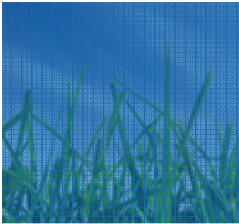


# Land Clearing Debris Burning





# Land Clearing Debris Burning - What Sources are Included?

## **SCCs:**

2610000500 - Land Clearing Debris Burning

Pollutants:  $PM_{10}$ ,  $PM_{2.5}$ , CO, VOC, 6\* HAPs

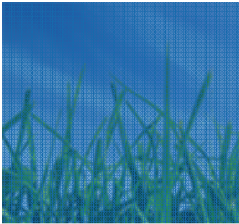
\*There are multiple HAPs likely emitted from debris burning which have not been fully assessed and will likely vary depending on debris content. The key HAPs used by EPA for risk assessment are identified as top priority for reporting.



# Land Clearing Debris Burning – NEI Method

## Activity Data

- Estimate the county-level total number of acres disturbed by residential, non-residential and roadway construction –same fundamental approach for each
  - Use number of acres disturbed from fugitive dust construction emissions activity calculations
- Apply loading factor to number of acres to estimate the amount of material or fuel subject to burning



# Land Clearing Debris Burning - NEI Method (cont'd)

- Weighted, county-specific loading factors developed based on acres of hardwoods, softwoods, and grasses (BELD2 database in BEIS) <http://www.epa.gov/asmdnerl/biogen.html>
- Multiply average loading factors by percent contribution of each type of vegetation class to the total county land area



## Land Clearing Debris Burning - NEI Method (cont'd)

Average loading factors for hardwood and softwood are then further adjusted by 1.5x to account for mass of tree below the surface

Fuel Type	Fuel Loading (tons/acre)
Hardwood	99
Softwood	57
Grass	4.5

# Land Clearing Debris Burning - NEI Method (cont'd)

## Fuel Loading Factor Equation

$$L_w = F_h * L_h + F_s * L_s + F_g * L_g$$

where:  $L_w$  = County-specific weighted loading factor

$F_h$  = Fraction of county acres classified as hardwoods

$L_h$  = Average loading factor for hardwoods

$F_s$  = Fraction of county acres classified as softwoods

$L_s$  = Average loading factor for softwoods

$F_g$  = Fraction of county acres classified as grasses

$L_g$  = Average loading factor for grasses

# Land Clearing Debris Burning - NEI Method (cont'd)

## Emission Calculation

$$E = A * LF * EF$$

where: E = Emissions, lbs pollutant per year

A = No. of acres of land cleared per county  
(residential + commercial + road construction)

LF = County-specific loading factor, tons per acre

EF = Emission factor, lbs pollutant per ton

Represents an upper-bound emissions estimate

Assumes all fuel loading on land cleared is burned; no controls or bans



# Land Clearing Debris Burning - Improvements to NEI Method

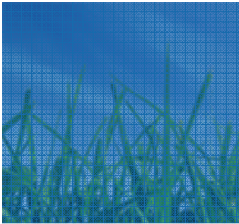
- Review EIIP section on Open Burning
  - <http://www.epa.gov/ttnchie1/eiip/>
  - EIIP Volume III, Ch. 16
  - Preferred methods rely on direct measure of mass of waste or debris burned
  - Mass amounts may be available from estimates in permits issued
- Review & improve estimates of the acres cleared based on local air and fire inspectors
- Develop improved estimate of the “average loading factor”





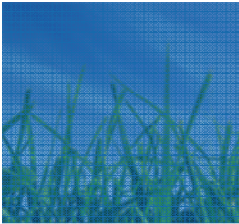
## Land Clearing Debris Burning - Improvements to NEI Method (cont'd)

- Identify specific counties with burning bans, and specification of counties where wastes are burned - all states have differences
- State or local estimates of the percentage or amount of waste burned per construction event



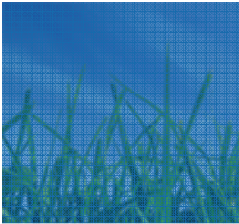
# Land Clearing Debris Burning - Northern Virginia Example

- Performed Rule Effectiveness (RE) survey to determine the level of compliance for:
  - Land clearing/debris burning
  - Residential waste burning
- Developed RE to apply to ozone season open burning emission estimates for the Virginia portion of the Washington DC-MD-VA Ozone Nonattainment Area



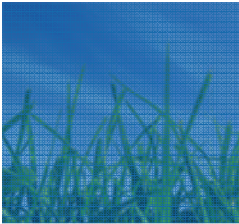
# Land Clearing Debris Burning - Northern Virginia Example (cont'd)

- Reviewed conditions of existing open burning rules
  - Time period of ban(s)
  - Exemptions and special provisions
- Surveyed local open burning officials responsible for tracking and enforcing open burning rules



## Land Clearing Debris Burning - Northern Virginia Example (cont'd)

- Started with EPA questionnaire from RE guidance, modified for open burning
- Responses to questions are assigned specific point values that add up to a maximum of 100 points, considered equivalent to a RE percentage value



## Land Clearing Debris Burning - Northern Virginia Example (cont'd)

- RE values analyzed by county and for 5-county region
  - Estimated regional RE of 93 percent
- If area comprised of counties and jurisdictions with significantly different population densities, one should analyze responses by urban and rural areas



## Lessons Learned

- Local officials may defer to higher officials (e.g., county or state-level) for enforcing open burning rules
- RE may be high for time period that ban is in effect, but need to account for duration of ban (RP) if less than annual or seasonal
- It is important to account for when the ban is taking place

# Questions



thievingjoker 2009