

2016 Nonroad Collaborative Work Group

Kick-off Call

8 February 2018

Sarah Roberts (EPA Office of Transportation and Air Quality) and
Joseph Jakuta (Ozone Transport Commission)

Agenda

1. Welcome and Introductions
2. Overview of Inventory Collaborative
 - a) Organizational Structure
 - b) Platform Schedule
 - c) Resources
3. Work Group Tasks
4. Planned Updates to EPA's NONROAD Model
5. Next Steps

Welcome and Introductions

Co-leads: Sarah Roberts (EPA) and Joseph Jakuta (OTC)

Members:

Alexandra Catena – DC	Chris Rochester – NY	Peter Verschoor – UT
Alison Eyth – EPA OAQPS	Collin Smythe – VT	Rebecca Simpson – CO
Andy Bollman – NC	Dale Wells – CO	Sonya Lewis-Cheatham – VA
Brian Sullins – AL	Gil Grodzinsky – GA	Susanne Cotty – Pima Co. (AZ)
Brian Timin – EPA OAQPS	James Smith – TN	Sylvia Vanderspek – CA
Brian Trowbridge – PA	Jim Koroniades – NJ	Tim Wallace – MD
Chris Bovee – WI	Marc Bennett – MA	Vanessa Crandell-Beck – AK
Chris Kite – TX	Mike Maleski – OH	

Overview of Inventory Collaborative

- Regional modeling organizations and states asked to be more involved in the development of the next modeling platform
 - States need a new platform to develop SIPs for the 2015 National Ambient Air Quality Standards for Ozone, as well as for Regional Haze
 - States often have better access to local information
 - States and regions would like to have more input into the methods used, particularly methods used to develop projections of emissions to future years
- For the first time, EPA is supporting a collaborative process to develop a new emissions modeling platform for 2016

Inventory Collaborative: Organizational Structure

- **Overall co-leads:** Zac Adelman (Lake Michigan Air Directors Consortium) and Alison Eyth (EPA Office of Air Quality Planning and Standards)
 - Coordinate communication, develop processes to be followed, assist in resolving issues, specify documentation requirements, facilitate distribution of data to stakeholders
- **Coordination Committee:** regional, state, and EPA leaders that help define the process, run work groups, and help resolve issues
- **Sector Work Groups:** co-led by one EPA representative and one regional/state representative, with participants from local/state/regional agencies
 - Work groups to focus on preparing emissions estimates for 2016 and future years (e.g., 2023, 2028), plus improve modeling of the emissions sectors

Inventory Collaborative: 2016 Platform Schedule

- 2014NElv2 is starting point: <ftp://newftp.epa.gov/air/emismod/2014/v2/2014fd/emissions/>
 - Nonroad file is large (~2.9 GB); disaggregate by state or by equipment sector?
- The 2016 platform will be developed over three versions:
 - 1. Alpha:** preliminary version with 2016 emissions for some sectors and 2014 emissions for others (**EPA to release this month**)
 - Nonroad mobile source emissions based on inputs for 2014NElv2 will be made available
 - 1. Beta:** improved version of alpha version and preliminary projections to 2023 and 2028 (**due summer-fall 2018**)
 - 2. 2016v1:** fully updated 2016 emissions and projected emissions for 2023 and 2028 (**due winter 2019**)

Inventory Collaborative: Resources

- The **Inventory Collaborative Google Drive** will be used to store data files, inventories, and to share documents
 - Each work group has a directory
 - https://drive.google.com/drive/folders/1QpNUcbQxkuO_wLZLrYR83QJF5PDtBubh
- The **Inventory Collaborative Wiki** will be used to document work group progress (e.g., meeting notes, key issues and action items, summary plots or figures)
 - Inventory Collaborative Wiki: <http://vibe.cira.colostate.edu/wiki/wiki/9169>
 - Nonroad Work Group Wiki: <http://vibe.cira.colostate.edu/wiki/wiki/9179>

Nonroad Work Group Tasks

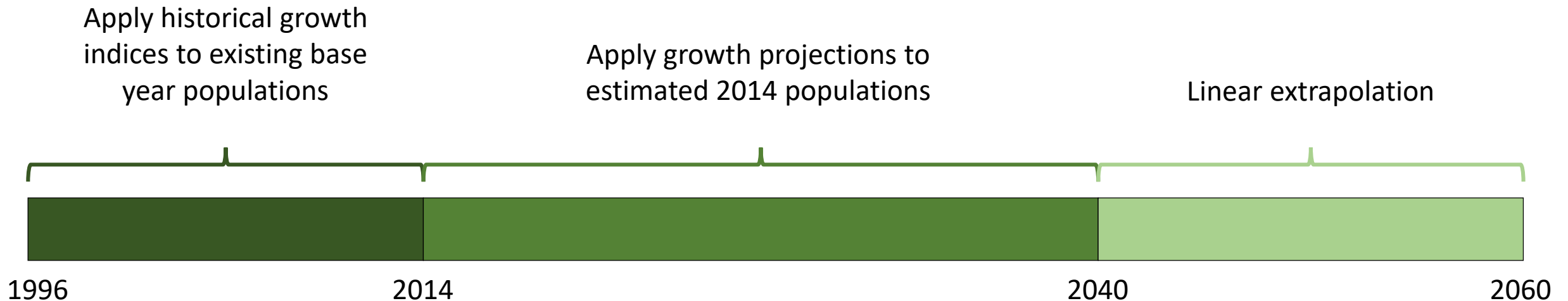
- Review forthcoming 2016 nonroad inventory
 - For information about the inputs used for this modeling, please refer to 2014 NEI documentation (v2 documentation to be posted in coming weeks): <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-documentation>
- Identify data sets and sources that could be used to refine nonroad inputs and provide sanity checks (for all nonroad equipment sectors or targeted sectors, e.g., Construction, Recreational Marine, Agriculture)
- Review information on EPA's proposed updates to NONROAD engine population growth rates (following slides)
 - MOVES Review Work Group presentation from September 2017: <https://www.epa.gov/moves/september-2017-moves-model-review-work-group-meeting-materials>
 - Updated MOVES Technical Report (when available)

Planned Updates to EPA's NONROAD Model

- NONROAD uses annual growth rates to estimate engine populations beyond the model base years (1996-2000)
 - The model specifies national average growth rates by equipment category and fuel type
 - A simple linear regression of historical (1989-1996) engine populations is used to estimate engine populations out to 2050
 - General consensus that basing long-term growth estimates on seven years of population data limits the model's ability to accurately portray engine/emissions growth at the regional or state levels
- In lieu of updating MOVES-NONROAD engine populations for the next MOVES release, EPA intends to refine the growth indices that are used to estimate engine populations beyond the base year populations

NONROAD Model Updates: Population Growth

- Projections of energy use, economic activity, human population, and equipment activity are matched with corresponding historical data to construct annual, state-level growth indices for each equipment category
- Growth indices function as annual multipliers that are applied to base year engine populations in order to estimate the engine population for a given year



NONROAD Model Updates: Population Growth

- Projections serving as surrogates for constructing annual growth indices from 2014 to 2040:

- | | |
|---|---|
| <ul style="list-style-type: none">• Energy Information Administration (energy consumption in nonroad sectors)• Moody's Analytics (sector and economy-wide GDP) | <ul style="list-style-type: none">• FAA Terminal Area Forecasts Model (aviation operations)• U.S. Census Bureau (human population) |
|---|---|

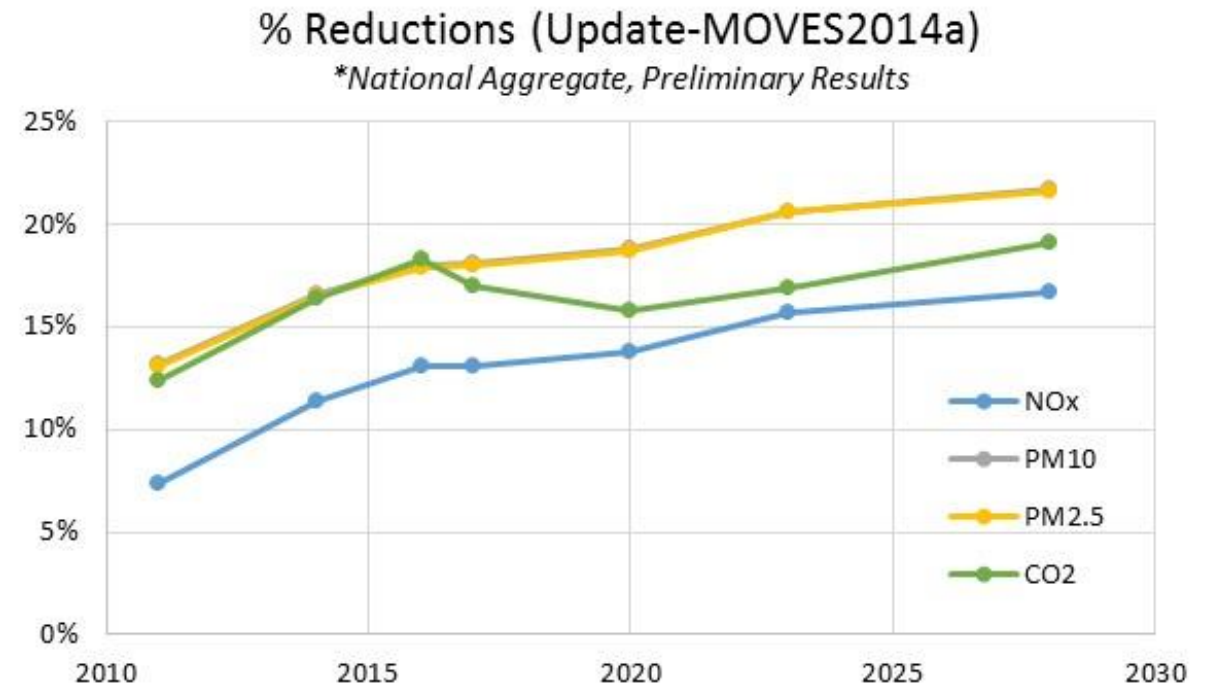
- Historical datasets serving as surrogates for constructing growth indices from the model base years to 2014:

- | | |
|--|--|
| <ul style="list-style-type: none">• Energy Information Administration (Fuel Oil and Kerosene Sales)• Bureau of Economic Analysis (sectors-wide GDP)• ORNL Transportation Energy Data Book (rail revenue ton miles) | <ul style="list-style-type: none">• National Marine Manufacturers Association (boat registrations)• U.S. Census Bureau (human population)• FAA Terminal Area Forecasts Model (aviation operations) |
|--|--|

- Publicly-available data sources are preferred

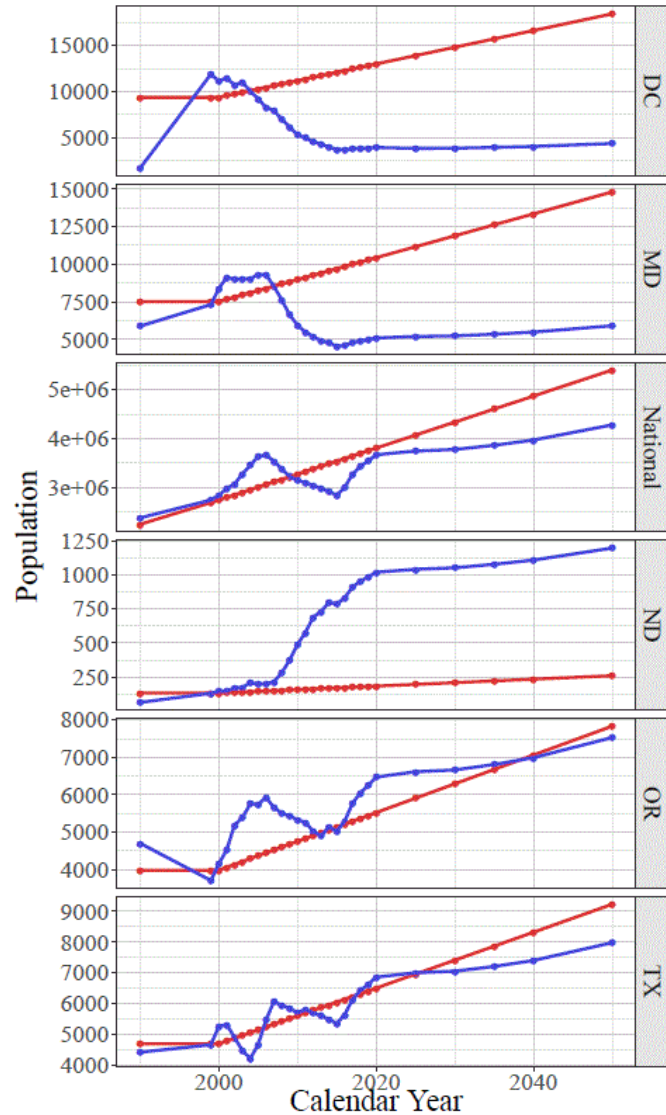
NONROAD Model Updates: Example Results

- Annual state-level growth indices for each equipment sector are applied to every equipment type within the sector, independent of fuel type
- Update required modifications to the model source code, to accommodate the ~55,000 new indices (current model contains 564 nrgrowthindex table values)
- New growth indices result in a decline in engine populations in almost all equipment sectors, particularly in future years
- Growth update results in lower emissions inventories (results vary by region and equipment type)

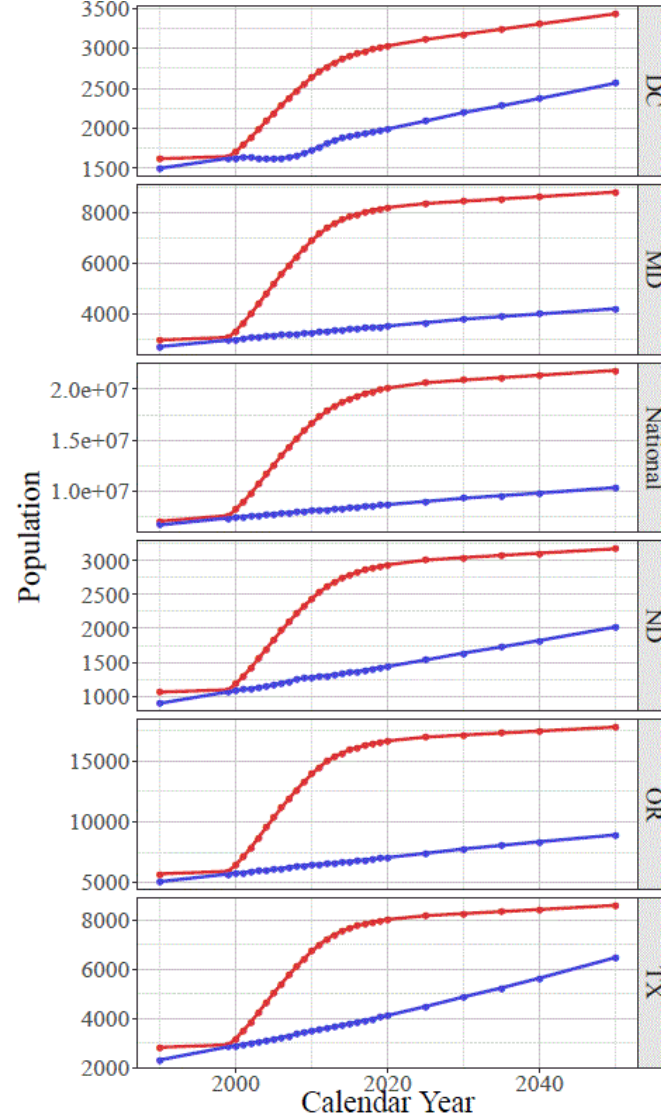


NONROAD Model Updates: Example Results

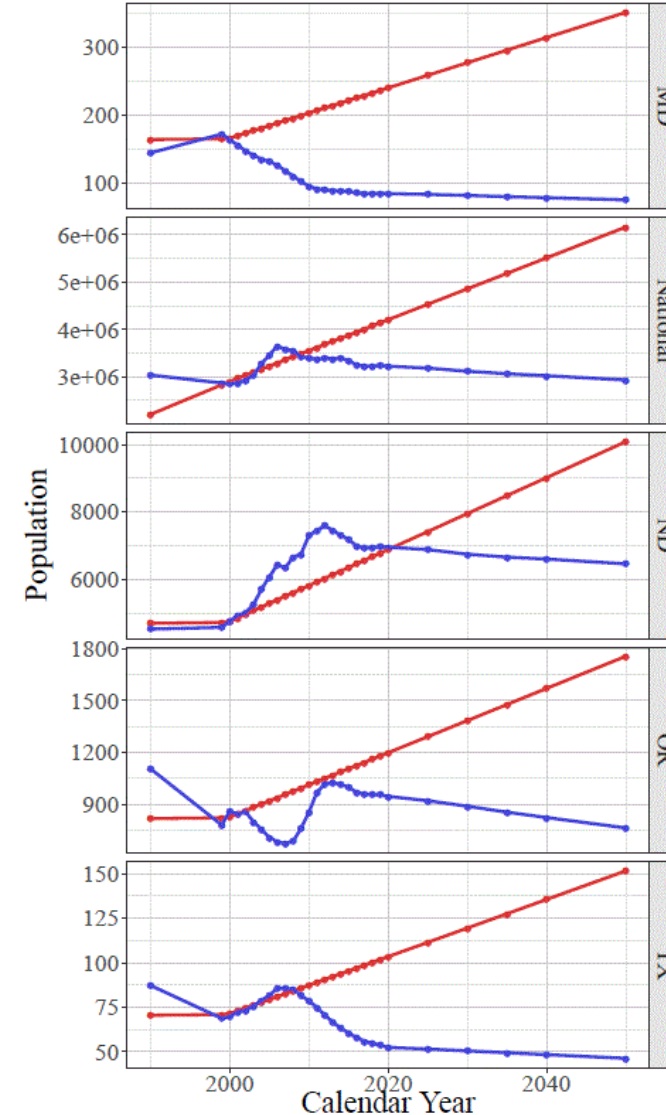
Construction



Recreational



Agriculture



MOVES2014a
Update

Runspects included:

Geographic Scope:

MD: Prince George's
ND: Mountrail
OR: Clackamas
TX: Galveston
D.C.
National

Equipment:

All SCCs

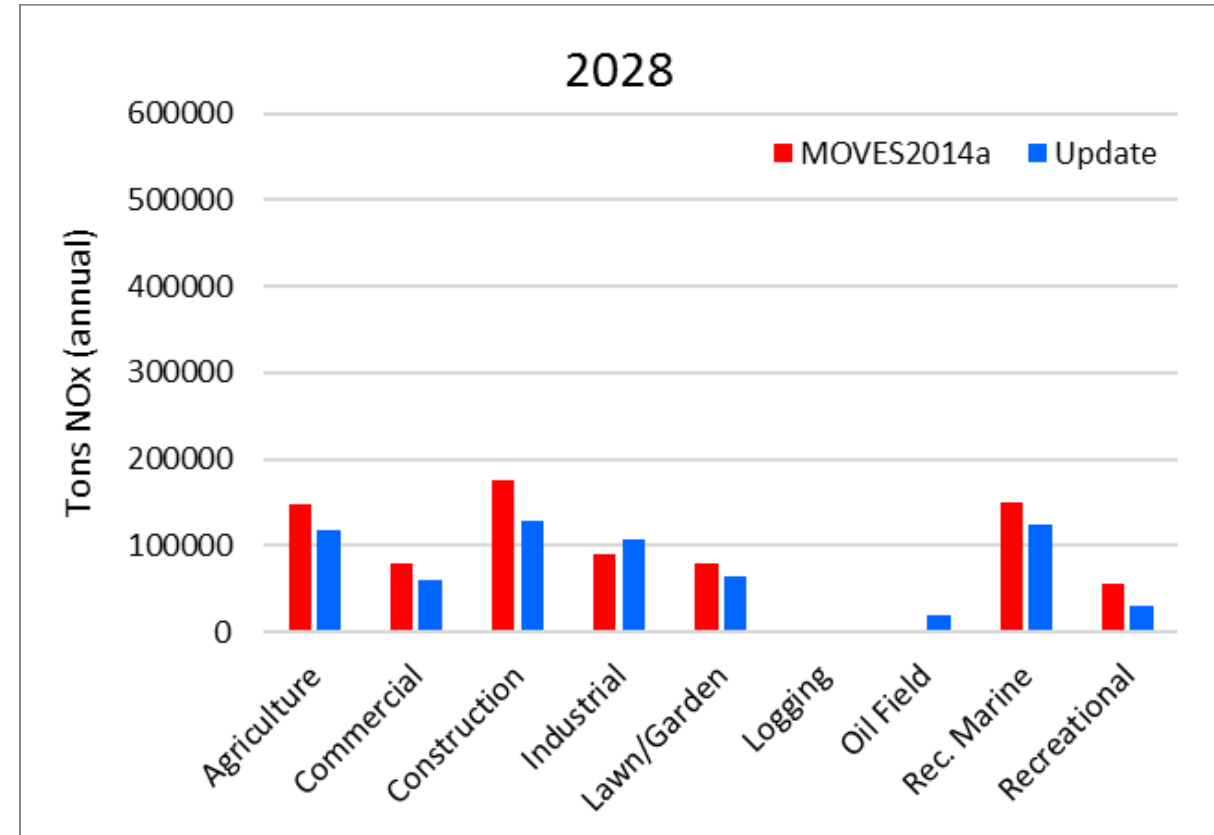
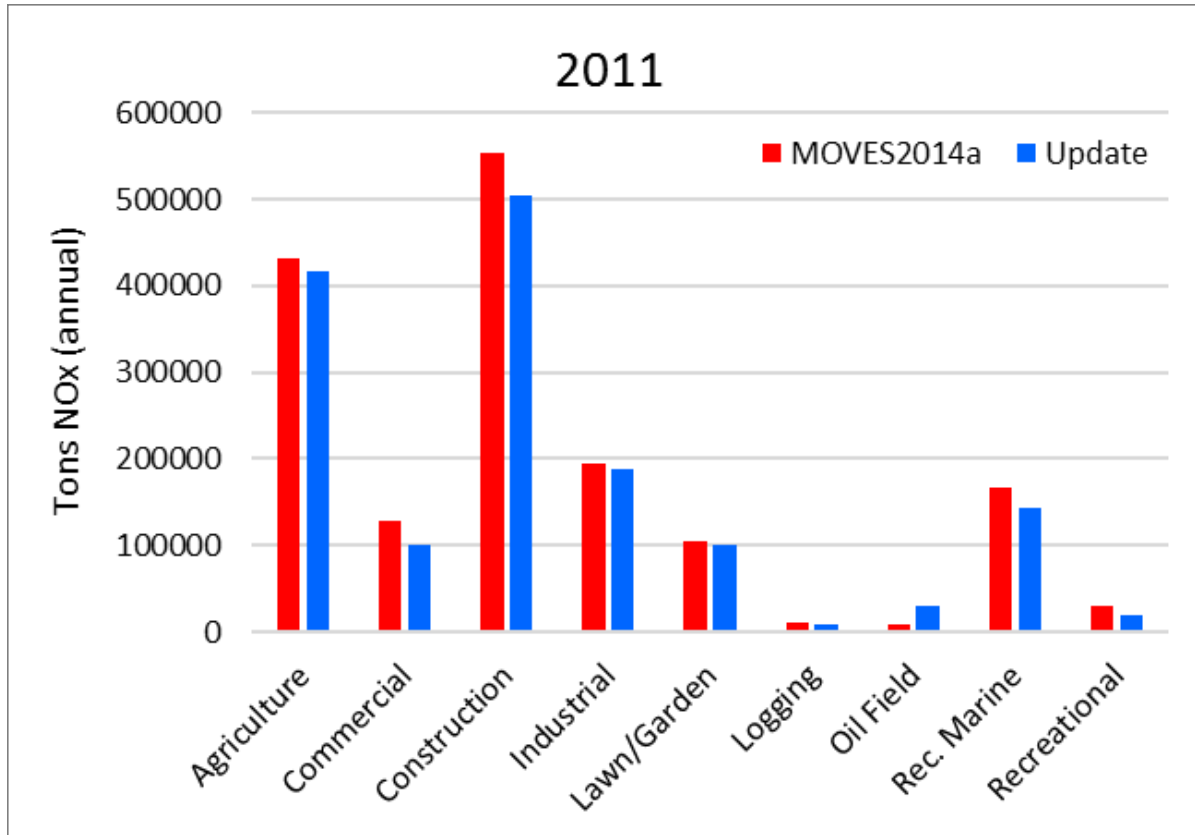
Fuel Types:

All

Days:

Weekend & weekday

NONROAD Model Updates: Example Results (NOx)



- Relative to MOVES2014a, the growth index update increases NOx emissions from the Oil Field and Industrial equipment categories
- Starting in 2008, aggregated nonroad NOx emissions decrease by up to 17% relative to MOVES2014a

NONROAD Model Updates: Next Steps

- MOVES Technical Report describing the new growth indices just completed peer review
 - Reviewers generally supportive of EPA's approach
 - Draft report, including peer review materials, will be posted on EPA's Science Inventory page (search 'MOVES201X' at <https://cfpub.epa.gov/si/>)
- Throughout spring 2018, the updated growth indices will be finalized and undergo extensive unit and integrated testing
- EPA looking at options for incorporating updated growth indices in 2016 platform work, e.g.:
 - Adjustment factors
 - New model code/database

Nonroad Work Group Next Steps

- Confirm access to work group's Google drive and wiki pages; report any issues to Sarah (Roberts.Sarah@epa.gov)
- Develop nonroad work group charge (Sarah and Joseph)
- Review forthcoming 2016 nonroad inventory
- Identify data sets and sources that could be used to refine nonroad inputs and provide sanity checks (for all nonroad equipment sectors or targeted sectors)
- Review information on EPA's proposed updates to NONROAD engine population growth rates (following slides)
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