

Development of a Commodity-Based Fire Emissions Tracking System

*Tools - Emissions Data Sharing and Assessment
2008 Emission Inventory Conference
June 4, 2008
Portland, OR*



DENVER • PORTLAND

Opening Remarks

- Introduction to production version of WRAP Fire Emissions Tracking System.
 - Commodity design
 - Critical functions
 - Emissions and fire science
- Web Tools of the FETS.
- Steps to full data acquisition.

Overview of FETS

Why do we have it?

- Section 51.309.(d)(6) of the Regional Haze Rule requires each State to establish an emissions inventory and tracking system (spatial and temporal).
- WRAP's Fire Tracking System Policy approved by the WRAP Board 4/2/2003
(<http://wrapair.org/forums/fejf/documents/fts/WRAPFTSPolicy.pdf>)
- Facilitate Regional Coordination among Smoke Management Programs

Overview of FETS

Why do we have it?

Barriers to Improved Coordination and Communication

- Smoke Management Programs (SMP) are autonomous
- Many SMP's have their own tracking/ database system
- Fire activity data may not be emissions/ air quality centric

WRAP developed the FETS so that

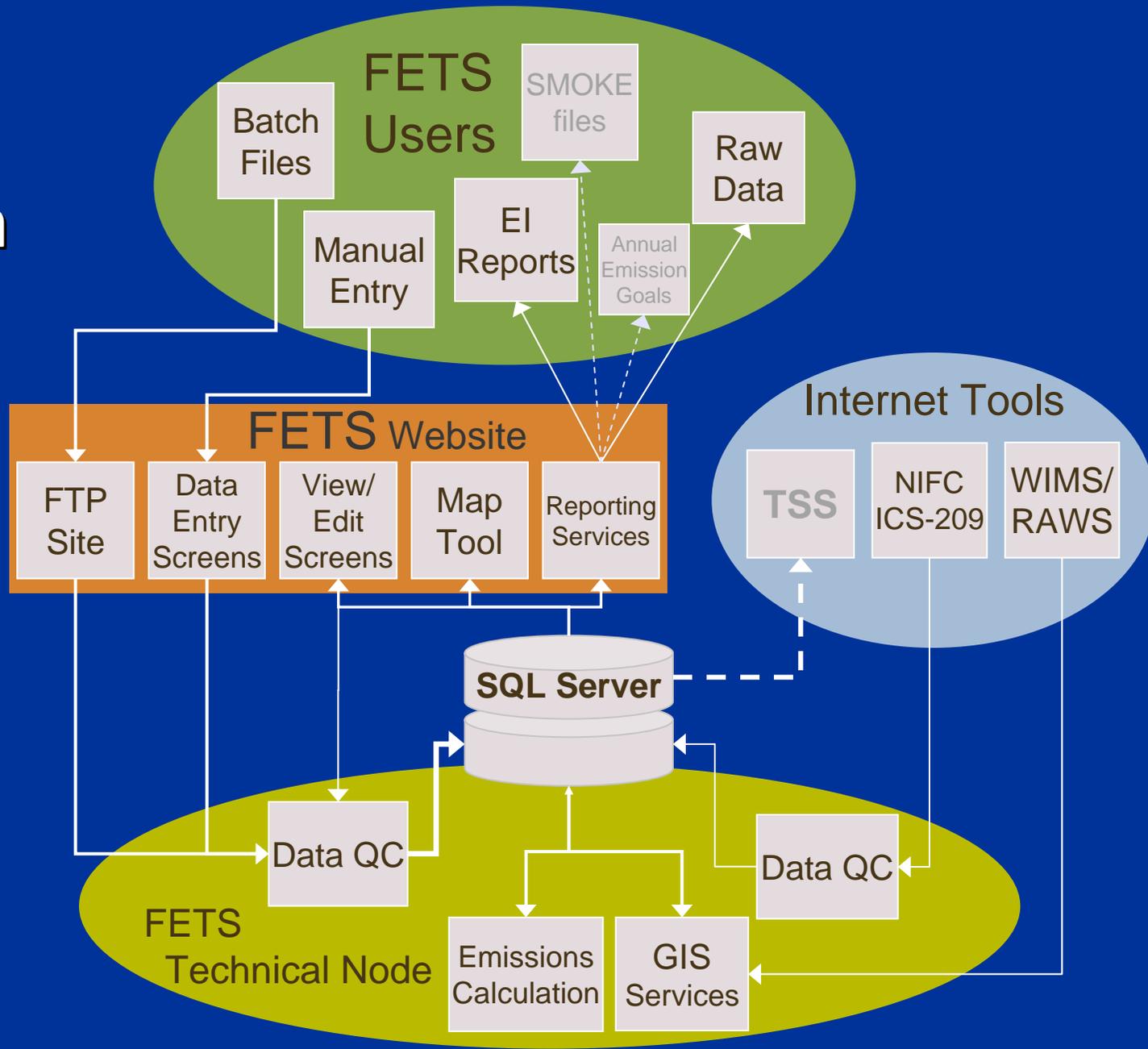
- Data from all sources are in one system (with little "extra" work from data providers)
- Mapping and reporting tools are web-based so information is easily shared
- Event data are acquired or gap-filled to be suitable for air quality planning.

Overview of FETS

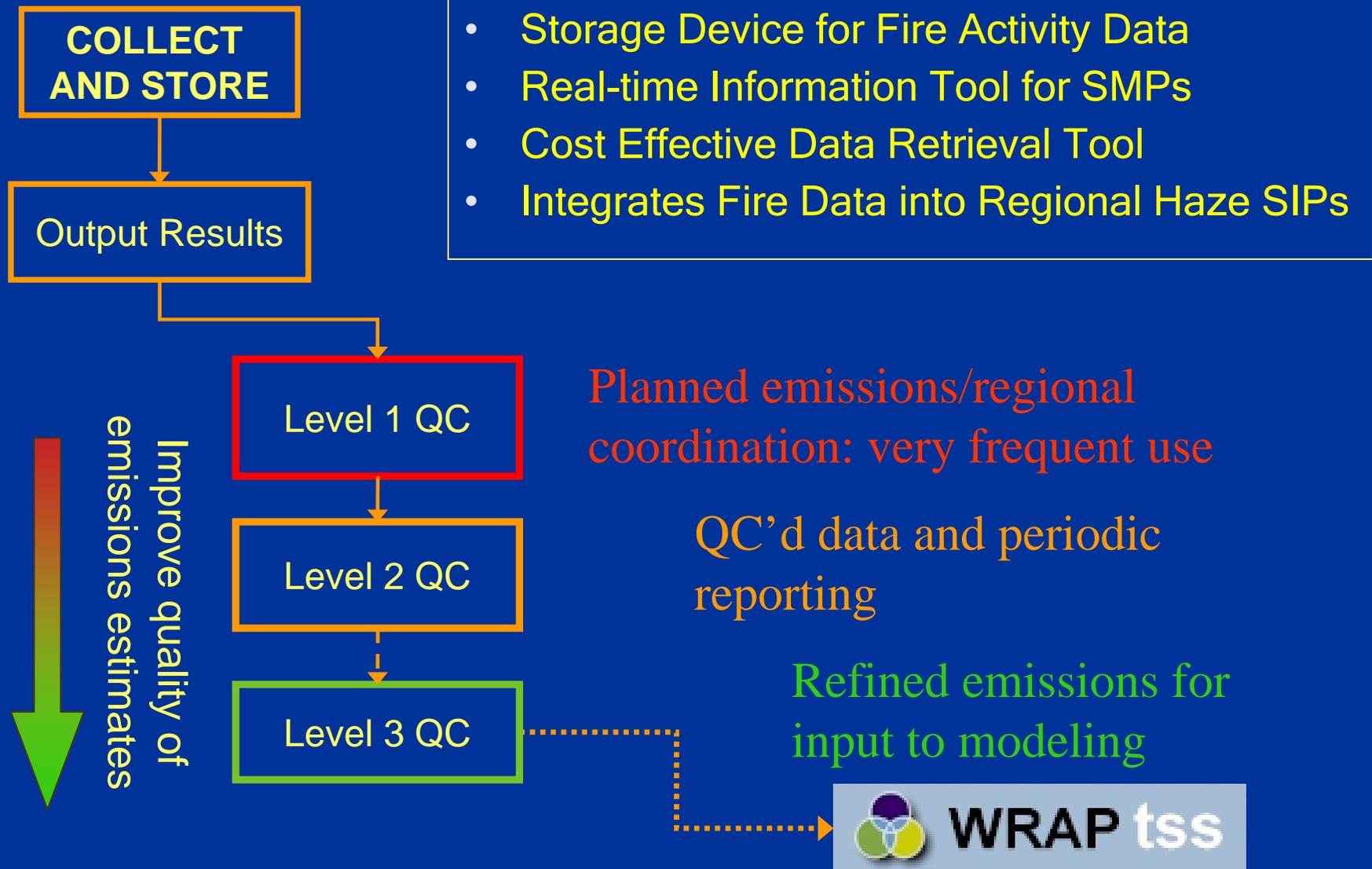
What is it?

- A secure, easy-to-implement database software package and development environment.
- Simple, efficient, “commodity” programming and software packages to communicate with a database, control data mining, and provide an effective, fully-functional web interface.

FETS Design



Critical Functions of the FETS

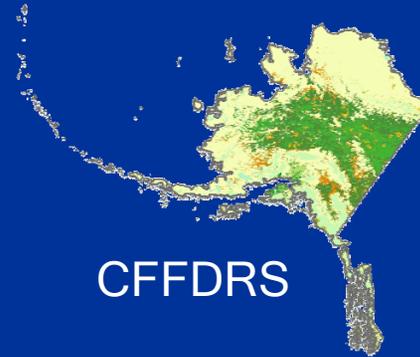




- FUEL AND EMISSIONS

Fuel Consumption

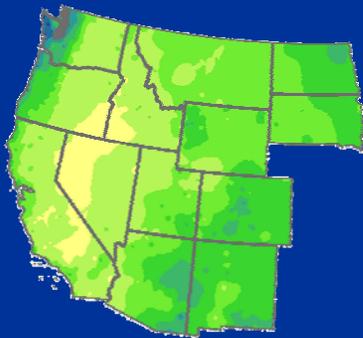
User Provided
GIS overlay with FCCS 1.1 (lower 48)
or CFFDRS (Alaska)



CFFDRS

Emission Estimates

User Provided
WRAP Phase II (simple) [always used for
Regional Coordination]
CONSUME 3.0 [includes GIS lookup of daily
fuel moisture (FM) and precipitation]



1k FM surface
8/8/2007



FCCS 1.1

Integration of WRAP Fire Policy Elements

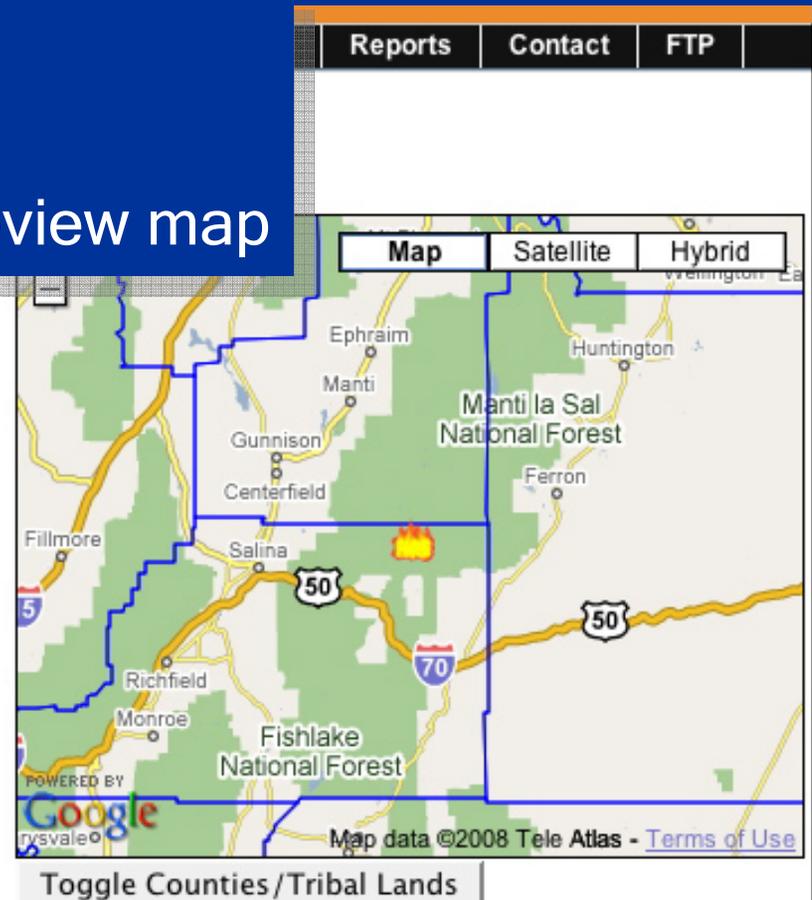
Natural/Anthropogenic
Emission Reduction Techniques

Web Tools

Data Entry

- List projects and Burn Days
- Enter and Edit burn information
- On-screen confirmation with preview map

Agency: U.S. National Park Service
Latitude: 39
Longitude: -111.4833
State Code: UT
Fuel Type: Interior Douglas-fir - Ponderosa pine / Gambel oak forest
User Fuel Loading (tons/acre): 0
Burn Type: B
Burn Category: NAT
Start Date: 01/06/2007
End Date: 12/25/2007
Created By: MEMavko



[Edit this record](#) | [Add Another Project](#) | [View My Projects](#) | [Return to Home Page](#)

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Mapping Tool - Google Maps

The screenshot displays the WRAP fets web application. The top navigation bar includes 'View My Projects', 'Enter Project', 'View My Burn Days', 'Enter Burn Day', 'Map', 'Reports', 'Contact', and 'FTP'. The 'Map' button is circled in red. Below the navigation bar, there are filters for 'Display: All Events' and 'Center: Lower 48'. The main area shows a Google Map of the Pacific Northwest region, with a red box highlighting a specific area in Idaho. Two callout boxes are overlaid on the map, both containing the following information:

Whitehawk Tree Torching Prescribed fire
04/13/2008 - 04/14/2008

Reported burns:	1
Planned acres in this period:	3
Accomplished acres in this period:	0
Burns with reported ERT use:	0
PM _{2.5} emissions in this period:	2.04 tons
Reporting State:	ID
Data Source:	MT/ID Airshed Group

At the bottom of the map, there is a legend with the following items: Prescribed Fire (green circle), Wildfire (red circle), Wildland Fire Use (orange circle), Agricultural Fire (blue circle), and Non-Federal Rangeland (dark green circle). The footer text reads: 'Copyright 2007, Western Regional Air Partnership.'

Mapping Tool - Google Maps

WRAP fets Login

Home View My Projects Enter Project View My Burn Days Enter Burn Day Map Reports Contact FTP

Center: Lower 48 Submit **Data Status**

Incoming Data Status

Source	WF	WFU	RX	AG	NFR	Last Submit	Domain
ICS-209	✓	✓	-	-	-	04/14/08	WRAP-Wide
AK	-	-	N.D.	N.D.	N.D.	No Data	State/Federal > 40 ac
AZ	-	-	✗	N.D.	N.D.	10/15/07	State-Wide
CA - PFIRS	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
CO	-	-	✗	N.D.	N.D.	No Data	State-Wide
ID - Agriculture	-	-	-	N.D.	-	No Data	State-Wide
MT - Agriculture	-	-	-	N.D.	-	No Data	State-Wide
MT/ID Airshed Grp.	-	-	✓	-	N.D.	04/14/08	State/Federal Lands
ND	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
NM	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
NV	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
OR - Dept. of Forestry	-	-	✓	-	✓	04/14/08	Federal/State/Private

Incoming Data Status

Source	WF	WFU	RX	AG	NFR	Last Submit	Domain
ICS-209	✓	✓	-	-	-	04/14/08	WRAP-Wide
AK	-	-	N.D.	N.D.	N.D.	No Data	State/Federal > 40 ac
AZ	-	-	✗	N.D.	N.D.	10/15/07	State-Wide
CA - PFIRS	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
CO	-	-	✗	N.D.	N.D.	No Data	State-Wide
ID - Agriculture	-	-	-	N.D.	-	No Data	State-Wide
MT - Agriculture	-	-	-	N.D.	-	No Data	State-Wide
MT/ID Airshed Grp.	-	-	✓	-	N.D.	04/14/08	State/Federal Lands
ND	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
NM	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
NV	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
OR - Dept. of Forestry	-	-	✓	-	✓	04/14/08	Federal/State/Private
OR - Agriculture	-	-	-	N.D.	-	No Data	State-Wide
SD	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
UT	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
WA - DNR	-	-	✓	N.D.	N.D.	04/14/08	Federal Lands
WA - Dept. of Ecology	-	-	N.D.	N.D.	N.D.	No Data	State/Private Lands
WA - Agriculture	-	-	N.D.	N.D.	N.D.	No Data	State-Wide
WY	-	-	N.D.	N.D.	N.D.	No Data	State-Wide

(40.81380923056958, -110.8740234375)

Key: ● Prescribed Fire ● Wildfire ● Wildland Fire Use ● Agricultural Fire ● Non-Federal Rangeland

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Reporting Tools

The screenshot shows two browser windows. The left window, titled 'FETS - Reports', displays the 'Generate Report' form with the following fields:

- Report Type: Quick QC
- Start Date: 10/1/2007
- End Date: 10/13/2007
- State: Idaho
- Agency: All Agencies
- Emission Suite: WRAP
- Output Format: HTML

The right window, titled 'Quick QC Report', displays a summary table for the report period 10/01/2007 - 10/13/2007, with Emissions Suite Selector: WRAP.

Source Type	Burn Type	Acres	PM25	# of Events
WF	Broadcast			
	Piled			
RX	Broadcast	4127.5	897.58503925	224
	Piles	26	1.62144	7
	Machine Piles	5756.5	420.4285	259
	Hand Piles	290	20.18704	63

- “Quick QC” Summaries of emissions, acres, fire types, NAT/ANTH activity
- EI Reports of all ‘Accomplished’ burns
- On-screen in HTML or download to XLS

Reporting Tools - Google Earth

The image displays the WRAP fets web application interface and a Google Earth map. The interface includes a navigation menu (Home, View My Projects, Enter Project, View My Burn Days, Enter Project) and a "Generate Report" section with the following fields:

- Report Type: El Summary
- Start Date: 10/1/2007
- End Date: 12/31/2007
- State: All States
- Agency: All Agencies
- Emission Suite: HTML, Excel Spreadsheet, Download to KML (Google Earth)
- Output Format: Download to KML (Google Earth)

The Google Earth map shows the United States with numerous red dots representing wildfire locations in 2007. A "Places" panel on the right lists the following categories:

- My Places
 - Fire locations in the WRAP Region 01/01/2007 to 12/31/2007
 - Wildfires
 - Prescribed Fires
 - Wildland Fire Use
 - Non-Federal Rangeland Burning
 - Agricultural Burning

2007
wildfire locations

Fletcher

Burn Date: 2007-07-15 00:00:00.0
Latitude: 41.917
Longitude: -120.615
Final Reported Acres (Total): 8121
Initial Reported Daily Acres: 600
PM_{2.5} emissions for this day: 210.892
FCC code for this Burn Day: 53
Reporting State: CA
Data Source: National Interagency Fire Center
See <http://wrapfets.org> for more information
Directions: [To here](#) - [From here](#)

Data Acquisition

Manipulating Fire Data

Data Acquisition Methods

- Wildfire
 - FTP-get ICS-209 data set from federal site. Pulls previous day's burns.
- All other fire types
 - FTP-get from Agency sites (OR, WA, NM)
 - FTP-put to FETS site from Smoke Management Programs (AZ)
 - Automated direct acquisition from SMP databases (MT, ID, Nez Perce)
 - Manual data entry at FETS

Uploading Batch Data

MS-Excel or CSV

- Same fields as required by manual data entry + extras
- Download Format Template (MS-Excel)



WRAP fets

Logged in as: M. Slavko | Log out

Home | View My Projects | Enter Project | View My Burn Days | Enter Burn Day | Map | Reports | Contact | **FTP**

FTP Instructions

For Internet Explorer 6 Users:

1. <ftp://ftp.airsci.com>
2. You will be prompted to log in...
3. Username: **FETSuser**
4. Password: **FireTracker**
5. Drop files onto web browser window.

For all other users:

1. Open a Windows Explorer window
2. Type "ftp://ftp.airsci.com" in the address bar and press <Enter>
3. You will be prompted to log in...
4. Username: **FETSuser**
5. Pswd: **FireTracker**
6. Drop files into the default directory

Alternatively, use a ftp client with the above username and password.
Drop files into the default directory.

[Download Batch Data Template \(Excel Spreadsheet\)](#)

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- Schedule for Automated Data Acquisition -
midnight; 0200; 0700 - 1900 MDT

Quality Control - Batch File Error Reports

	A	B	C	D	E	F	G	H	I	J
1	RequestID	PermitID	LAT	LON	TWN	TWND	RNS	RNGD	SECT	TYPE
2						Choose N or S				
3						Choose N or S				
4	Record 3 OK									
5	Record 4 OK									
6	Record 5 OK									
7	Record 6 OK									
8	Record 7 OK									
9									NaN	
10	Record 9 OK								NaN	
11										
12	Record 11 OK									
13	Record 12 OK									
14	Record 13 OK									
15	Record 14 OK									
16	Record 15 OK									
17	Record 16 OK									
18	Record 17 OK									
19									NaN	
20	Record 19 OK									
21	Record 20 OK									
22	Record 21 OK									
23	Record 22 OK									
24	Record 23 OK									
25	Record 24 OK									
26	Record 25 OK									
27	Record 26 OK									
28						NaN				
29	Record 28 OK									
30	Record 29 OK									
31	Record 30 OK									

Recent Data Acquisition Developments

<i>Provider</i>	Federal	State	Private	Agricultural	Rangeland
Oregon	X	X	X	X	X
Washington	X	X	X	X	
Montana	X	X	X		
Idaho	X	X	X	X	
New Mexico	X	X	X		
Colorado	X	X	X		
Arizona	X	X	X		
Nez Perce				X	X

- Data stream **active**
- Data stream **pending**
- Data stream **known, not initiated**

Concluding Remarks

- FETS is up and running with growing participation among data providers and Smoke Management Programs.
- WRAP would support efforts to integrate the FETS with other tracking or forecasting systems.

Links/Contact Information

- www.wrapfets.org

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Questions?