Planning-grade Emission Inventory Development Protocol: Draft Outline and Technical Meeting Notes

BIG PROTOCOL THEMES

A. FETS produces specific products for specific purposes.
B. Develop "use cases" for FETS data.
C. Development of "über-map" (jurisdictions, ownership, vegetative cover) to inform rule set for fire activity data replacement, augmentation and classification.
D. Include operational definitions for all fire types (include list of fire types that are NOT incorporated in FETS).
E. 4 km emissions/modeling grid is expected to be the smallest resolution required for emissions data.

PRODUCTS TO BE USED

Items in *italics* need further investigation as to their efficacy.

A. Fire Activity
    a. SMARTFIRE: classified, large wildfire data and unclassified small fire data.
    b. MTBS (for review of accuracy of large fires)
    c. Develop an über-map to make decisions about SMARTIFRE data to keep
        i. NILS landowner data set (from BLM).
        ii. Develop a custom map layer of FETS coverage by source type.
B. Fire Science
    a. CONSUME + Compilable FEPS to calculate emissions
    b. Refine inputs for emission calculations
        i. For large fires use MTBS to inform fire consumption/combustion efficiency
        ii. USDA-NASS for agricultural lands assignment
        iii. New table of Emission Reduction Techniques (ERT), *speciated by pollutant*
        iv. National Weather Service (NWS) radar-observed precipitation maps and *MODIS vegetation condition maps* to inform fuel moisture assignments.
C. Plume Height
    a. An update to the WRAP method (empirical lookup tables) using one of the following
        i. DAYSMOKE
        ii. Briggs/ SMOKE
        iii. existing comparative analytical data

Topic points are followed by the protocol decisions and notes on process

1. FIRE ACTIVITY – The lack of full coverage - geographic area and fire type
    a. SMARTFIRE – for 1km detection level reporting of fires
        i. Receive the data before the rectification of fire pixels into daily perimeter polygons or "pre-blob"
        ii. BLUE SKY calculations are <u>not</u> a part of this data
        iii. SMARTFIRE receives acknowledgement on the FETS site
        iv. This starts with meetings with USFS/FERA and STi to discuss complimentary features and functions of FETS and SMARTFIRE / BLUE SKY Systems.
    b. For unclassified points from the SMARTFIRE data stream
        i. Landownership and land use filters are applied to assign a fire type to each detection
        ii. Zones of exclusion are applied (e.g., Nez Perce)
        iii. Add "unclassified" as a legitimate classification for valid satellite fire detects.
    c. MTBS is used to further correct wildfires for intensity
    d. Prepare a matrix of fire activity data sources for review.

2. FIRE ACTIVITY – The daily resolution of fire events
    a. SMARTFIRE
        i. Receive data after the rectification of fire pixels to ICS-209 reported fires
        ii. This will give daily perimeters and acreages

3. FIRE SCIENCE – The determination of loading and consumption
    a. CONSUME + Compilable FEPS
        i. Acquire executables and scripts via request from USFS / FERA.
        ii. Case Study: Large fire(s). Compare acres, loading, consumption, and emissions for several methods. ICS-209/WRAP; SMARTFIRE/CONSUME/FEPS; MTBS/CONSUME/FEPS.
        iii. Review findings of SEMIP.
    b. Agricultural burning

i. When a non ICS-209 SMARTFIRE pixel lands on farmland it is
    1. Split into a rangeland fire -or-
    2. An agricultural burn
        a. Canal burning is specifically removed

4. FIRE SCIENCE –Align pollutants output by FETS with the input requirements for regional chemical transport models (CTM).
    a. As much speciation as possible
        i. With a limit to complexity based on
            1. Staying within server limits
            2. Not splitting a "parent" pollutant (e.g., PM 2.5, VOC) just to have it aggregated again in the CTM.
    b. C. Ramsdell and C. Swab to provide list of required inputs for their SIP's as a shortlist of pollutants FETS is to provide.

5. Plume height
    a. There are several available methods for characterizing physical plume characteristics in dispersion models:
        i. WRAP method (empirical look up tables)
        ii. DAYSMOKE
        iii. Briggs/SMOKE
    b. Use existing comparative analytical data to revise/refine lookup table for WRAP method; provide to dispersion modelers for study and analysis.
        i. Revise the assumed height of the mixing layer.
        ii. Be sure to retain heat-release / plume rise characteristics in instances where fire activity are reported to FETS as 1 km (or smaller) pixel event.

6. Emission Reduction Techniques
    a. Application of Alternatives to Burning is not tracked in FETS.
    b. Revise / refine implementation of Emission Reduction Factors (ERF) (e.g., all emissions decrease with ERT's that reduce consumption; revise ERF's for ERT's that change combustion efficiency (some emissions may increase).
    c. The numbered list of ERT's will be posted on the FETS site along with ERT Seasonal Suites table.

7. Improved Fuel Moisture estimates
    a. Case Study: Testing of new sources of fuel moisture and resulting consumption / emission estimates against the current method.
        i. Will prepare a report on ease of implementation and accuracy is generated
    b. Using the National Weather Service rainfall totals seems the best option at this time

8. Converting to a geodatabase
    a. Conversion will take place with no loss of publicly available FETS capabilities.
    b. Server currently being built and tested.

9. Extra topics
    a. A strawman for smolder imputs (investigate smoldering emissions estimates from FEPS).
    b. Data visualization and reporting functions
        i. Output to ORL or NET_CDF formats.
        ii. Progress report for states/Tribes to show effectiveness of ERTs.
    c. Determine Time-Step for new activity data and application of new fire sciences methods (i.e., how far back do we apply methods? "Lock" certain inventories (like 2002 WRAP modeling input and 2008 NEI).