

Highlights of the RPO Approaches to Fire Inventory Development

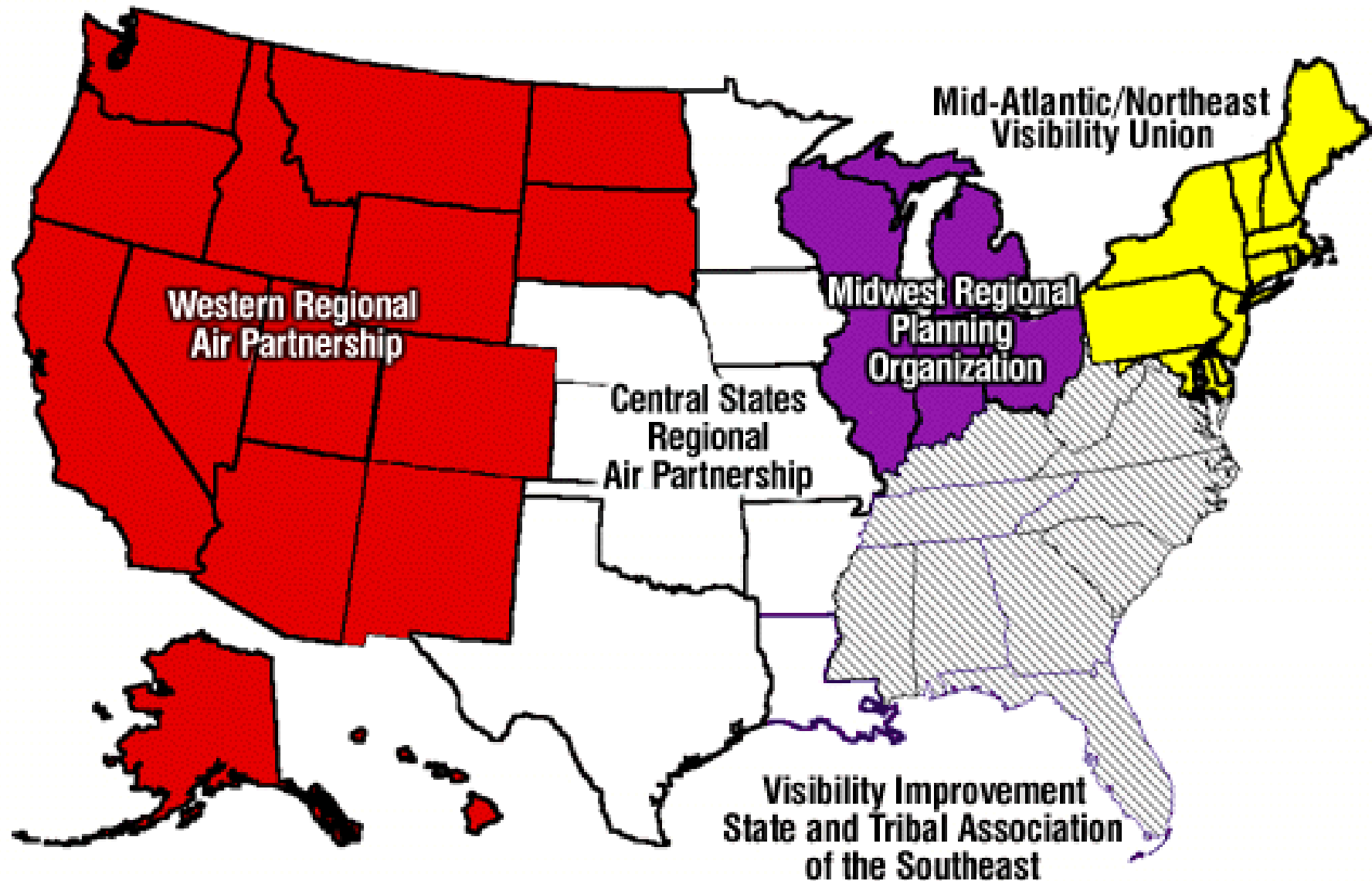
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National Fire Emissions Technical Workshop

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Regional Planning Organizations



What's an RPO?

- Organization of States, Tribes, and FLM's.
- Responsible for the development of Regional Haze Plans.
- RPO's have different goals and methods based on the goals of the participants, resources available, and importance of the problem to their members.
 - Fires in WRAP, Electric Utilities in Midwest

Inventory Sectors for the RPO's

- Industrial Point Source
- Electric Generation, CEM
- On-Road Mobile
- Off-Road Mobile
- Agricultural Ammonia(livestock, fertilizer)
- Forest Fires
- Other Area(hairspray, paint, solvent)
- Biogenics
- Dust
- Modeling inputs (temporal,spatial,speciation)

7 Fire Methods Topics

- Fire Tracking
- Fuel Characterization
- Consumption
- Agricultural
- Modeling issues
- Project Specifics
- Projections

Be patient. Compressing work from many folks into 12 slides will result in truncated answers.

Fire Tracking – Federal Databases

Federal Incident Databases	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
ICS209	Compared to NIFC	Used databases (NIFMID, NFPORS)	Database From Bruce Bayle, FS for wildfires and Rx and Pete Lahm for wildfires		Obtained QA'd data base from P. Lahm (USDA - FS) that includes WF records for all WRAP states ▪
BIA, Parks, F&W, BLM, FS (1202)	Obtained QA'd dbase from DRI for 2001-2002, from NWCG website for 2003	NIFMID – from NWCG website for 2002			Obtained QA'd data base from P. Lahm (USDA - FS)

Fire Tracking- State and Local Databases

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
State/Local Incident Databases	IL, IA (2003 only), IN, MI, MN, MO, OH, WI	AR, LA, MN, and OK	For wildfires, AL, FL, GA, KY, NC (hard copy), SC, TN, VA and WV	MD, DE, PA	AK, WA, OR, CA, AZ, NV, ID, UT, MT, SD, WY, CO, NM, ND
State Summary Databases	IA (2001-2002), MO (Rx), WI	TX, MO, and KS			
NIFC Summaries	Compared to incident databases		Not used	Local Rx permits(MD, DE), State fire marshalls	Used to QA Other Sources
NFPORS for Rx fires		Obtained for Minnesota and Missouri only	For prescribed, agricultural, land clearing AL, FL, GA, MS, and SC. Rx from State permit; AL, FL, GA and SC		Obtained from USDA - FS. Integrated into database as supplemental data

Fuel Characterization

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Forest Service	NFDRS code modified by Midwest FCCs, cross-check with BELD3	BELD3, database fuel codes	NFDRS code from database	Depends on data states can obtain from local agencies	Explicit fuel loading; NFDRS fuel model code; vegetation type description; no information. If no information, GIS application to link incident location with national + AK NFDRS cover map to assign fuel model code and crosswalk to NFDRS (modified) fuel load values table.
ICS-209	Correlated fuel model code to NFDRS		NFDRS code		
BIA, Parks, F&W, BLM	Linked to NFDRS map	BELD3, database fuel codes	State supplied value or NFDRS code by vegetation		
States w/ fuel codes	Same as FS/ICS-209	BELD3, database fuel codes	NFDRS code by vegetation type State value from EPA wildland document	DE	
States w/o fuel codes	Same as DOI	BELD3	None. Fuel loading by NFDRS.		

Consumption

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Fuel Combustion/Consumption Model	FOFEM	FOFEM	"Data Needs and Availability for Wildland Fire..." values or AP-42 depending upon fire type.	DE, WRAP emission factors; PA, AP-42	NFDRS fuel loading table modified by Smoldering emissions added to events (WF and Rx) associated with heavier fuel loads.
NH3, EC, OC emission factors	EPA Wildland Fire Resource Document	NH3 emission factors derived from those for NOx, CO2, and CO.			NH3 - fraction of CO per OAQPS compilation report. EC & OC - fraction of PM2.5 per OAQPS compilation report.

Agricultural- Activity Tracking

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Incident Reports	IA (2003 only), IN, MI, MN, WI		AL, FL, GA and SC only	DE, MD	Agricultural burning data from states and agricultural extension offices. Gap-filling using crop production & BELD data for areas with no data. Temporally aggregated data (monthly, annual) broken into daily, realistically sized events through stochastic modeling techniques.
Expert Input	MO, OH, IL	Surveyed Ag Extension Offices in each county (AR, IA, LA, KS, MN, MO, NE, OK, TX)	None		
By Crop Type		Survey questions were crop-specific.	Limited		
Prairie Restoration	incident report for Illinois		N/A		

Agricultural – Emissions Factors

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Emission Factor Source	NFDRS for grasses, AP-42, Jenkins	AP-42, Jenkins	AP-42	AP-42 (Table 13.1-2, Table 13.1-1)	Crop specific emission factors for approximately 70 crops compiled by B. Jenkins, PhD, UC Davis. Source data from AP-42 and UC Davis emissions studies.
Emission Factor Model	FOFEM for grasses	FOFEM for grasses (rangeland)	AP-42		Crop specific emission factors for approximately 70 crops compiled by B. Jenkins, PhD, UC Davis. Source data from AP-42 and UC Davis emissions studies.

Modeling Issues

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Monthly Allocation	Random assignment of incidents to days Where fire date not available	Used fire incident dates and ag survey responses to generate monthly profiles.	Monthly profiles developed from fire by fire data for wildfires and prescribed burns	DE, date and duration of WF and Rx can be summed to obtain monthly emissions	No monthly allocation. Each incident is a daily event.
Hourly Allocation	Standardized diurnal profiles by NFDRS and Wild or Rx	Used SMOKE-formatted diurnal profiles recently distributed by Houyoux.	EPA/SMOKE Profiles		Diurnal profiles (one for WF & Rx, one for Ag)
Repair Missing Coordinates	Assign to wildland grid squares	Assign to forested land/grassland grid squares	Coordinates checked using GIS Bad coordinates (e.g. in ocean) deleted - resulted in <3% of acreage being lost		GIS QC techniques T/R/S to lat/long; county info to county centroid outside domain; water bodies; investigated & repaired

More Modeling Issues

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Plume Rise	WRAP/FS methodology modified for height distribution		WRAP/FS methodology modified for height distribution		Emissions Task Team developed methodology to assign *hard-coded* plume characteristics for each event. Plume characteristic assignments based on idealized estimates of heat release & buoyancy.
Emissions Model Used	EMS-2003/. Concept in late 2004	SMOKE version 1.5	SMOKE v.2	SMOKE	SMOKE
Photochemical Model Used	CAMX		CMAQ	CMAQ, REMSAD, CALGRID	CMAQ
File Format for files	NIF3.0 Point Sources.	Produced both NIF3.0 and IDA-format files.	IDA PTINV/PTDAY/PTHOUR; IDA ARINV	IDA, NIF 3.0(?)	PT files for SMOKE; all incidents represented as point sources.

Projections

	Midwest RPO	CENRAP	VISTAS	MANE-VU	WRAP
Development of Average Year	Historic data by county/month	Historic data by county/month.	Historic data on a fire by fire basis where possible converted to county annual data with monthly profiles based on actual fire by fire data		2018 developed for WF (typical wildfire year), Rx fire, and agricultural burning. Typical WF estimates based on scaling 1996 WF activity by long term WF averages in the Western US. Rx fire based on Grand Canyon Visibility Transport Commission (GCVTC) 1995 Fire Emissions Project .

Project Specifics

Primary RPO Contact	Mark Janssen - LADCO	Elizabeth Byers - CENRAP	Greg Stella	Megan Schuster - MANE-VU	Tom Moore - Technical Coordinator
Primary Contractor Contact	William Battye	Dana Sullivan	Bill Barnard	Randy Strait, Steve Roe	Dave Randall
Primary Contractor	EC/R Incorporated	Sonoma Technology, Inc.	MACTEC Engineering and Consulting, Inc.	Pechan	Air Sciences Inc.
Contract Start Date	Aug-03	June, 2003	June 2002/Dec 2003	Apr-04	2002 Emissions inventory - Feb 2004.
Draft Product Delivery	1-Jun-04	April, 2004	Nov 03/Apr 04	Aug/Sept 2004	1-May-04
Final Product Delivery	July/August 2004	May, 2004	Jan 04/Oct 04	Oct-04	Essential documentation - June 30, 2004
URL For Project	NA	N/A	http://www.vistas-sesarm.org/documents/index.asp	NA	Data and project documentation on CD-ROM or www.wrapair.org .