



National Fire Activity Tracking

National Fire Emissions Technical
Workshop

New Orleans, LA

May 4-6, 2004

Old Fire / Robert A. Eplett / OES Ca.

Overview

- ◆ Existing national fire occurrence database systems
- ◆ Available data elements for emission inventories
- ◆ RPO approaches to obtaining fire occurrence data
- ◆ Usefulness of existing data in developing fire emission inventories
- ◆ Development of a single national fire occurrence database
- ◆ Necessary data elements for emission inventories

Existing National Fire Occurrence Databases

- ◆ Shared Application Computer System (SACS)
 - Used by NPS and BIA
 - Includes all wildland fire types
 - Populated with data from form DOI-1202
- ◆ National Interagency Fire Management Integrated Database (NIFMID)
 - Currently used only by the USFS
 - Includes historical occurrence data for all fire types back to 1970
 - Populated with data from form FS-5100-29
- ◆ Fire Management Information System (FMIS)
 - Currently used only by the FWS

Existing National Fire Occurrence Databases Cont.

- ◆ National Fire Information Reporting System (NFIRS)
 - Used by some State Forestry Agencies and municipalities, but not required
- ◆ National Fire Planning and Operations System (NFPORS)
 - Used primarily for upward reporting to Congress to fulfill National Fire Plan goals
 - NFPORS is only a data repository, not a data system
 - Primarily tracks data related to fuels treatment and operations
 - Imports wildfire data

Existing National Fire Occurrence Databases Cont.

- ◆ Incident Status Summary Reports (ICS209)
 - Used primarily for daily operational planning and logistics on large fires (e.g., 100+ acres in timber or 300+ acres in grass / brush)
 - Contains data elements similar to SACS and NIFMID
 - Includes periodic reports for long duration fires
- ◆ New fire reporting system (????)
 - Used by BLM and soon to be adopted by NPS and BIA
 - Oracle based
 - May serve as basis for future interagency (state and federal) fire occurrence reporting system

Available Data Elements for Emission Inventories

- ◆ Fire name and code
- ◆ Fire type /cause (natural, prescribed, etc.)
- ◆ Location as either lat / lon, UTM, or township / range / section
- ◆ Date and time of ignition and control
- ◆ Acres burned (often ambiguous)
- ◆ National Fire Danger Rating System (NFDRS) fuel model or similar is common proxy to fuel loading

Available Data Elements for Emission Inventories Cont.

- ◆ Cover type
- ◆ Fire intensity / behavior
- ◆ Fire objective (resource benefit vs. hazard reduction, etc.)
- ◆ Different data elements are collected based on fire type
- ◆ For prescribed fire, specific fields for fuel loading, percent burned, etc., exist, but may be omitted

Forest Service 5100-29 Wildland Fire Report Cont.

USDA - Forest Service															
PRESCRIBED FIRE REPORT															
(Ref. FSH 5109.14)															
1. Prescribed Fire Name			2. Latitude		Longitude		3. Township		Range		Section		Sub-section		Principal Meridian
4. Region		Forest		District		5. State		6. Prescribed Fire #		7. Ignition Date/Time			8. Project End Date		
9. Primary Objective		10. Secondary Objective		11. Burn Type		12. Complexity		13. NFDRS Fuel		14. Cover		15. Rep WX Station		16. Elevation (feet)	
17. Total Acres		18. Percent Burned		19. Converted to Wildland Fire Nbr				20. Pre-fire Loading (Tons/Acre)		Dead 0-3"		Dead 3+"		Live	
21. Percent Consumed															
22. Special Codes															
/ / / / / / /															
23. Remarks															
24. Submitted by:				25. Date				26. Approved by:				27. Date			
FS-5100-29T (xx/98)															

Incident Status Summary (ICS-209) Report

Incident Status Summary (ICS-209)

1. Date	2. Time	3. Initial Update Final	4. Incident Number	5. Incident Name	
6. Incident Kind	7. Start Date / Time	8. Cause	9. Incident Commander	10. IMT Type	11. State-Unit
12. County	13. Latitude and Longitude Lat _____ Long _____		14. Short Location Description (in reference to nearest town):		
Current Situation					
15. Size/Area Involved	16. % Contained or MMA	17. Expected Containment Date: _____ Time: _____	18. Line to Build (# chains)	19. Costs to Date	20. Declared Controlled Date: _____ Time: _____
21. Injuries This Reporting Period	22. Injuries to Date	23. Fatalities	24. Structure Information		
		Type of Structure			# Threatened # Damaged # Destroyed
25. Threat to Human Life/Safety: Evacuation(s) in progress _____ No evacuation(s) imminent _____ Potential future threat _____ No likely threat _____		Residence			
		Commercial			
		Property			
		Outbuilding/Other			
26. Communities/Critical Infrastructure Threatened (in 12, 24, 48 and 72 hour time frames):					
12 hours:					
24 hours:					
48 hours:					
72 hours:					
27. Critical Resource Needs (kind & amount, in priority order):					
1.					
2.					
3.					
28. Major problems and concerns (control problems, social/political/economic concerns or impacts, etc.) Relate critical resources needs identified above to the incident Action Plan.					
29. Resources threatened (kind(s) and value/significance):					

ICS-209 (04/03) NFES 1333 Previous editions obsolete

30. Current Weather Conditions Wind Speed: _____ mph Temperature: _____ Wind Direction: _____ Relative Humidity: _____	31. Resource benefits/objectives (for prescribed/wildland fire use only)		
32. Fuels/Materials Involved Enter the predominant fuel from the Thirteen Fuel Models for Fire Behavior in the adjacent box to the right. List additional fuels and/or materials involved in the block below:			
33. Today's observed fire behavior (leave blank for non-fire events):			
34. Significant events today (closures, evacuations, significant progress made, etc.):			
Outlook			
35. Estimated Control Date and Time:	36. Projected Final Size:	37. Estimated Final Cost:	38. Tomorrow's Forecasted Weather Wind Speed: _____ mph Temperature: _____ Wind Direction: _____ Relative Humidity: _____
39. Actions planned for next operational period:			
40. Projected incident movement/spread during next operational period:			
41. For fire incidents, describe resistance to control in terms of: 1. Growth Potential - _____ 2. Difficulty of Terrain - _____			
42. How likely is it that containment/control targets will be met, given the current resources and suppression/control strategy?			
43. Projected demobilization start date:			
44. Remarks:			

ICS-209 (04/03) NFES 1333 Previous editions obsolete

RPO Approaches to Obtaining Fire Occurrence Data - CENRAP

◆ Prescribed fire

– Federal Lands

- ◆ DOI prescribed fire data to be obtained from SACS
- ◆ USFS prescribed fire data to be obtained from NFPORS
- ◆ Will supplement with state supplied data and check for redundancy

– State, Tribal, and Private

- ◆ Where available, data will be obtained from state smoke management programs (e.g., MN, AK, and LA)
- ◆ Where available, data will be consolidated from other state agencies / land owners (e.g., Dept. of Natural Resources, Dept. of Wildlife, Nature Conservancy)
- ◆ If state data not available, will assume that percentage of land area burned is same as on federal lands

- Cover data will come from EPA BELD3 while fuel loading will be provided by FOFEM model (no need for NFDRS) ¹²

RPO Approaches to Obtaining Fire Occurrence Data – CENRAP Cont.

◆ Wildfire

- Will use Inter-RPO wildfire emissions inventory being developed under recently released WGA RFP

◆ Agricultural / burning

- Will conduct telephone and mail survey of each of of 969 counties in CENRAP
- Will collect data on crop type, fraction of crop burned annually, and timing of burns
- Survey results will be compiled and used to profile agricultural burning practices by region
- Will use similar approach for prescribed burning on rangeland
- Cover data will come from EPA BELD3 database

RPO Approaches to Obtaining Fire Occurrence Data –MANE-VU

- ◆ Obtained open burning survey data from local fire marshals (have completed open burning inventory)
- ◆ Have not yet defined approach for wildland fire
- ◆ Will review existing work on fire emissions inventories and consider recommendations of this workshop
- ◆ Activity data used for state emission inventories in DE, PA, and MD is available
- ◆ Will also use Inter-RPO project for wildfire

RPO Approaches to Obtaining Fire Occurrence Data - MWRPO

◆ Prescribed fire

– Federal / State Lands

- ◆ Will obtain Federal incident / summary data from federal databases (SACS, NIFMID, ICS209, etc.)
- ◆ Will obtain similar data from state agencies

– Private lands and agricultural burning

- ◆ Will solicit data from agricultural and forestry agencies

◆ Wildfire

– Same approach as for prescribed fire

◆ Other

- Will augment fire activity data with satellite imagery or GIS where available
- Recognize need to address ambiguity of fire acreage
- Focus is on fires greater than 10 acres

RPO Approaches to Obtaining Fire Occurrence Data - VISTAS

- ◆ Prescribed fire
 - Federal Lands
 - ◆ USFS prescribed fire data to be obtained from NFPORS
 - ◆ NPS data spreadsheet from D. Bahr (SACS)
 - Only used Federal data if State and Federal data received for a county
 - Maintained 1999 NEI emission estimates if not or used State if State permitted all fires (Fed and State)
 - State, Tribal, and Private
 - ◆ Where available, data were submitted by State agencies
 - ◆ Source detail varied considerably
 - ◆ State data used for both State and Federal lands if permit system covered both to avoid double counting
 - ◆ If state data not available, maintained 1999 NEI emission estimates

RPO Approaches to Obtaining Fire Occurrence Data – VISTAS Cont.

◆ Wildfire

- Federal data obtained from B. Bayle and P. Lahm for all agencies. Combination of SACS, ICS-209 reports and NIFMID
 - ◆ Checked data sets for double counting and removed identical fires
 - ◆ Performed QA on latitude/longitude data and county assignments
- Augmented NFDRS-derived fuel loading defaults to account for eastern cover types

◆ Agricultural / land clearing burning

- Solicited data from States
- Data received from only four States (AL, FL, GA, SC)
- Maintained 1999 NEI emissions for all other States

RPO Approaches to Obtaining Fire Occurrence Data – WRAP

- ◆ Prescribed fire
 - State - Data obtained from state smoke management and/or forestry programs (all 14 states in WRAP Region included)
 - ◆ State data used as *primary* data source (in preference to federal/other data, when available).
 - ◆ FASTRACS data (OR & WA) also obtained from USDA-FS / BLM (primarily used to QA OR & WA state data).
 - Federal Data
 - ◆ NFPORS and DOI 1202 data acquired.
 - ◆ Will supplement state data, as appropriate, and check for redundancy
 - Fuel Loading
 - ◆ Explicitly provided in source data; or
 - ◆ Assigned via WRAP-approved method (GIS applications & NFDRS (modified) fuel loading lookup)

RPO Approaches to Obtaining Fire Occurrence Data – WRAP Cont.

◆ Wildfire

- Federal data obtained from P. Lahm (USDA – FS) for all federal agencies. Combination of ICS-209 daily reports. SACS and NIFMID fires broken out to daily events using modified *spreading oval* (FEPS) algorithm. Data gathering included QA and rudimentary QC.
 - ◆ Used GIS-based proximity analysis to review data set for double counting and removed duplicate (& complex) records
 - ◆ Performed QA using state and federal wildfire summary data.
 - ◆ Used GIS for multiple QC tasks & data augmentation.
- Fuel Loading
 - ◆ Explicitly provided in source data; or
 - ◆ Assigned via WRAP-approved method (GIS applications & NFDRS (modified) fuel loading lookup)

RPO Approaches to Obtaining Fire Occurrence Data – WRAP Cont.

◆ Agricultural

- Contracted collection of agricultural burning data from state, local, and agricultural extension offices.
- Data received from many entities; data gaps filled with gap-filling routines based on crop production activity, BELD crop coverage data, and common burning practices. Daily data not always available (only monthly and annual).
- Available data (from 1995-1997) used to develop one calendar year of representative agricultural burning activity data (used as base case for WRAP 2018 projections).

RPO Approaches to Obtaining Fire Occurrence Data – Inter-RPO

- ◆ Inter-RPO Wildfire Emissions Inventory RFP released on April 27, 2004
- ◆ Specifies use of data from Federal databases including NIFMID (USFS), SACS (DOI), and ICS-209 (USFS / DOI)
- ◆ ICS-209 will serve as the primary database for obtaining fire occurrence data
- ◆ Fire occurrence data already collected from state and local forestry agencies by VISTA, WRAP, and MWRPO will also be utilized

RPO Approaches to Obtaining Fire Occurrence Data – Inter-RPO Cont.

- ◆ GIS data will be utilized in some cases to provide spatial data (e.g., fuels information)
- ◆ Results of this workshop will augment the approach
- ◆ Initial wildfire occurrence data collection to be completed by July 15, 2004

Usefulness of existing fire occurrence databases for emission inventories

- ◆ All contain location, start/end date and time, fire type, and some level of fuel loading
- ◆ Most are not accessible to the public
- ◆ Strong potential for double counting acres (and emissions) due to redundant or overlapping fire reports
- ◆ Redundancy occurs for prescribed fires where states maintain permitting system
- ◆ Redundancy occurs for wildfires and is more problematic

Usefulness of existing fire occurrence databases for emission inventories (Cont.)

- ◆ Basis of acres reported not consistent
 - Definitions include total acres, burned acres, blackened acres, treated acres, etc..
- ◆ Spatial data is limited to assumed ignition point
- ◆ Spatial data occurs in various formats and requires significant massaging
- ◆ Accurate fuel loading is rarely available – NFDRS field is most common
- ◆ Overall consistency between datasets from various agencies is very problematic

Development of a Single National Fire Occurrence System

- ◆ National Fire Policy (1995) emphasis need for interagency fire occurrence database
 - Result was National Fire Statistics Information Project (NIFSIP)
 - NIFSIP was conceptual data model only
 - NIFSIP was dropped in 1998
- ◆ National Fire Plan (2001) again emphasized need for
 - Result was National Fire Plan Operations and Reporting System (NFPORS)
 - Only a data repository, does not replace individual systems
 - Appropriate for emission inventory purposes?

Development of a Single National Fire Occurrence System Cont.

- ◆ Current effort to build Fire Occurrence Reporting System (FORS)
 - Fire Statistics Task Group (FSTG) formed under NWCG
 - FSTG identified five alternatives (see White Paper)
 - Proposed alternative is a hybrid central system with direct input or conversion from other systems
 - System would include states
 - Next step: Selecting business lead for a business requirements study (BRS)
 - Fire / air community has opportunity to influence core data elements and data standards

What the Air Quality Community Needs in Fire Occurrence Reporting System

- ◆ Consistent reporting among fire agencies
- ◆ A consolidated fire occurrence reporting system for all fire types (wildland, silviculture, agricultural, etc.)
- ◆ Accessibility to system
- ◆ A consistent definition for acreage
- ◆ Improved fuel loading data
- ◆ Improved spatial data (GIS, satellite)

What the Air Quality Community Needs in Fire Occurrence Reporting System Cont.

- ◆ Single identifier for fires spanning more than one agency
- ◆ Means for addressing very large fires that occur over large area and span several days
- ◆ Access to consistent historical fire occurrence data in order to establish typical fire emissions baseline and temporal profiles

Other Fire Activity Data Needed

- ◆ Accurate default for cover type / fuel loading where specific data not provided
- ◆ Recommendations on which cover type / fuel loading data are most appropriate for air quality use
- ◆ Method for projecting fire activity in future year scenarios

Development of Fire Emissions Inventory

It All Starts with Fire Activity Data



