter 8).

Guidelines:

Data Sharing:

- If transitioning in behind another team, ask the outgoing GISS for the NIFC FTP password for the incident during transition.
- If needed, request a password for the NIFC FTP site as soon as possible after arrival.
- Consider referring requests for sensitive data back to the owner of the data.

Data Backups:
(Refer to Chapter 2 for File Naming and Directory Structure.)

- Data should be backed up in formats that allow for quick recovery: export incident data to shapefiles before any backups are made, but, also, back up the geodatabase(s).
- At the end of each operational period, back up the "incident_data", "products", and "projects" directories to a different location than the operational computers.
- Only dynamic datasets need to be backed up daily. However, it is prudent that one copy of all base data should also be stored on media separate from operational systems.
- Document each backup and provide that information to the SITL for the Unit Log.
- More frequent backups can occur for datasets as the data change, if desired.
- Consider providing a copy of the GIS incident data backup to Computer Technical Specialist CTSP or DOCL for safekeeping.
- If backing up (or archiving) data to CD or DVD, consider using the ISO Level 2 or UDF 102 formats to accommodate long file names and directory paths. Avoid using Joliet or ISO 9660 formats as they are not compatible with long file names, i.e. file names will be truncated to the older MS-DOS 8.3 file name therefore losing any metadata contained in the file name.

Data Archives:
(Refer to Chapter 2 for File Naming and Directory Structure.)

- All necessary data to recreate the incident should be archived. Archive the contents of the incident data, products, projects and (non-sensitive) base data folders.
- Document each archive for inclusion in the Unit Log.
- The archived copy may be kept indefinitely or for a defined period of time; the archive retention period is usually set at 3 or 5 years and can be renewable.
- Data should be archived in formats that allow for quick recovery (e.g. shapefile), so export incident data to shapefiles before any archive task.

- Archived data should also include datasets in the original format, so archive the geodatabase, as well.

Responsibilities:
The GISS is responsible for posting updated data to the NIFC FTP site regularly, sharing data with other interested parties in consultation with the SITL, protecting incident information with regular backups and archiving, and ensuring proper transition and use of data.

The GISS and SITL are responsible for knowing which data layers are considered sensitive data and adhering to restrictions on the distribution and handling of such data.

The GISS is responsible for communicating requests for information (data, maps, etc.) to the SITL to get the proper authorization to release the data to the requesting party.

Definitions:
Archive—the long-term storage of data that are considered to be of value to the incident. Archived data is held independent of the continued existence of the file on the local disk. Files which have been archived may be removed from the local computer disk, if required (for example, for space reasons).

Backup—a copy process for securing current, active files, which are resident on the local disk and by implication actively in use. Backups enable recovery of working files with minimal loss of data in the event that data are lost or corrupted due to power interruptions, hardware failure, software issues, accidental deletion, or other calamity.

Data sharing—the process of distributing data to other interested and authorized parties or agencies during the course of an incident. At the end of the incident, data are transitioned (Chapter 8).

Base data—data layers existing prior to the incident, that are used to provide the base features for mapping (e.g., roads, land ownership, DRGs, etc). These data are not edited during the incident.

Incident data—data that are created or edited in support of the incident, which are stored in the "incident_data" folder of the GIS subdirectory.

Modified base data—a type of incident data consisting of base data layers that have been altered or edited in support of the incident.

Chapter 8 Team Transition

Purpose

This chapter provides the GIS Specialist (GISS) with an effective and consistent method of transitioning from one GISS to another. Providing the methods of work and direction ensures that all related information, data, and products, are transferred successfully.

Specifications

Transition of the GIS responsibilities refers to any hardware purchased for the incident's GISS plus all relevant GIS data and media. It is important that all data are transferred and remain in the current directory structure (Chapter 2). It is also the responsibility of the GISS to prepare a transition document (narrative) or briefing of all the activities of the GIS function on the incident. The choice between a briefing and a document should be based on incident complexity, size, and deviation from normal SOPs.

A transition document should be initiated at the beginning of the assignment as a way to track the on-going work on the incident. It may be rolled up as part of an Incident Management Team (IMT) transition document, or may be developed as a stand-alone document. This decision is up to the Situation Unit Leader (SITL). This narrative will not only help the next GISS assigned to the incident, it can be of great value during the assignment to help locate various map products when incident personnel need to obtain maps created earlier in the incident.

Procedures

It is always important for the GISS to remain focused and follow procedures during this transition period.

The first procedure that must be addressed is transferring data from one storage device to another. It is critical to preserve the directory structure, drive letter mapping, or to follow Universal Naming Conventions (UNC) (i.e. \\server\share\file_path) from one GISS to the next.

A GISS use a variety of media when operating on an incident. Storage devices range from basic shared drives on computers utilizing workgroups and shared portable hard drives to advanced computer networks utilizing switches, hubs, DHCP, and Snap Servers. Several transition methods can be used (Peer to Peer, DVD, external hard drives). When allowed by the incident, large capacity external hard drives should be purchased by the incident to store data and ease transition between personnel/teams. At incident close-out, the hard drive can be delivered to the local jurisdiction.

General Guidelines:

- Document any unique characteristics of the data, along with the software (including version) and any tools being used.
- Check for any sensitive information and what guidelines need to be satisfied for it to be transitioned to the next team. (This could include the need to reformat contractors' hard drives or any other media that will be leaving the incident.)
- Before saving all final products, turn off all software extensions so that the final GIS documents can be opened with the basic installation of the relevant GIS Commercial Off-the-Shelf Software (COTS).

• Before data transfer begins, archive all incident data to removable media.

Documentation useful at transition includes:

- An image, hardcopy, and a list of each map type that has been produced on the incident, as an example of products produced.
- A detailed narrative describing the status of equipment, workload, work schedule, and other activities.
- A list of resources being used for mapping and data collection (IR, Helicopter, FOBS, Local Jurisdiction, Other Partner Agencies, Imagery Sources).
- The skill sets of the individual GISS(s) remaining on the incident, to better utilize them with the incoming team and advise their schedules and availability.
- The outgoing GISS(s) will provide map symbology information, including the authorized use of nonstandard symbols, to the incoming GISS or the SITL during the transition briefings. This facilitates consistency in the use of map symbols on an incident.

To ensure transition is complete, use the following checklist:

- Are there enough GISSs and is workload appropriate?
- Are the incoming GISSs able to reproduce products produced by the exiting GISS(s)?
- Are there any outstanding requests from the local unit or other involved entities?
- Have the new GISSs established communication with the local jurisdiction(s) to share data (e.g., perimeter data)?

A GISS transition document outline can be found in Appendix C.

Responsibilities

It is the responsibility of the outgoing GISS to:

- Ensure that the incoming GISSs have a clean, usable, and documented copy of the incident data.
- Review the transition document with the incoming GISS. It should include the requirements for storing, sharing, and displaying sensitive data. Review the detailed GISS transition documents if they were not included in the IMT transition package.
- Give NIFC FTP site password to incoming GISS (but do not include it in transition document).
- Request enough overlap between outgoing and incoming GISSs as to allow for a smooth transition. It is suggested that there should be at least a half of shift overlap, and it should occur before items are due for the next IAP.

It is the responsibility of the outgoing GISS and SITL to:

- Ensure that the GIS staffing and equipment requirements are planned for and will be met during the transition.

It is the responsibility of the incoming GISS to:

- Test and verify that all data have been transferred successfully and are fully usable (access, read, and edit).
- Review the GISS transition document before the outgoing GISS demobilizes and make sure its contents are clear, since contacting the outgoing GISS may be difficult after departure.

Communications
If any Sections and Units on the Incident want maps related to their own position transition, requests should go through the SITL.

When available, Computer Specialists (CTSP) should be briefed on transitions in the GISS section to to assist with the transition of the network, hardware, and software requirements of the GISS.

Glossary

Attribute—non-spatial information about a geographic feature in a GIS, usually stored in a table and linked to the feature by a unique identifier.

Backup—a copy of one or more files made for safekeeping in case the originals are lost or damaged.

Coordinates—a set of values represented by the letters x, y, and optionally z or m (measure), that define a position within a spatial reference. Coordinates are used to represent locations in space relative to other locations.

Coordinate System—a reference system consisting of a set of points, lines, and surfaces, and a set of rules, used to define the positions of points in space in either two or three dimensions.

Datum—the reference specifications of a measurement system, usually a system of coordinate positions on a surface (a horizontal datum) or heights above or below a surface (a vertical datum).

Declination [magnetic]—the horizontal angle between geographic north and magnetic north from the point of observation.

Differential Correction—a technique for increasing the accuracy of GPS measurements by comparing the readings of two receivers—one roving, the other fixed at a known location.

Digitize—to convert the shapes of geographic features from media such as paper maps or raster imagery into vector x, y coordinates.

Documentation—tracking information about geospatial data using methods that are less than FGDC compliant. These may include "ReadMe" files (in TXT or HTML format) or attribution of datasets describing the projection, methods of collection, contact information, and other information.

Dongle [sentinel key]—the sentinel key is a parallel or USB port hardware dongle that provides a unique number used in the generation of a licenses. The sentinel key will return its number only when the sentinel key and the sentinel key driver are communicating properly.

Esri- Environmental Systems Research Institute. Esri develops geographic information systems (GIS) (e.g., ArcGIS). Synonymous with the acronym ESRI.

Feature—(1) an object in a landscape or on a map; (2) a shape in a spatial data layer, such as a point, line, or polygon, that represents a geographic object.

File Geodatabase— a database or file structure used primarily to store, query, and manipulate spatial data (geometry, spatial reference system, attributes, and behavioral rules. Stored as

folders in a file system. Each dataset is held as a file that can scale up to 1 TB in size.

Geodatabase—a database or file structure used primarily to store, query, and manipulate spatial data (geometry, spatial reference system, attributes, and behavioral rules).

Graticule—a network of longitude and latitude lines on a map or chart that relates points on a map to their true locations on the earth.

Incident Command System (ICS) Data – primary information about the wildfire itself and features or locations directly pertinent to the management of the incident, including: the fire perimeter (area burned), fire lines (handline, dozer line), and fire points (drop points, helispots, ICP, safety zones, etc.).

Infrared Imagery—an image created by a device that detects infrared radiation and converts it into an electrical signal that is processed and stored digitally. .

Latitude—the angular distance along a meridian north or south of the equator, usually measured in degrees. Lines of latitude are also called parallels.

Local Incident Identifier—number or code that uniquely identifies and incident for a particular local fire management organization within a particular calendar year. (Often improperly referred to as "fire number")

Longitude—the angular distance, expressed in degrees, minutes, and seconds, of a point of the earth's surface east or west of a prime meridian (usually the Greenwich meridian). All lines of longitude are great circles that intersect the equator and pass through the North and South Poles.

Map Scale—the ratio or relation between distance or area on a map and the corresponding distance or area on the ground.

Maximum Manageable Area (MMA): The maximum geographic limits of spread within which a wildland fire is allowed to spread. The MMA was defined in a Wildland Fire Implementation Plan for Wildland Fire Use Fires. These terms (MMA, Wildland Fire Use Fire) and process (WFIP) are no longer used since the publication of the Guidance for Implementation of Federal Wildland Fire Management Policy (February 2009).

Metadata—information about data, such as content, source, vintage, accuracy, condition, projection, responsible party, contact phone number, method of collection, and other characteristics or descriptions.

Orthoimagery—a digital perspective aerial photograph from which distortions owing to camera tilt and ground relief have been removed. An orthophotograph has the same scale throughout and can be used as a map.

Personal Geodatabase—a database or file structure used primarily to store, query, and manipulate spatial data (geometry, spatial reference system, attributes, and behavioral rules.

Datasets are stored within a Microsoft Access data file, which is limited in size to 2 GB.

Projection [map]— A method by which the curved surface of the earth is portrayed on a flat surface. This generally requires a systematic mathematical transformation of the earth's graticule of lines of longitude and latitude onto a plane. Every map projection distorts distance, are, shape, direction, or some combination thereof.

Remote Sensing—collecting and interpreting information about the environment and the surface of the earth from a distance, primarily by sensing radiation that is naturally emitted or reflected by the earth's surface or from the atmosphere, or by sensing signals transmitted from a satellite and reflected back to it. Examples of remote sensing methods include aerial photography, radar, and satellite imaging.

Shaded Relief Image—a raster image that shows light and shadow on terrain from a given angle of the sun.

Shapefile—a vector file format for storing the location, shape, and attributes of geographic features. It is stored in a set of related files and contains one feature class.

Server—a computer and storage device dedicated to storing files. Many users on a network can store files on a particular server.

Topography—the shape or configuration of the land, represented on a map by contour lines, hypsometric tints, and/or relief shading.

Unit Identifier (ID)—a code used within the wildland fire community to uniquely identify a particular government organizational unit (e.g., IDBOF = Boise National Forest located in the State of Idaho).

Universal Naming Convention (UNC) - a naming convention used primarily to specify and map network drives in Microsoft Windows. UNC names consist of three parts - a server name, a share name, and an optional file path. These three elements are combined using backslashes as follows: \\server\share\file_path

USB External Storage Drive—an external disk drive that is connected to a computer through a USB connection.

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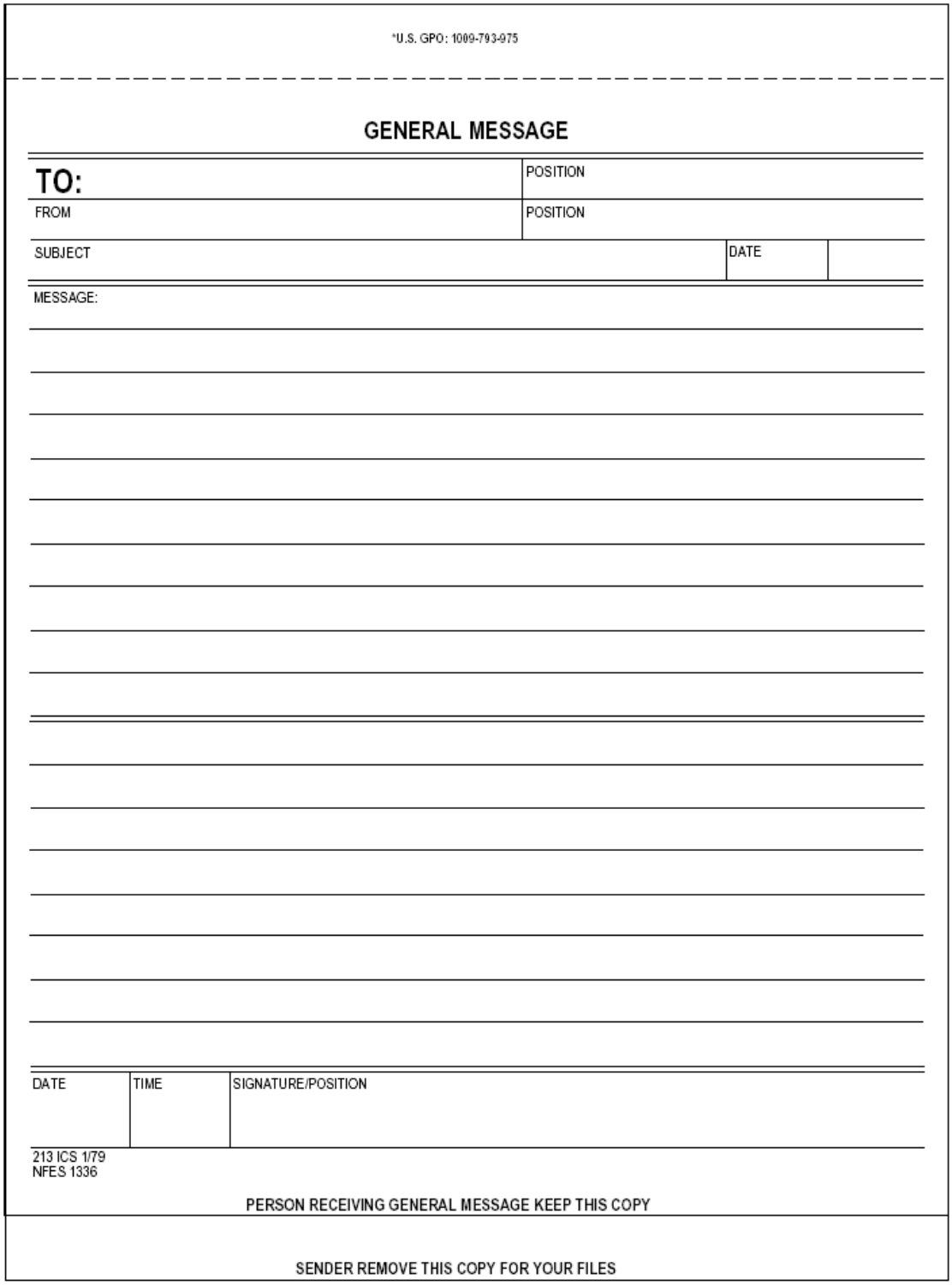
Appendix A. Incident Command System (ICS) Form 213, General Message Form.

http://www.nwcg.gov/pms/forms/ics213.pdf



*U.S. GPO: 1009-793-975

GENERAL MESSAGE

TO:	POSITION	
FROM	POSITION	
SUBJECT	DATE	

MESSAGE:

DATE	TIME	SIGNATURE/POSITION

213 ICS 1/79
NFES 1336

PERSON RECEIVING GENERAL MESSAGE KEEP THIS COPY

SENDER REMOVE THIS COPY FOR YOUR FILES

Appendix B. Incident Command System (ICS) Form 214, Unit Log.

http://www.nwcg.gov/pms/forms/ics214.pdf

UNIT LOG	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Unit Name/Designators	5. Unit Leader (Name and Position)		6. Operational Period

7. Personnel Roster Assigned		
Name	ICS Position	Home Base

8. Activity Log	
Time	Major Events

9. Prepared By:

ICS 214

Appendix C. GISS Transition Document Outline

The GISS transition document should contain enough information for the incoming GISS to continue the work without needing to contact the previous GISS. The IMT may not want the fine details of a GISS transition document in the team transition package, but they should be documented regardless and given to the incoming GISS. The following are suggested sections to be included within the transition document

- Daily Work Requirements and Time Schedule
- Data Structure (capture screen shots of directory in Windows Explorer)
    - Folder by folder description of its contents
- Incident Specific Information
    - Issues with data or software
    - Other unique issues
- Data
    - Sensitive Data handling
    - Daily data needs
- Websites Used
    - Info on ftp site
    - GIS Services (WMS, ArcGIS, etc)
    - Servers
    - Other important websites
- Software
    - Versions
    - Software added on incident
- Printing
    - Available printers/plotters
        - Location of printer drivers
        - IP address / network settings
    - Document settings
    - Workload
        - GIS products
        - Non GIS products
    - Networked printer addresses
    - Sources for supplies