An Introduction to MOVES:
County Data Manager

FHWA Resource Center
EPA Office of Transportation and Air Quality

MOVES

EPA

Presentation Outline

- **Setting up the County Data Manager.**
- **Examples of entering county specific data.**
- **Issues and limitations.**

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County Domain

- **Users must use the County scale for SIP and Conformity analysis.**
- **County scale requires entering county specific data.**
- **Access to default data is limited.**

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Setting up a County Domain

- **Set up a Run Specification file <u>first</u>.**
  - This enables MOVES to filter the default database for relevant information
- **The RunSpec must have:**
  - Only a single county selected.
  - Only a single calendar year selected.
- **Create a County Domain database to store the information, and a separate database to store the results for the county.**

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We will be using the County Data Manager to set up the county database.

Setting up a Run Specification

- MOVES cannot run without a valid Run Specification (runspec).
- A runspec indicates the location, time period, alternate data and output preferences.
- Runspecs can (should) be saved and can be re-loaded to be run again and/or edited.
- The GUI panels are used to set up your runspec.
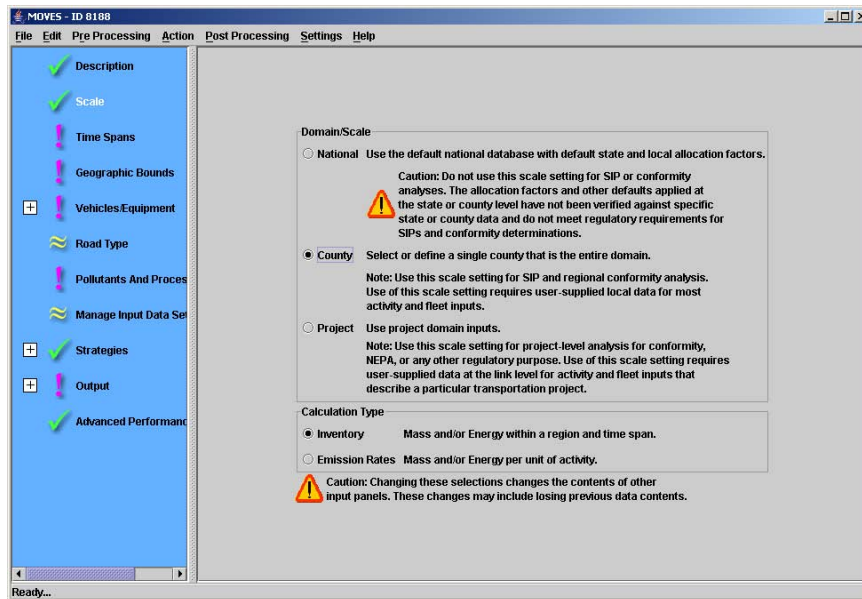
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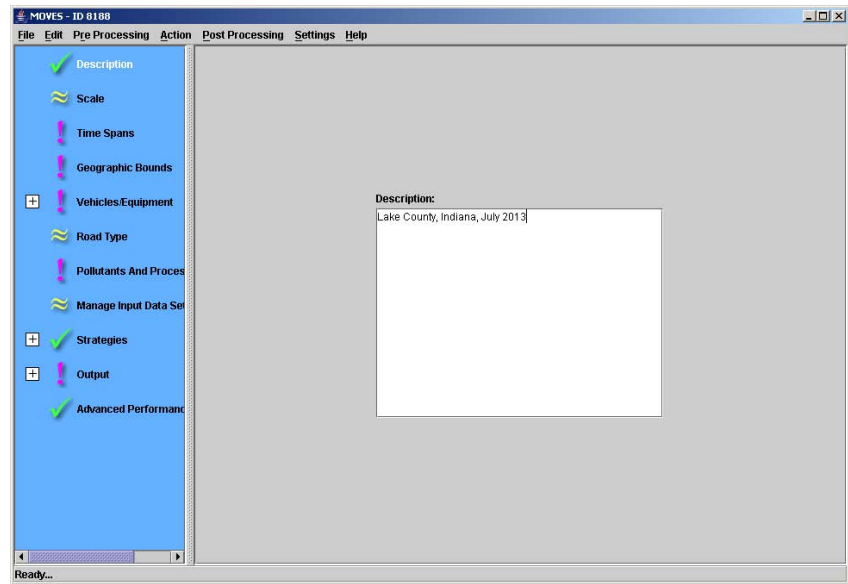
Description

This panel shows where you can describe your analysis.

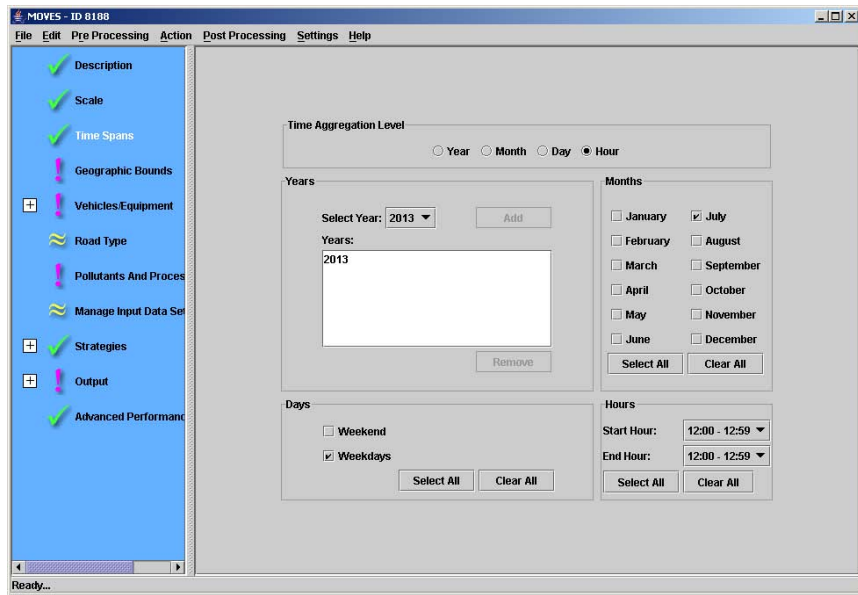A good description will help you keep track of your results.

County Scale

This panel is used to select the scale of the analysis.

Select County. Select Inventory. (We will discuss the Emission Rates option later.)

Selecting County will require the use of the County Data Manager.

Time Span

This panel is used to select the time period you wish to include in the output.

You may select only one year if you wish to use the County Data Manager.

Geographic Bounds: County

- **Once you have selected the County scale, you may only choose a single county from the list.**
- **Choosing a county selects the available default data stored for that county.**
- **You must first select a calendar year for analysis (previous screen).**
- **You must create or select a database to store the county specific data. (done later)**

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Select a single County
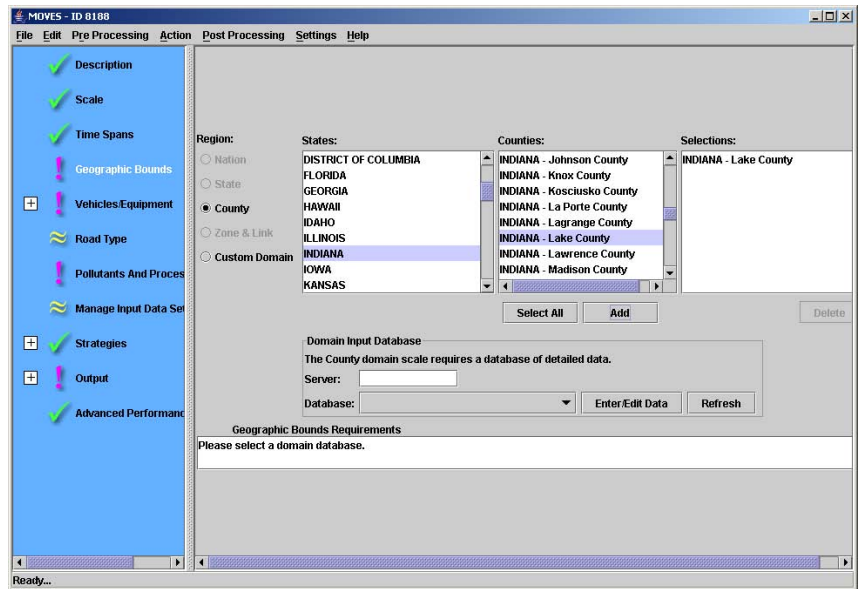
This panel is used to select a county.

You may only select one county if you wish to use the County Data Manager.

Select fuel/vehicle combinations.
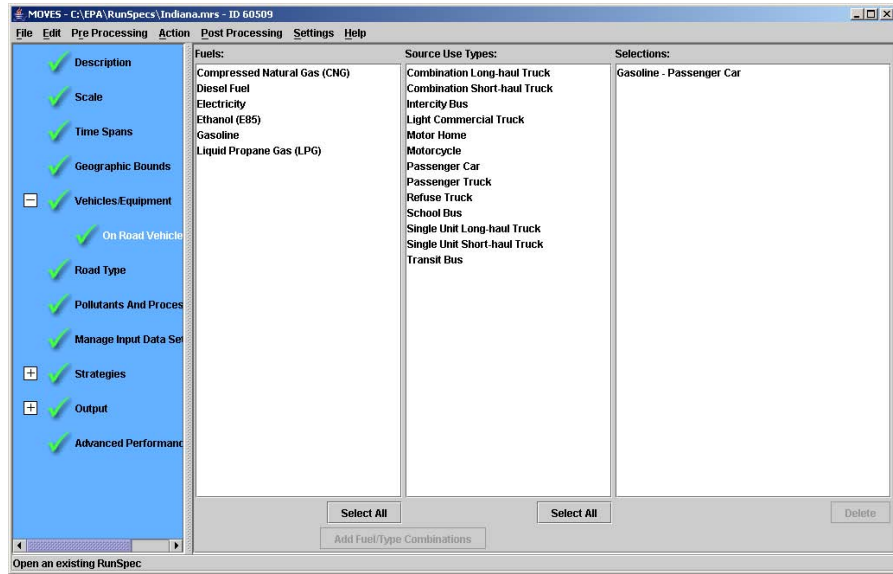
This panel is used to select the fuel types and source use types to be included in the output.

Select road types.
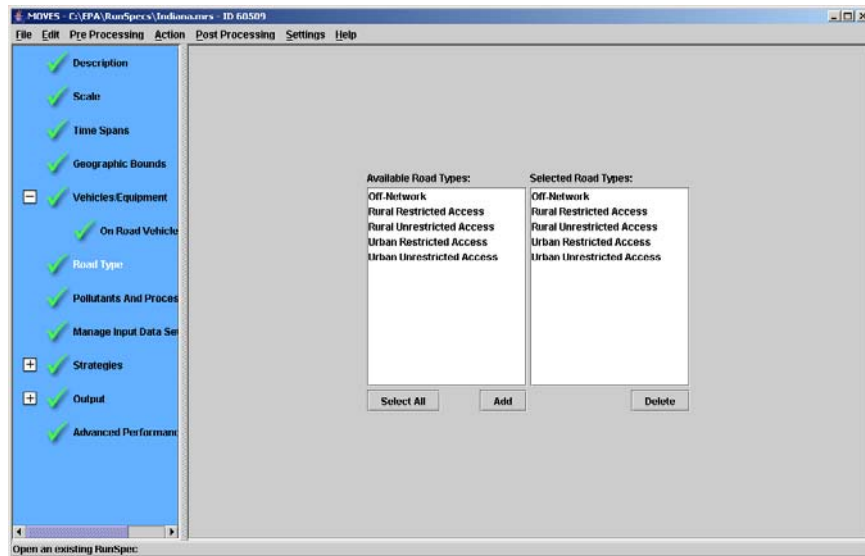
This panel is used to select the road types to be included in the output.

Select pollutant/processes.
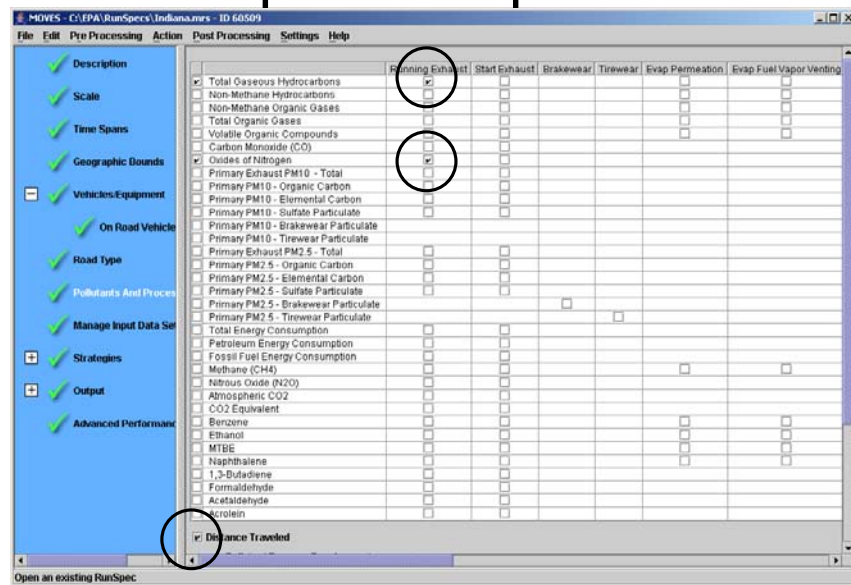
This panel is used to select the pollutants and processes to be included in the output.

The activity (vehicle miles traveled, VMT) can also be selected here. If you do not choose this option, there will not be VMT values in the output database.

Create a new output database.
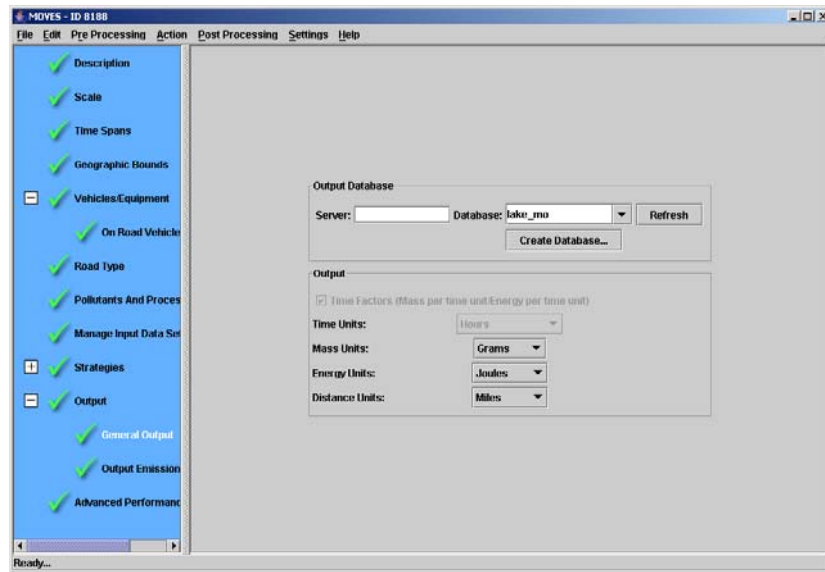
This panel is used to create (or choose) an output database and the time units for the output tables.

This information will be stored in the output database for reference.

Choose output granularity.
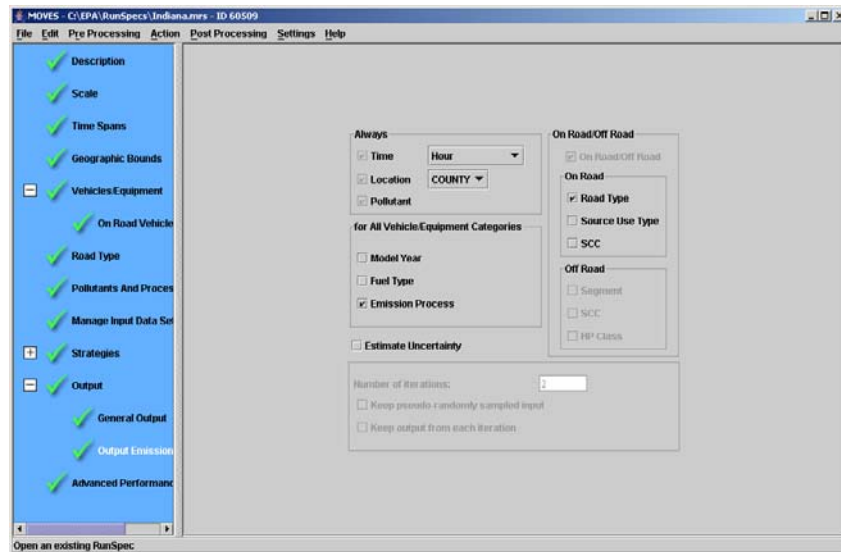
This panel determines the detail contained in the output. The output will be by pollutant (always), hour, county, emission process and road type.

The user could also choose model year, fuel type and source use type or SCC (source classification code).

Completed Run Specification

- Save your run specification.
- Use naming conventions (like .mrs for MOVES run specification)
- Although the run specification is complete, it will not run without entering county specific information.
- Use the County Data Manager to enter data.

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Go to the County Data Manager
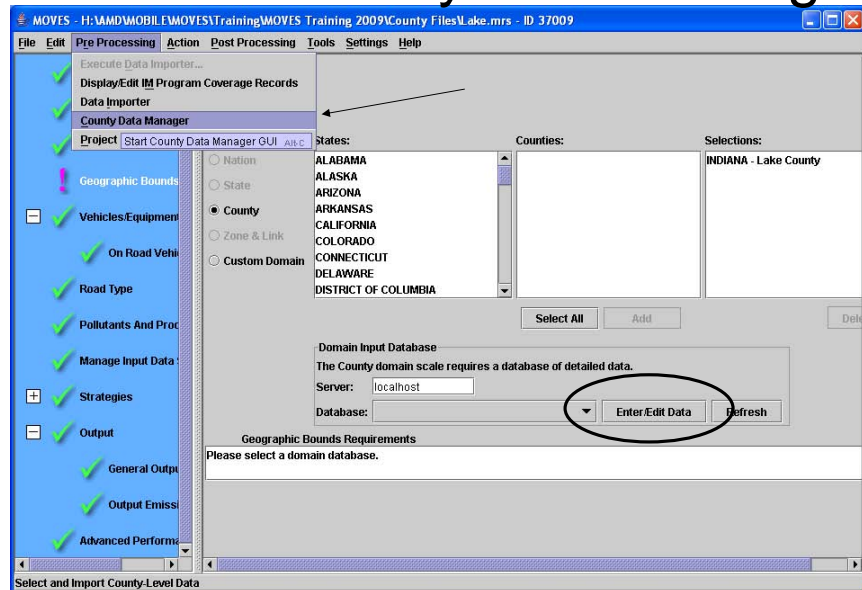
Since we do not have a county database yet, we must create one.

Use the Enter/Edit Data button to go to the County Data Manager.

Create an input database
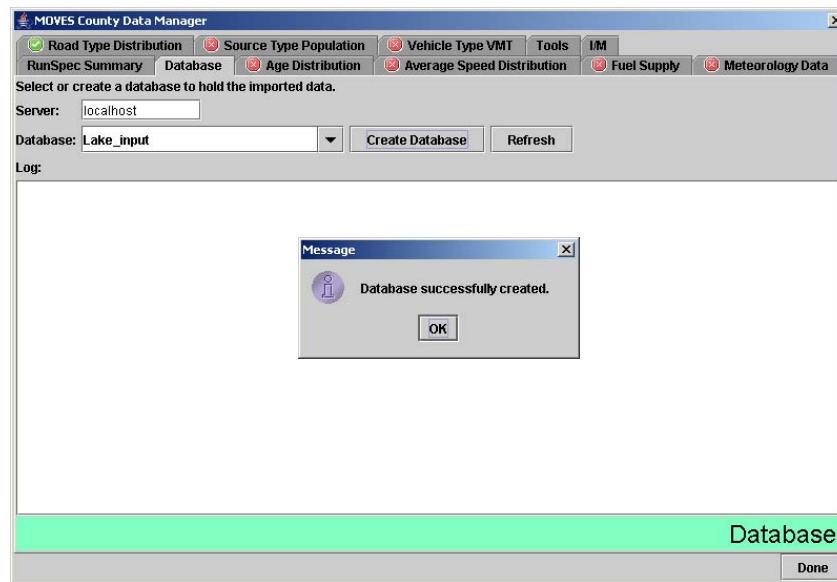
This is the County Data Manager. You can also get here from the pull-down Pre-Processing menu.

Enter the name you wish for your database (no spaces or special characters) and push the Create Database button.

When you create a database, you will get this pop-up message to indicate that the database was successfully created.

These empty tables were created.
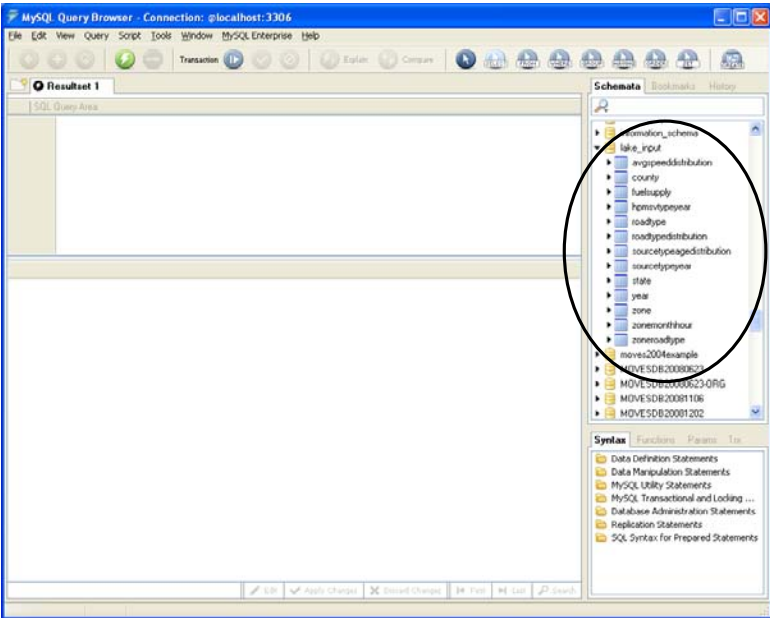
This slide shows the MySQL Query Browser showing the tables contained in the county database we just created.

County Data Manager

- Export templates (or default data).
- Enter/edit the data in MS Excel files.
- Import the data to your input database.

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Export Template

- **Most parameters can be entered using a spreadsheet.**
- **The run specification will determine the scope of the template that is presented.**
- **Use the XLS extension to get a spreadsheet format.**
- **Extra tabs will help you decode the categorical values.**

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Export Template
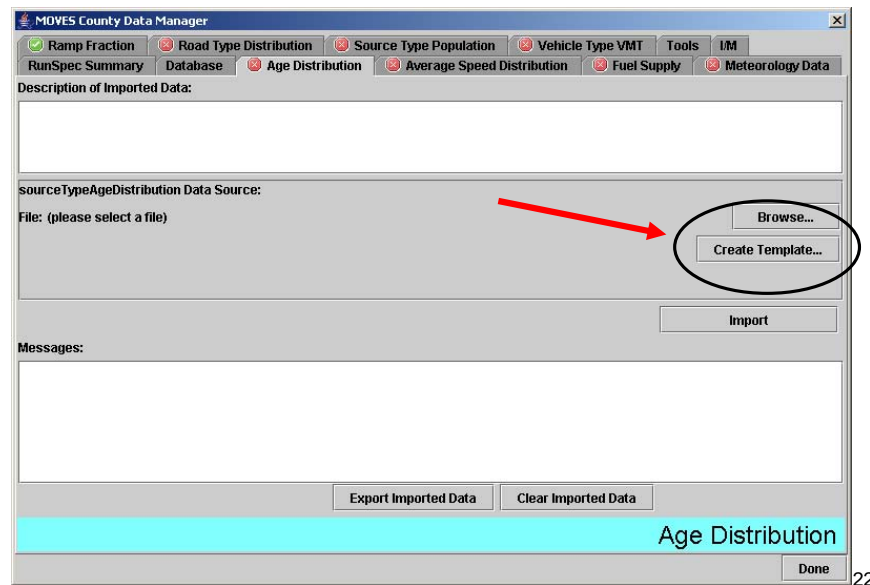
This panel shows where on the panel the button is to initiate the creation of a template for this information (age distribution).

Notice that all of the ageFraction cells are empty. This is where the data will go.

Notice that there are tabs which explain the AgeCategory and SourceUseType fields.

Export Default Data
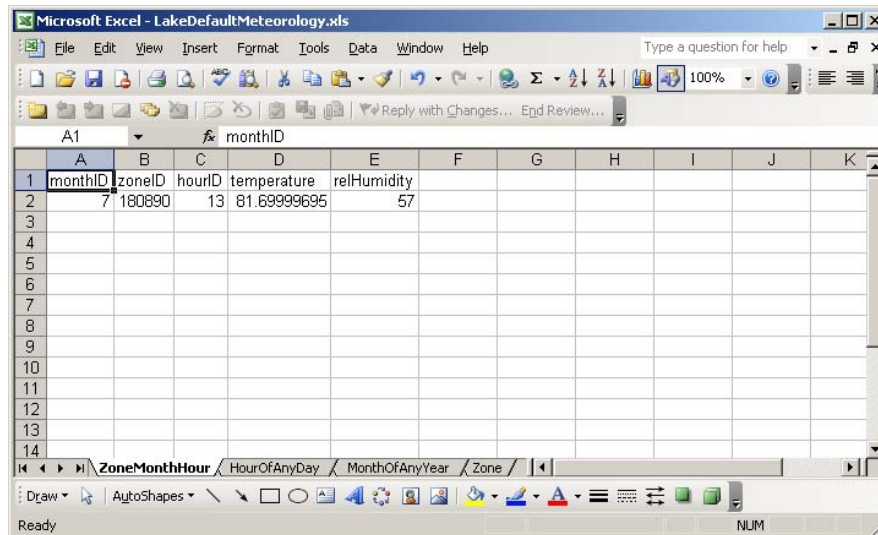
- **Only some parameters have default data available.**
  - Average Speed Distribution
  - Fuel Supply
  - Meteorology Data
- **The run specification will determine the amount of default data that is presented.**
- **Use the XLS extension to get a spreadsheet.**
- **Extra tabs will help you decode the categorical values.**
- **In most cases, users should not use default data.**

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Export Default Data
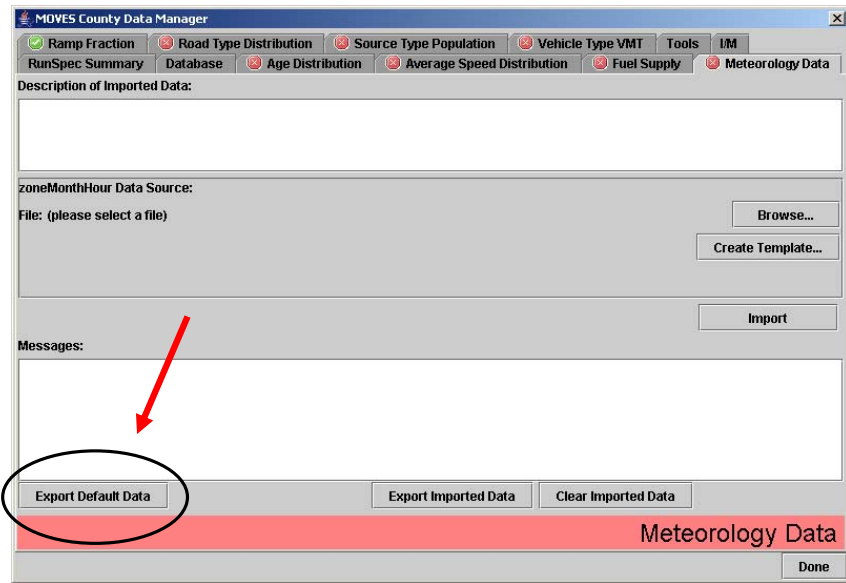
This panel shows where on the panel the button is to export default data from the MOVES database. Not all import panels can access default data.

Note that only the location, month and hour selected in the run specification is shown.

Note that there are tabs that decode the hour of the day, month of the year and zone.

Importing Data

- **Data can be read directly from the MS Excel worksheet tabs.**
- **Browse to find and select the MS Excel file.**
- **Be sure to add a description of the data you are about to import.**
- **Select the appropriate tab (usually the first one).**
- **Click on the Import button after you have selected the spreadsheet file and tab location.**
- **You should get an "Import Complete" message.**

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Description data will help you keep track of what you have already put into the database you are creating.

Import Meteorology Data
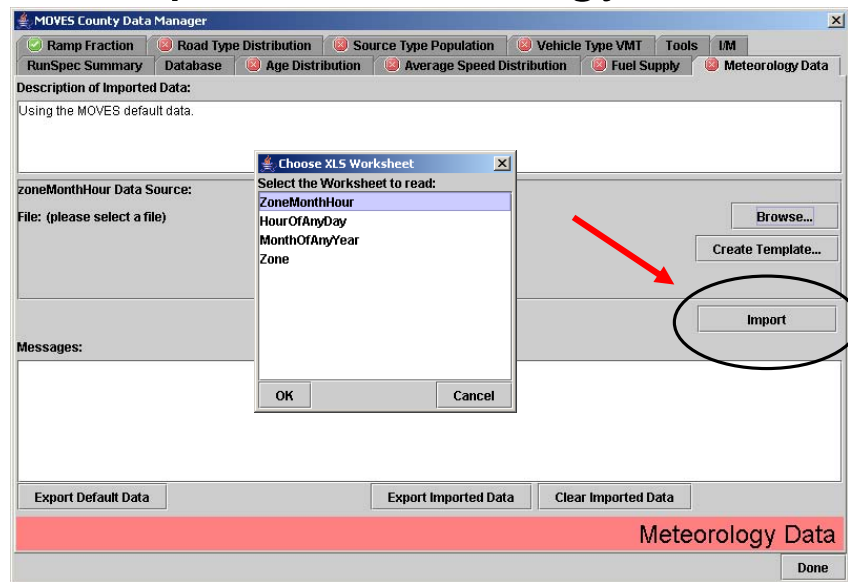
Select the ZoneMonthHour tab (with the temperature and humidity data). In the template and export spreadsheets the first tab in the workbook usually contains the information you will want to import.

Data Successfully Imported

- Check to see if you get an "Import Complete" message.
- When the import is successfully completed the red "X" will change to a green check on the County Data Manager tab.
- The description you entered will appear in the log, which can be viewed on the database tab.

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Import Success
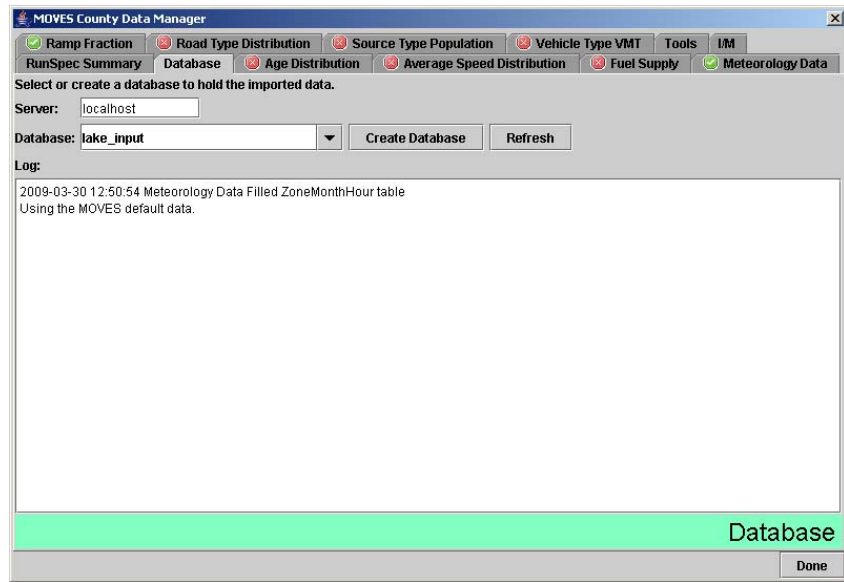
This panel shows where the comments we wrote on the import panel are displayed. These comments are stored in the database.

Repeat for all county-specific inputs

- **Age distribution.**
- **Vehicle population by vehicle type.**
- **Annual VMT by vehicle type.**
- **Fuel specifications.**
- **Hourly temperature and humidity.**
- **Distribution of VMT by road type.**
- **Distribution of speed by road type.**
- **Ramp fraction (optional).**
- **Inspection/maintenance program description.**

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Default Ramp Fraction is 8% of VMT from Road Types 2 and 4 are on Ramps.

Use the Training_Lake Inputs:

- **Use the Training_Lake inputs for:**
  - Age distribution.
  - Vehicle population by vehicle type.
  - Annual VMT by vehicle type.
  - Hourly temperature and humidity.
  - Distribution of VMT by road type.
  - Distribution of speed by road type.
- **Export/Import Defaults for Fuel Supply.**
- **Skip the I/M Editor – This will be discussed later.**
- **Skip the optional Ramp fraction.**

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Since we have a set of input files already populated, lets use them.

The Example City fuels will not work for Lake County, IN, without editing.

Fully Populated County Data
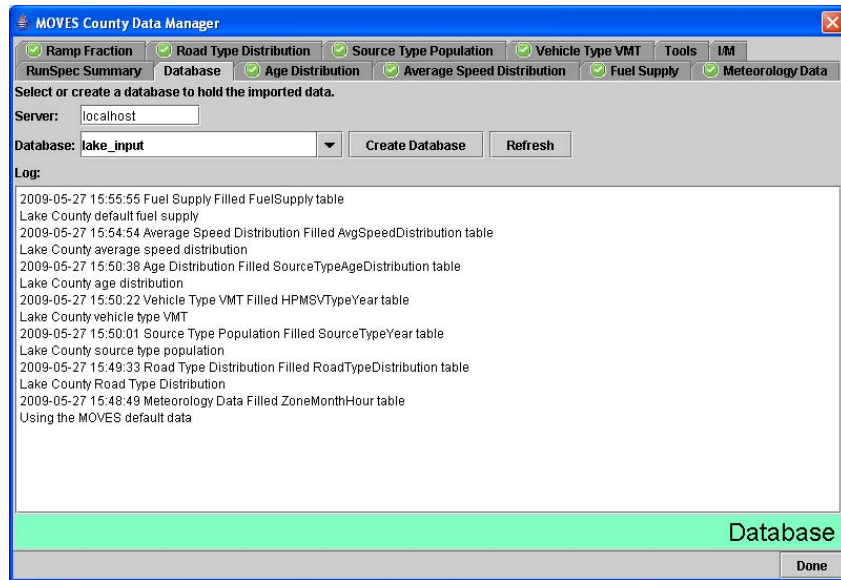
This panel displays the times when changes were made to each table in our county database along with any comments we have provided.

Other Features

- **Database**
  - Used to select the database to be edited.
  - Displays the log of changes.
- **RunSpec Summary**
  - Contains a summary of the run specification.
  - Helpful as a reference while creating inputs.
- **Tools**
  - Generate importer XML file.
  - Used for batch operation.
  - Can be used to automate importing your data.

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This panel displays the run specification information that governs the content of the county database we have created.

Back to Geographic Bounds

- **Click Done to close the County Data Manager.**
- **Click Refresh to update the list of databases.**
- **Select your database from the list.**
- **Continue to build your run specification.**

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Select your new database.
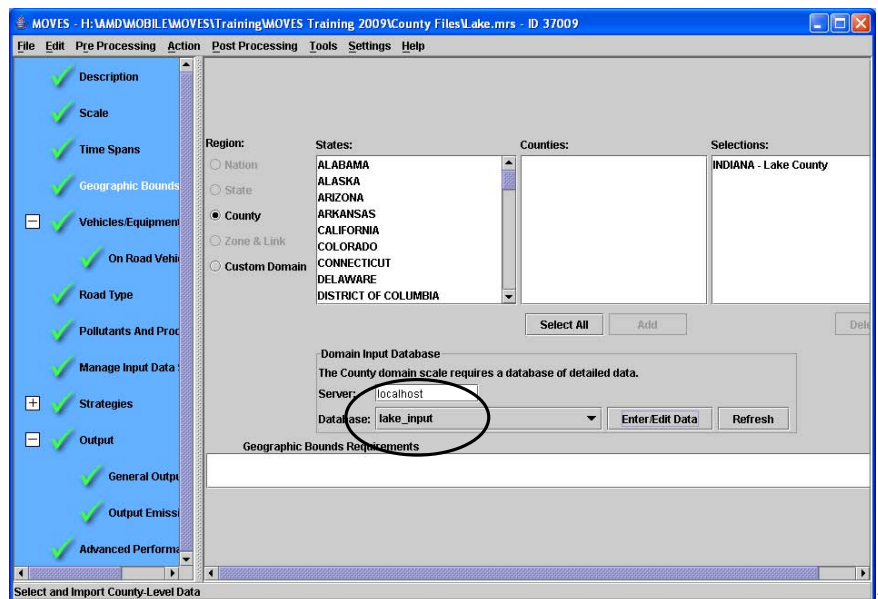
This panel shows where on the panel you select the county database you wish to use for this run.

If you do not have a county database yet, you select Enter/Edit Data to go to the County Data Manager.

MOBILE6 to MOVES Converters

Developing inputs:
Comparison to MOBILE6

- **MOBILE6: VMT fractions, road type distribution (fraction of total VMT), ramp fraction, speed distribution, age, fuels, met data**
  - Total VMT (or VMT by road type, time of day, etc) applied outside model
  - RVP, temperature & year only inputs required for model to run
- **MOVES: Sourcetypepopulation, total VMT by vehicle type, road type distribution (fraction of total VMT), ramp fraction, speed distribution, age, fuels, met data**

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Developing inputs: Key differences from MOBILE6

- **MOVES needs the number of vehicles (population) by vehicle type.**
  - Not typically available in SIPs.
  - Will need guidance.
- **MOVES needs vehicle miles traveled by vehicle type (not MOBILE6 VMT fractions).**
  - VMT data exists in SIPs or use HPMS data.
  - Need to map local data to new MOVES vehicle categories.
  - Will need guidance.

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Convertors

- **Convertors are spreadsheets that convert MOBILE6 external input file data into MOVES compatible data.**
- **Converted inputs can be read directly by the County Data Manager from the spreadsheets.**
- **You do not need convertors if you can enter the data directly.**

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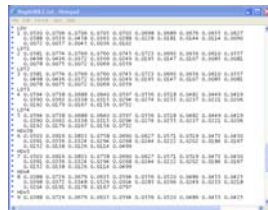
Available Converters

- **Speed**
- **Registration Distribution**
- **Temperature**
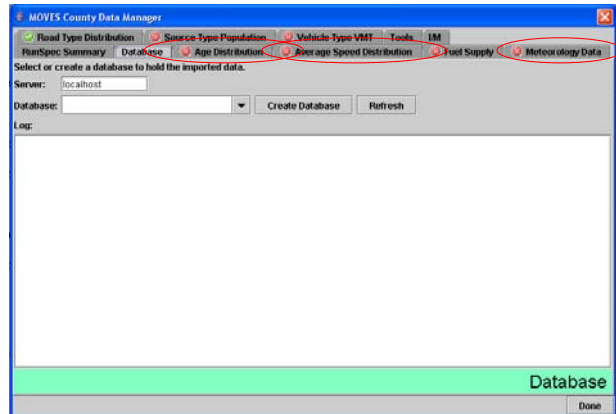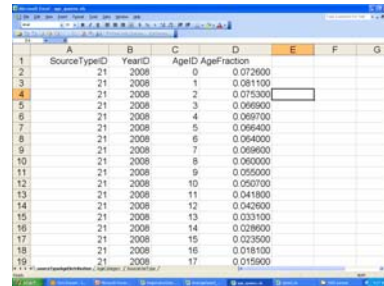
Age Distribution

- Uses MOBILE6 registration distribution files
- Converts to MOVES Age Distribution input file

Uses standard 10-10-5 MOBILE6 age distribution tables

MOBILE6 input tab.

Input tab

Results for MOVES.

Output tab with containing data for MOVES County Data Manager AgeDistribution input file

Speed Converters

- **Available for NMIM and MOBILE6 speed tables**
  - NMIM converter uses 18 speed files: 9 FW, 9 AR
  - MOBILE6 converter uses 2 speed files: Urban, Rural
- **Converts into MOVES compatible speed input file**

MOBILE6 input for urban.

Urban input tab

Results for MOVES.

Output tab for MOVES County Data Manager AverageSpeedDistribution input file. The converter only gives age distribution for weekends (hourdayID=2). Weekdays can be added by copying and pasting the output distribution below the weekend distribution and changing the hourdayID to end in 5 instead of 2 (eg. 75 rather than 72).

Temperature Converter

- **Some M6 users input MAX and MIN daily temperature**
  - MOVES requires 24 values
- **Fills in all 24 hours based on diurnal temperature curve**
- **MOBILE6 day begins at 6am**
- **MOVES day begins at 12am**

	A	B	C	D	E	F	G	H
1	monthID	zoneID	hourID	temperature	relHumidity			
2	7	360810	1	79.6	71.1			
3	7	360810	2	78.9	68.6			
4	7	360810	3	77.9	69.2			
5	7	360810	4	77.3	72.3			
6	7	360810	5	76.6	73.9			
7	7	360810	6	75.9	75			
8	7	360810	7	77.3	71.4			
9	7	360810	8	79.7	67.4			
10	7	360810	9	82.2	60.5			
11	7	360810	10	85.2	56.3			
12	7	360810	11	88.8	48.7			
13	7	360810	12	91.3	46.4			
14	7	360810	13	92.6	45			
15	7	360810	14	93.6	42			
16	7	360810	15	93.2	43.3			
17	7	360810	16	91.6	45.7			
18	7	360810	17	90.1	50			
19	7	360810	18	89	50.9			

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Converts Min/Max to hourly.

Cannot be used for humidity. Currently being developed

Miscellaneous

- **Currently MOVES requires <u>annual</u> VMT - MOVES disaggregates to time period (hour, day).**
- **Watch your units (e.g., use of "tons" might result in 0 emissions for low-emission pollutants and short time periods, due to rounding)**
- **CDM and Project Level won't work with databases that contain data for multiple years.**
- **EPA is developing alternative approaches and guidance to generate data for:**
  - Age Distribution
  - Source Type Population

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