



2017 Nonpoint Emissions Inventory Training

EPA's Emissions
Inventory Conference
August 14, 2017



Introductions



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Course Schedule



- 1:30 – 1:40 Computer Setup / Introductions
- 1:40 – 2:00 Overview of the Nonpoint NEI
- 2:00 – 2:20 Anatomy of a NEMO
- 2:20 – 3:15 Introduction and Demonstration of the Wagon Wheel Tool
- 3:15 – 3:30 Break
- 3:30 – 4:00 Point Source Subtraction Discussion
- 4:00 – 4:20 ICI Demonstration
- 4:20 – 4:30 Next Steps
- 4:30 – 5:00 Open Discussion / Answer Any Remaining Questions

Nonpoint NEI



- Formal definition: Not a major industry (Point) source or a mobile source or event (wildfire or prescribed burn)
- A disparate “catch-all” of sources
 - Biogenic and soil emissions
 - Small-scale fuel combustion (industrial, commercial/institutional, residential)
 - Solvent utilization
 - Agricultural from livestock & fertilizer application
 - Most oil and gas exploration and production
 - miscellaneous sources like agricultural field burning, various types of dust, non-combustion Hg, to literally cats and dogs
- A mix of EPA Tools and standalone EPA datasets

Current Nonpoint Process: 2014NEI



- Multiple versions of EPA Nonpoint Tools
- Results in extra costs and uncertainty in budget resource management
- Lack of known benchmarks for several source categories
- Inconsistent and incomplete methodology documentation
- Process unavoidably leads to missed NEI Plan deadlines
-too flexible to late comments/submittals
- Lack of timely QA to prevent need for additional versions
- Resulted in multiple 2014 nonpoint NEI “Final” versions

2014 NEI High-level Issues



- Budget uncertainty vs desire for timely inventories
 - Limited time for State/Local/Tribe (SLT) review of new EPA estimates for some key sectors
 - Lack of confidence in end results
- Nonpoint survey for first time in 2014, generally successful but overly-complicated
- NEI Technical Support Document lagged public release of NEI by 2 months

Proposed Improvements for 2017 NEI



- Early coordination and buy-in on methods and implementation
 - 2017 NEI Plan w/ clear and realistic milestones
 - Robust Nonpoint Emissions Methodology and Operator instructions (NEMO) for each EPA nonpoint tool
 - Slightly delayed 2017 NEI Version 1, but no nonpoint method development for Version 2
- Streamlining communications
 - SharePoint organized & simplified Nonpoint Survey
 - Emissions Inventory Conference training highlighting 2017 NEI Plan and nonpoint tools
- Utilize activity and other tool inputs from SLTs
 - Providing formats, schedule and QA procedures prior to inventory development beginning
 - EPA staff runs tools rather than EPA contractors –helps with cost and tracking
- Web-based pilot for a sector

3-Track Staggered-Schedule Plan



- Category 1: Tools with minimal or no methodology changes
 - No point reconciliation
 - Not waiting on new activity data to release draft version of tools
 - Sectors are regarded in “good shape” already or, are not considered high-priority based on stakeholder feedback
 - Sectors: ag tilling, ag pesticides, ag burning, aviation gasoline stage 1 & 2, composting, mining & quarrying, construction dust, open burning, non-wood residential heating, backyard BBQs, asphalt paving

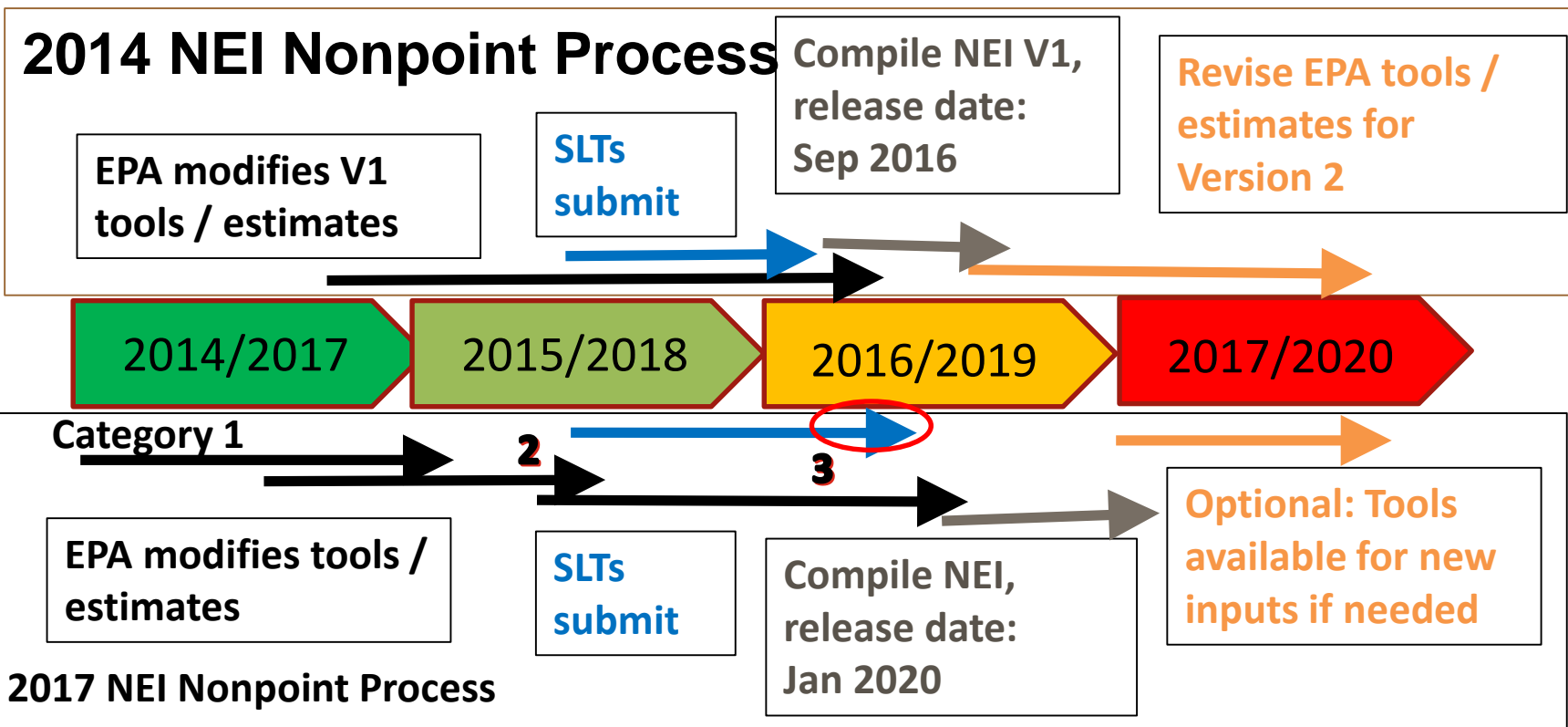
3-Track Staggered-Schedule Plan (cont.)



- Category 2: Significant method changes and no point subtraction
 - No point reconciliation
 - More time/collaboration needed to discuss each of these tools
 - Sectors: residential wood combustion (RWC), ag livestock and fertilizer, commercial cooking, mercury, road dust, portable fuel containers

- Category 3: point source subtraction needed
 - Waiting on point throughput data
 - Will pre-populate throughputs with older data
 - Sectors: industrial and commercial/institutional (ICI) fuel combustion, solvents, oil & gas, publicly-owned treatment works (POTW), stage 1 gasoline distribution

Current vs Proposed Timeline



2017 NEI Nonpoint Timeline: Category 1



- Spring 2017 (DONE): NEMO development for up to 15 tools
 - Draft version of tools and NEMOs
 - Includes comprehensive methods documentation for all options and assumptions
 - Operator Instructions to be provided with Version 1 of tools
- Mar - May 2017 (DONE): SLTs and NEI staff review and submit comments
- Jun - Aug 2017: EPA reviews comments, makes necessary edits and posts version 1 of EPA tools and NEMOs
- Jun - Nov 2017: SLTs submit inputs for tools
- Sep 2017 - Jan 2018: EPA runs Cat 1 tools w/ SLT (& default) inputs
 - SLT collaboration to settle on final results
 - Any potential issues and revisions complete, tools finalized, results loaded in EIS

2017 NEI Nonpoint Timeline: Category 2



- Aug - Oct 2017: NEMO development for 8+ tools
 - Draft version of tools and NEMO
 - Includes comprehensive methods documentation for all options and assumptions
- Nov 2017 – Jan 2018: SLTs and EPA modelers and NEI staff review and submit comments
- Jan – Mar 2018: EPA reviews comments, makes necessary edits and posts version 1 of EPA tools and NEMOs
- Jan – June 2018: SLTs submit inputs for tools
- Apr – Sep 2018: EPA runs Category 2 w/ SLT (& default) inputs
 - SLT collaboration to settle on final results
 - Any potential issues and revisions complete, tools finalized, results loaded in EIS

2017 NEI Nonpoint Timeline: Category 3



- May – Aug 2018: NEMO development for 4 tools
 - Draft version of tools and NEMO
 - Includes comprehensive methods documentation and operator instructions for all options and assumptions
 - Will be prepopulated with 2014v2 NEI throughputs and/or 2015/2016 point emissions where applicable
- Sep - Nov 2018: SLTs and EPA modelers and NEI staff review and submit comments
- Nov 2018 – Feb 2019: EPA reviews comments, makes necessary edits and posts version 1 of EPA tools and NEMOs
- Dec 2018 – May 2019: SLTs submit inputs for tools (varies by SLT, e.g., Jul 2019 for NC)
- Mar - Aug 2019: EPA runs Cat 3 tools w/ SLT (& default) inputs or emissions
 - SLT collaboration to settle on final results
 - Any potential issues and revisions complete, tools finalized, results loaded in EIS

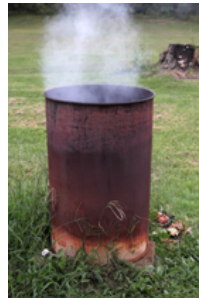
Compiling the 2017 Nonpoint NEI



- Begins September 2019, after all Category 1, 2 and 3 tool results are loaded in EIS
- For internal EPA modeling/testing, we could create partial 2017 data and use older data for category 3 sectors
- SLTs can and will submit their own emissions (e.g., oil and gas, California in general) but at extended AERR deadlines:
 - Jan 15, 2019 for non-Cat 3 sources
 - March 31, 2019 for Cat 3 sources



Anatomy of a NEMO



Motivation



- NEMO (Nonpoint Emissions Methodology and Operator Instructions)
- Proactive inventory development as opposed to reactive
- Improve timeliness of inventories by eliminating multiple NEI versions
- Improve efficiency allowing SLTs to devote less resources to inventory development

Anatomy of a NEMO



- **Source Category Description**
 - Description of the category, a full list of source category codes (SCCs) included, and any notes on what is/is not included.
- **Overview of Calculations**
 - Brief description of the basis for the calculations.
- **Activity Data**
 - Activity data used in the calculations, sources, and equations that are applied in order to calculate the activity data, quoting and referencing specific tables and fields that are pulled, when applicable.
- **Allocation Procedure**
 - Any procedures used to allocate data to the county level and sources of data and other assumptions.
- **Emission Factors by SCC**
 - Emission factors used, sources, and/or equations used to calculate emission factors.
- **Controls**
 - Any assumptions about controls.

Anatomy of a NEMO



- Emissions
 - Description of how emissions are calculated including an equation, and any other data needed and the sources.
- Point Inventory Subtraction (if applicable)
 - Discussion and table of point and nonpoint SCCs crosswalk.
 - Description of how point emissions or activity/throughput data are used to compute nonpoint emission estimates.
- Sample Calculations
 - Sample calculations from 1 county.
- Changes to Methodology
 - Changes to the methodology from the previous NEI.
- Puerto Rico and US Virgin Islands Emissions Calculations
 - Description of how emissions for PR & VI were calculated if no activity data/emission factors exist for the islands.

Anatomy of a NEMO



- Quality Assurance Procedures
 - Comparison to previous EPA estimates or as directed by the EPA WAM.
- References
- Operator Instructions
 - User instructions for running the tool.
 - Discussion of all tables, inputs, parameters and user options in the tool.

Mining and Quarrying NEMO Walk Through



Wagon Wheel Nonpoint Emissions Estimation Tool



Motivation



- Many NEI excel tools are large & run slowly
- Multiple places in which human error can occur when updating data
- Many tools use the same data, but it needs to be input separately for each tool
- Overall, not an efficient process

The Wagon Wheel Tool

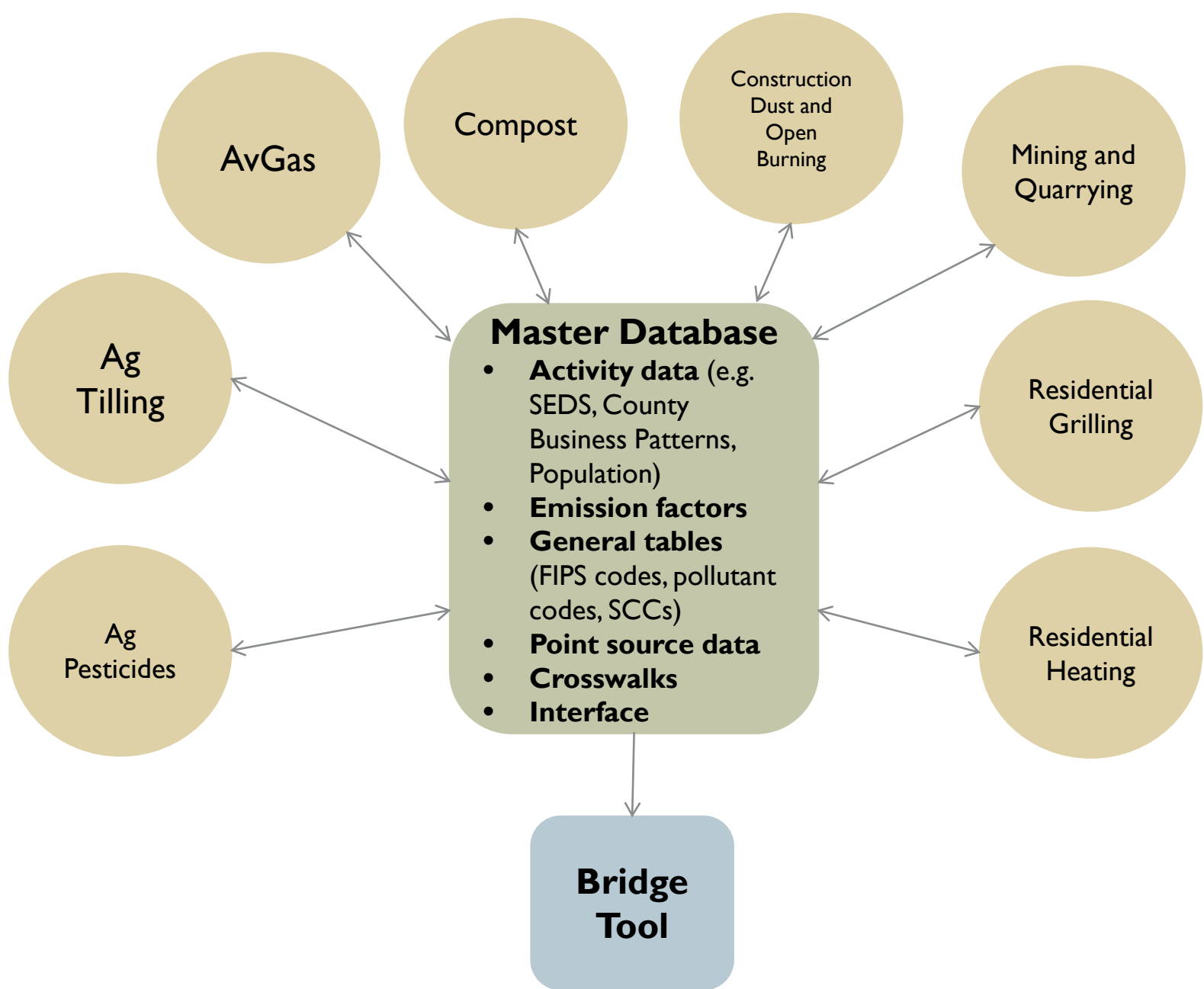


- Developed in Microsoft Access
- Tools are created so updated data can easily be input and used without needing to modify the tool
- Macros can be created that allow us to quickly run tools
- Ability to link tables between databases, so data only needs to be input once
- W.W. will increase efficiency and decrease human error

Wagon Wheel Tool Development



- Develop NEMOs
 - Ask for state/local input
 - Revise methods based on input
- Constructed Tools in Access
 - One central database
 - Link to “modules”
 - Assumptions in modules link to central databased to edit



Nonpoint Implementation Plan Bins



Bin 1

- Agricultural Pesticides
- Agricultural Tilling
- Asphalt Paving
- Aviation Gasoline, Stage 1 & 2
- Composting
- Residential Construction Dust
- Non-residential Construction Dust
- Road Construction Dust
- Mining & Quarrying
- Open Burning Land Clearing Debris
- Open Burning Residential Household Waste
- Open Burning Yard Waste
- Residential Charcoal Grilling
- Residential Heating (non-wood)

Bin 2

- Agricultural Dust (from hooves)
- Agricultural Fertilizer
- Agricultural Livestock
- Agricultural Fires, including rangeland
- Agricultural Silage
- Biogenics
- Commercial Cooking
- Human Cremation (non-Hg)
- Nonpoint Mercury (inc. human cremation)
- Portable Fuel Containers
- Publicly-Owned Treatment Works
- Road Dust: Paved & Unpaved
- Commercial Marine Vessels
- Locomotives

Bin 3

- ICI Fuel Combustion
- Oil and Gas Production & Exploration
- Solvents
- Stage 1 Gasoline Distribution
- POTWs

Demonstration



Please take out your computers and feel free to follow along with this demonstration










Scenario



- You are from Delaware and are interested in seeing the nonpoint dust emissions from the state.
- Which Bin 1 NEI categories include PM emissions?
 - Ag Tilling
 - Construction Dust
 - Mining & Quarrying
 - Open Burning
 - Res. Heating

Step 1: Download the Tool





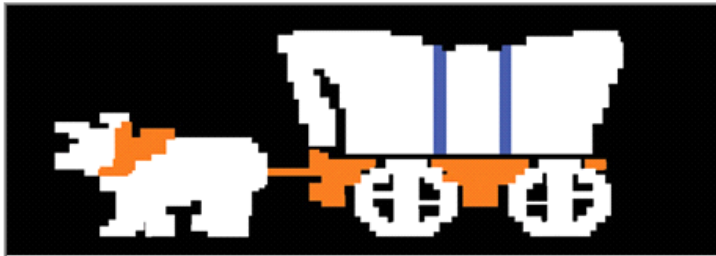
Central Database/ Tool Interface	→	 WAGON WHEEL Nonpoint Emissions Tool	8/1/2017 3:28 PM	Microsoft Access ...	33,192 KB
		 Tools	7/21/2017 4:22 PM	WinZip File	141,248 KB
Output Database/ Bridge Tool	→	 Output	8/1/2017 3:28 PM	Microsoft Access ...	421,668 KB
		 County Business Patterns	5/9/2017 4:40 PM	Microsoft Access ...	3,172 KB
		 County Business Patterns Data	5/9/2017 4:39 PM	Microsoft Access ...	491,992 KB
Template for SLT Input	→	 Templates	8/1/2017 3:41 PM	File folder	
		 Pre Calculations	6/20/2017 2:27 PM	File folder	
		 Modules	8/1/2017 3:31 PM	File folder	
Category Tools	→	 Data	6/1/2017 4:49 PM	File folder	

Step 2: Getting Started



Home Screen

WAGON WHEEL 3000



ver. 1.0
Last updated May 11, 2017

Web-like Algorithm for the Generation Of Nonpoint inventories
With Helpful Emissions Estimation Logic

[Get Started](#) [User's Guide](#) [Tool Change Log](#)

Step 3: Select Scenario



Control Panel

WAGON WHEEL

Select the states, tools, and pollutant types to include in the emissions estimation output table.

CAPs

HAPs

Previous: Home Screen Next: Document Header

State	Selected	Tool	Selected
Alaska	<input type="checkbox"/>	Agricultural Pesticides	<input checked="" type="checkbox"/>
Alabama	<input type="checkbox"/>	Agricultural Tilling	<input checked="" type="checkbox"/>
Arkansas	<input type="checkbox"/>	Asphalt Paving	<input checked="" type="checkbox"/>
Arizona	<input type="checkbox"/>	Aviation Gasoline	<input checked="" type="checkbox"/>
California	<input type="checkbox"/>	Commercial Cooking	<input type="checkbox"/>
Colorado	<input type="checkbox"/>	Composting	<input checked="" type="checkbox"/>
Connecticut	<input type="checkbox"/>	Construction Dust	<input checked="" type="checkbox"/>
District of Columbia	<input type="checkbox"/>	Gasoline Distribution (Stage 1)	<input checked="" type="checkbox"/>
Delaware	<input type="checkbox"/>	ICI	<input type="checkbox"/>
Florida	<input type="checkbox"/>	Mercury	<input type="checkbox"/>
Georgia	<input type="checkbox"/>	Mining and Quarrying	<input checked="" type="checkbox"/>
Hawaii	<input type="checkbox"/>		
Iowa	<input type="checkbox"/>		

Step 4: Insert User Information



Enter Document Header Information

**WAGON
WHEEL**

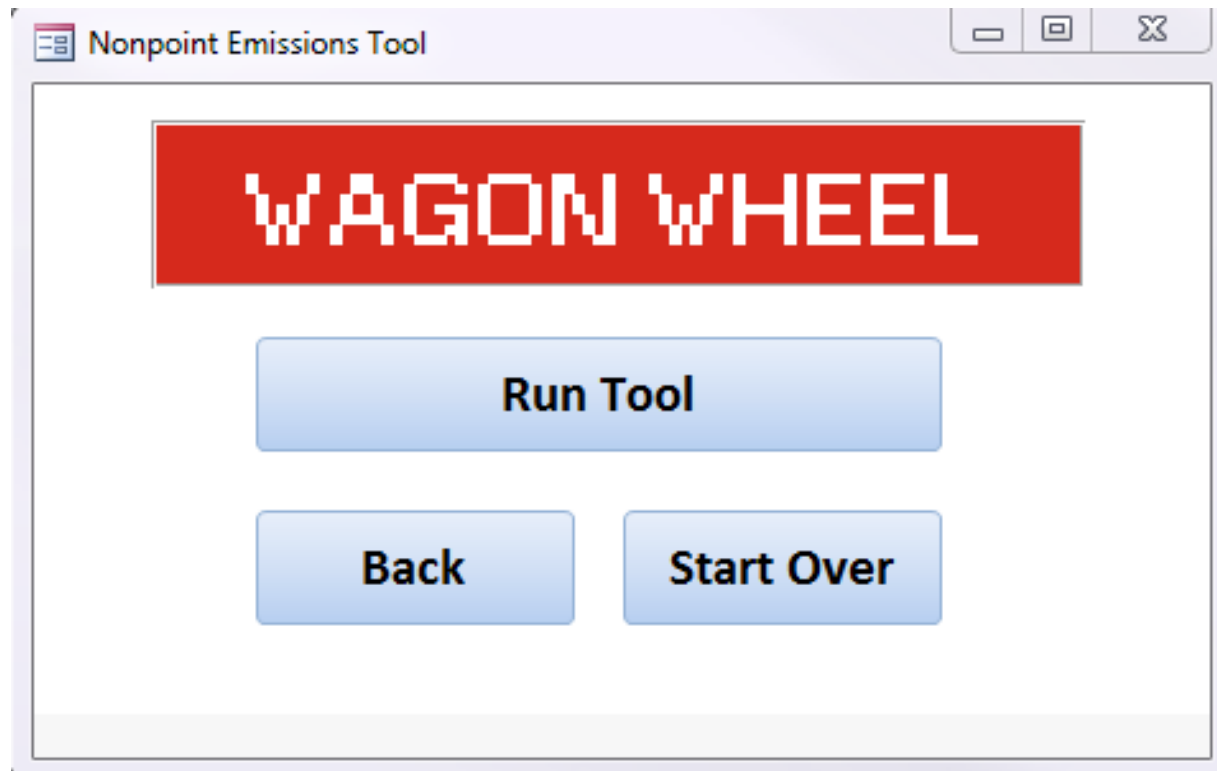
Please enter the appropriate information in the fields to the right to add the header information to the EIS output files.

Author Name*	Jane Smith
Organization Name*	DNR
Document Title*	EIS
Keywords	
Comment	
Data Flow Name*	EIS_v1_0
Property-Submission Type*	QA
Data Category*	Nonpoint
NCD Data File	
User Identifier*	jane.smith@dnr.gov
Program System Code*	DNR
Emissions Year*	2017
Model	Nonpoint Emissions Tool
Model Version	1.0
Emissions Creation Date	5/17/2017
Submittal Comment	

Previous: Select States and SCCs **Next: Run Nonpoint Tool**

** Indicates required field.*

Step 5: Run Tool





Step 6: Wait for Results



Process Running

The Nonpoint Emissions Tool is running.
This process may take several minutes.
This window will close and another window will open when the process is complete.

The results will be output to the Bridge Tool.



Progress

Agricultural Tilling...

State, Local, and Tribal Inputs



- The current NEI plan states that EPA will run the W.W.
- Unless SLT's use another method for estimating emissions they will only have to provide EPA with inputs
- SLT's will be able to use the W.W. to run different scenario calculations
- SLT's can then submit final inputs to EPA via Excel templates



Point Source Subtraction



Content



- What is Point Source Subtraction (PSS)
- Categories that use PSS
- PSS with activity data
- PSS with emissions data

Total Activity – Point Activity = Nonpoint Activity

Point Source Subtraction



- What is point source subtraction (PSS)?
 - Process of subtracting point source activity/emissions data from total known activity/emissions data
 - Completed to avoid double counting between point and nonpoint sources
- EPA prefers PSS be completed with activity data
 - Emissions data may contain emission controls and will distort calculations

Categories that use PSS



- ICI Fuel Combustion
- Oil and Gas Production & Exploration
- Solvents
- Stage 1 Gasoline Distribution
- POTWs

PSS with Activity Data



- SLT submits category point source activity data
- Point source activity data is subtracted from total activity data
- State level estimated nonpoint activity data is distributed to the county level and checked for accuracy
- Nonpoint emissions factors applied to county-level activity data

PSS with Emissions Data



- SLT submits category point source emissions data
- Control efficiencies are used to estimate uncontrolled emissions when applicable
- Point source emissions data is subtracted from total emissions data
- State level estimated nonpoint emissions data is distributed to the county level and checked for accuracy

Point Source Subtraction for ICI



- Point source data are subtracted from total state energy consumption to avoid double counting emissions using the following steps:
 1. **Import the data.** The ICI Tool includes a user-friendly interface to import point source activity data at the county and/or state level
 2. **Link point source SCCs to nonpoint source SCCs** using a crosswalk included in the tool
 3. **Subtract point source activity from total state activity**
 - If both county- and state-level activity data are provided, subtraction from county-level is performed first and then gaps are filled with state-level data
 4. **Corrections:**
 - If PS activity data $>$ Total activity for a county, then the nonpoint activity is set to 0 for that county and the difference between total activity and PS activity for that county is distributed to the other counties in the state.
 - If PS activity \geq Total activity for all counties, then the nonpoint activity for all counties is set to 0.



Industrial,
Commercial, and
Institutional Fuel
Combustion
Nonpoint
Emissions
Estimation Tool



Contents



- Source Categories
- Calculation Methodology Overview
 - Default Data Sources (activity and emissions factors)
 - Assumptions and Adjustments
 - County Distributions
 - Point Source Subtraction
- Tool Demonstration



Source Categories



SCC	Description
2102001000	Industrial /Anthracite Coal /Total: All Boiler Types
2102002000	Industrial /Bituminous/Subbituminous Coal /Total: All Boiler Types
2102004001	Industrial /Distillate Oil /Boilers
2102004002	Industrial /Distillate Oil /IC Engines
2102005000	Industrial /Residual Oil /Total: All Boiler Types
2102006000	Industrial /Natural Gas /Total: Boilers and IC Engines
2102007000	Industrial /Liquified Petroleum Gas /Total: All Boiler Types
2102008000	Industrial /Wood /Total: All Boiler Types
2102011000	Industrial /Kerosene /Total: All Boiler Types
2103001000	Commercial/Institutional /Anthracite Coal /Total: All Boiler Types
2103002000	Commercial/Institutional /Bituminous/Subbituminous Coal /Total: All Boiler Types
2103004001	Commercial/Institutional /Distillate Oil /Boilers
2103004002	Commercial/Institutional /Distillate Oil /IC Engines
2103005000	Commercial/Institutional /Residual Oil /Total: All Boiler Types
2103006000	Commercial/Institutional /Natural Gas /Total: Boilers and IC Engines
2103007000	Commercial/Institutional /Liquified Petroleum Gas /Total: All Combustor Types
2103008000	Commercial/Institutional /Wood /Total: All Boiler Types
2103011000	Commercial/Institutional /Kerosene /Total: All Combustor Types

ICI Emissions Calculations



ICI Calculation Methodology:

- Nonpoint Emissions =

(Total State Activity – Point Source Activity) * Emission Factor



Activity Data and County Distributions



- Total State Energy Data comes from EIA
 - State Energy Data System (SEDS)
 - Fuel Oil and Kerosene Sales
- State-level data are distributed to the county level based on employment
 - Industrial sector: NAICS 31 – 33
 - Commercial/Institutional: NAICS 42 – 92, Census of Governments

Assumptions and Adjustments



- Coal
 - % Anthracite and % Bituminous/Subbituminous (*EIA Annual Coal Distribution Report*)
- Distillate Fuel and LPG
 - % of fuel used by Stationary Sources (i.e. not mobile sources; *EIA Fuel Oil and Kerosene Sales and EPA's National Mobile Inventory Model*)
- Distillate Fuel
 - Split Between Boilers and Engines
 - EIA data is total distillate use, and must be split into boilers and engines
- Coal and Residual Oil
 - % Sulfur and % Ash (*EIA Quarterly Coal Report*)
- All fuels
 - % of Energy Resources used for Nonfuel (Feedstock) Purposes (*EIA Manufacturing Energy Consumption Survey*)

Emissions Factors



- Majority of emissions factors are from AP-42 and the EPA/ERTAC2 database
- Ammonia emissions factors for wood combustion are from an EPA Emission Inventory Improvement Program (EIIP) guidance document
- For coal combustion, the SO₂ emissions factors are based on the sulfur content of the coal burned
- Some PM emissions factors for anthracite coal require information on the ash content of the coal

Next Steps for NEI 2017



- Develop Bin 2 and 3 NEMOs and tools
- Add operator instructions (the “O” in NEMO) to the NEMOs
- Finalize templates for SLT data
- Develop QA database
 - Quickly identify anomalies in EPA estimates and SLT submitted activity data
 - Compare emissions to 2014v2



**BOLD
THINKERS
DRIVING
REAL-WORLD
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