

Status Report: Ozone Precursors Emissions Inventory Study and Contingency Plan

C. David Cooper
University of Central Florida
*Study commissioned by
METROPLAN ORLANDO
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Air quality projects sponsored by METROPLAN ORLANDO

- Contingency Plan
 - Quantify emissions of VOCs & NO_x from mobile sources (on-road & non-road)
 - Pro-active 5-year project (2006-2011) to recommend cost-effective ways to reduce those emissions
- Emissions Inventory
 - Quantify emissions from all sources in the Orlando Urban Area (OUA)
 - 1-yr project (2009-10) to quantify all sources



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Background on Ozone (O_3)

- O_3 comes from VOCs + NO_x + Sunlight
 - VOCs and NO_x come from many sources
 - on-road and non-road vehicles are biggest
- O_3 standards are getting tighter
 - 2 yrs ago 84 ppb; now 75 ppb
 - next year maybe 65 ppb?
- Central Florida O_3
 - There are 4 monitors in our 3 counties
 - April, May, June typically our worst months

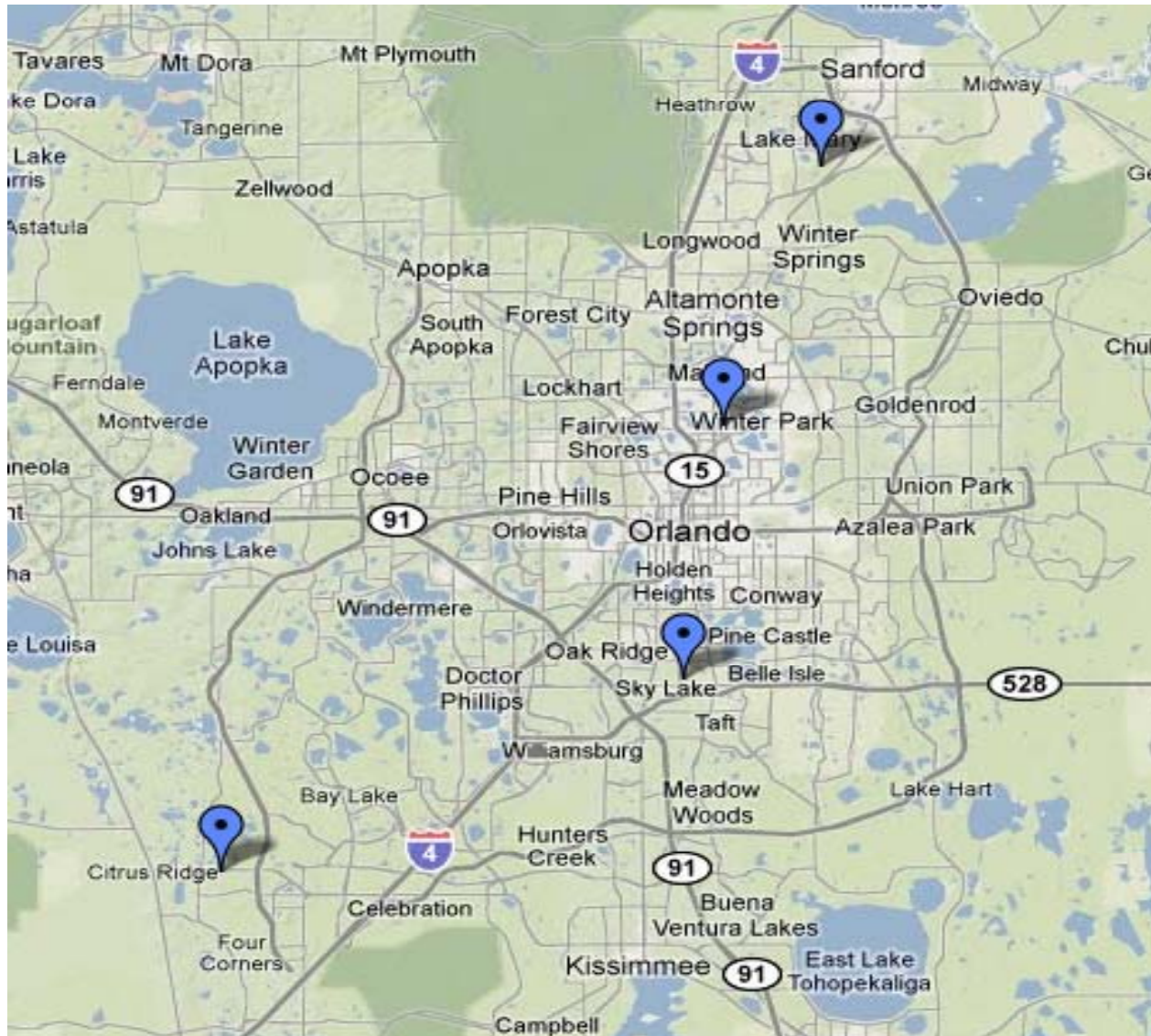


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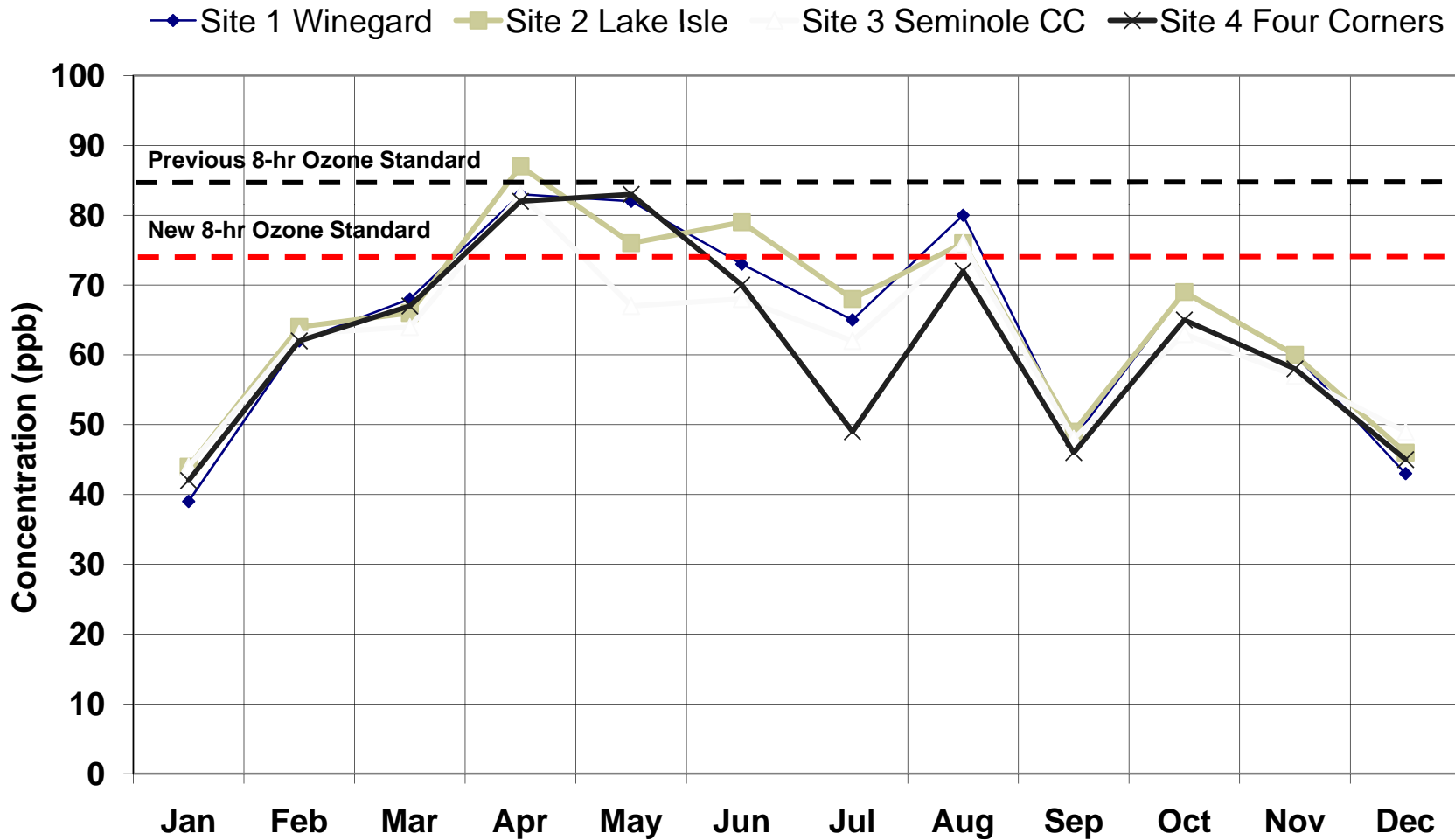
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The 4 Ozone Monitors in Orange, Seminole and Osceola

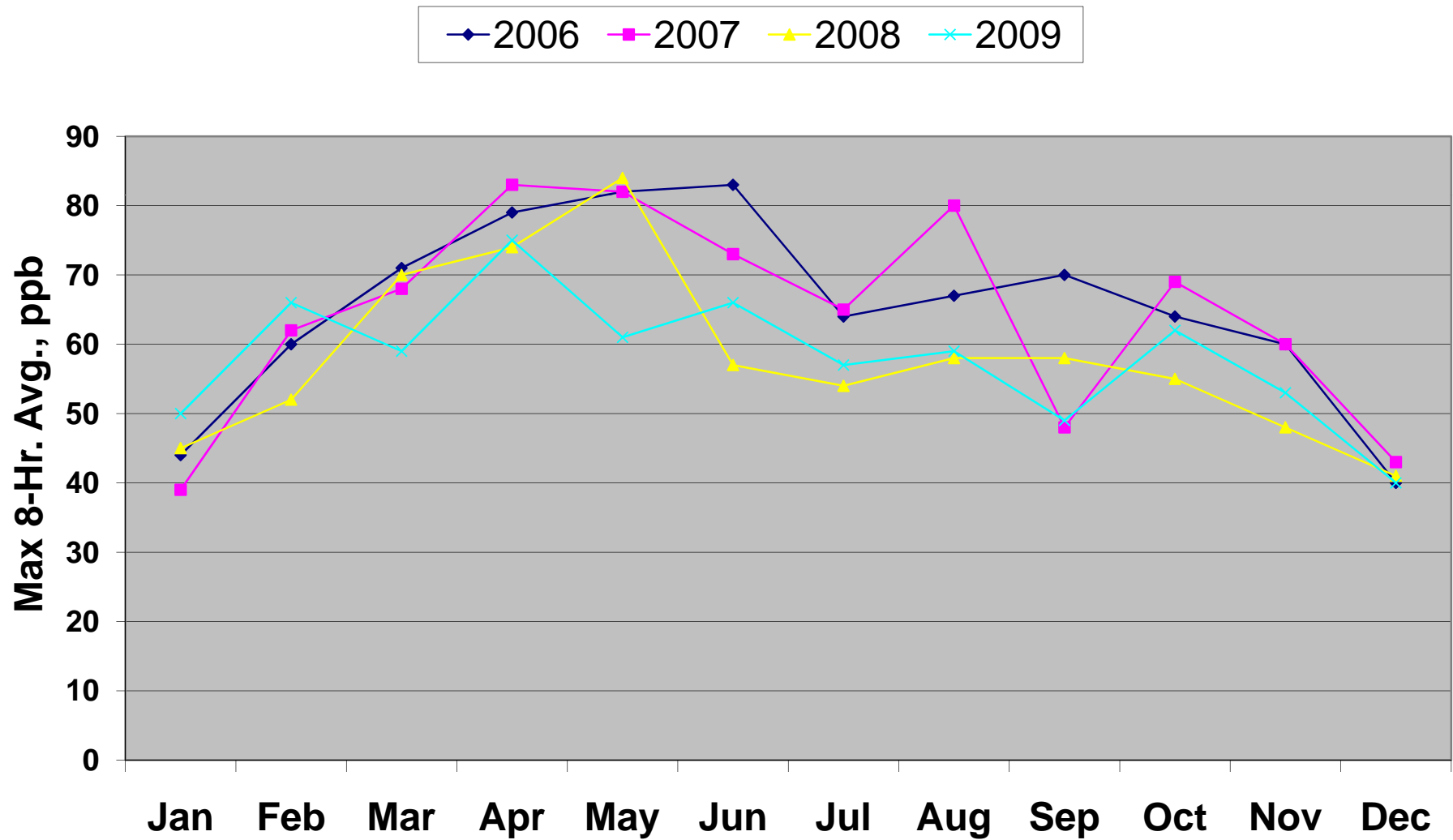


Significance of Seasonality for Ozone



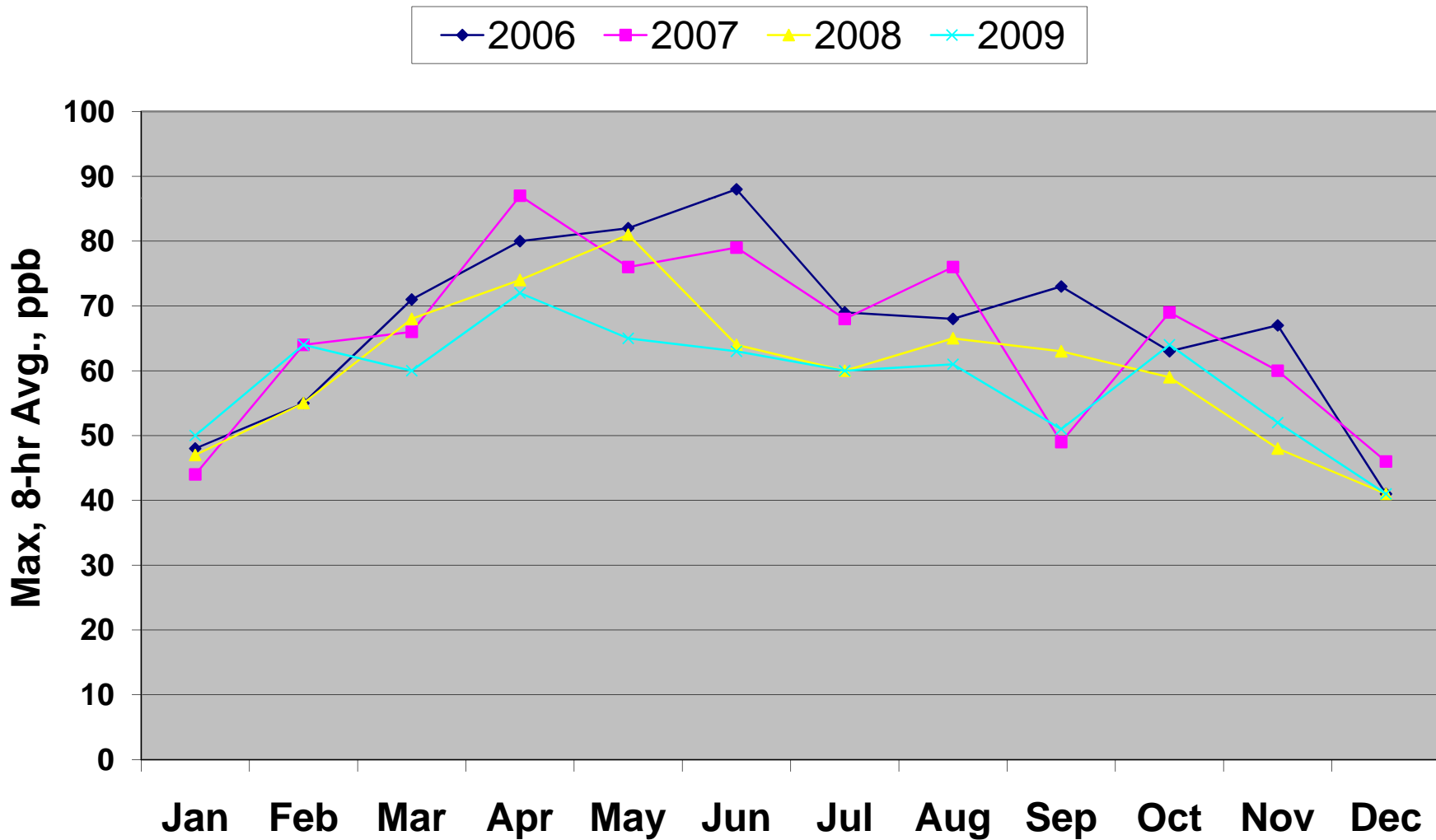
Ozone Pattern: South Orlando

maximums by month for 4 years



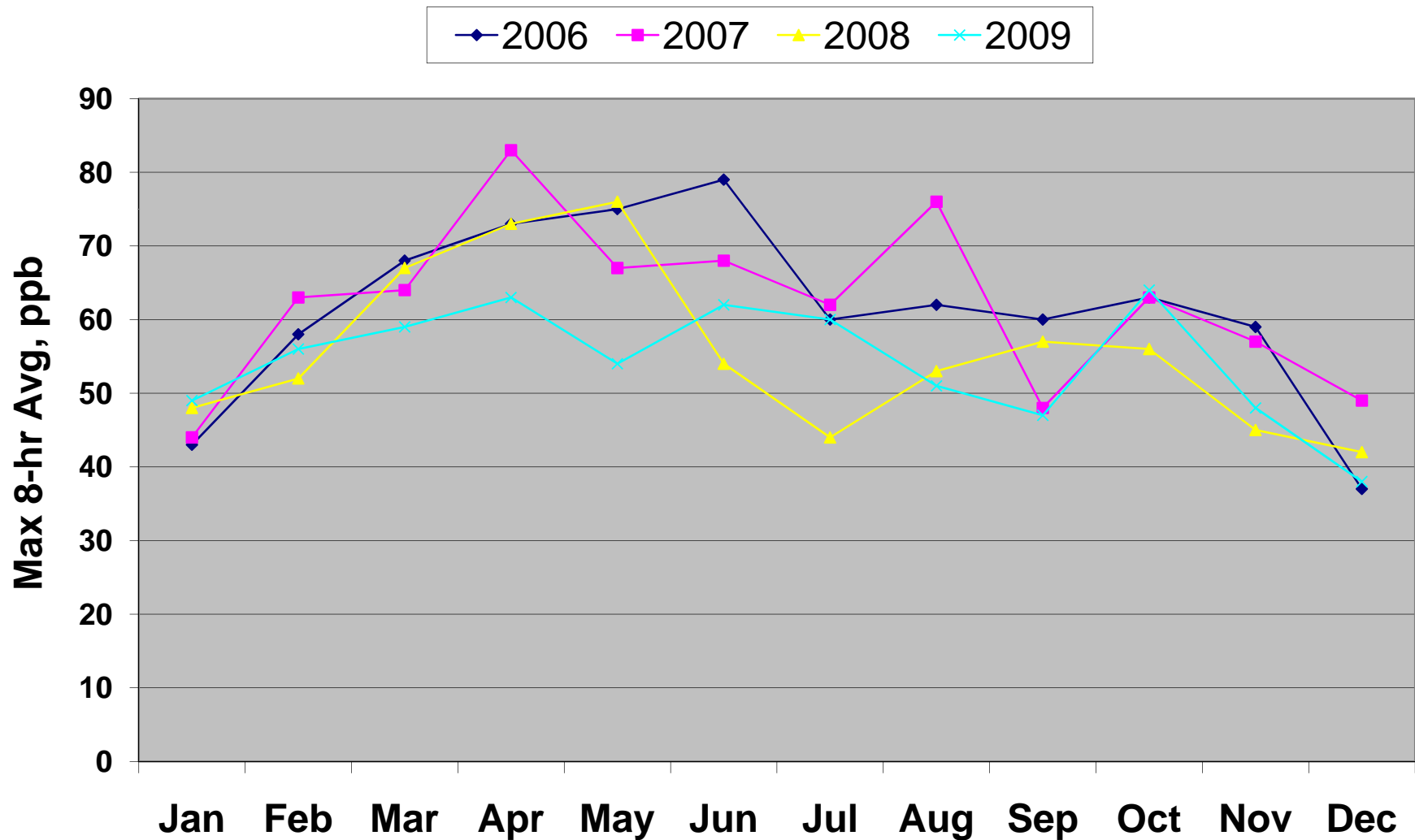
Ozone Pattern: Winter Park

maximums by month for 4 years



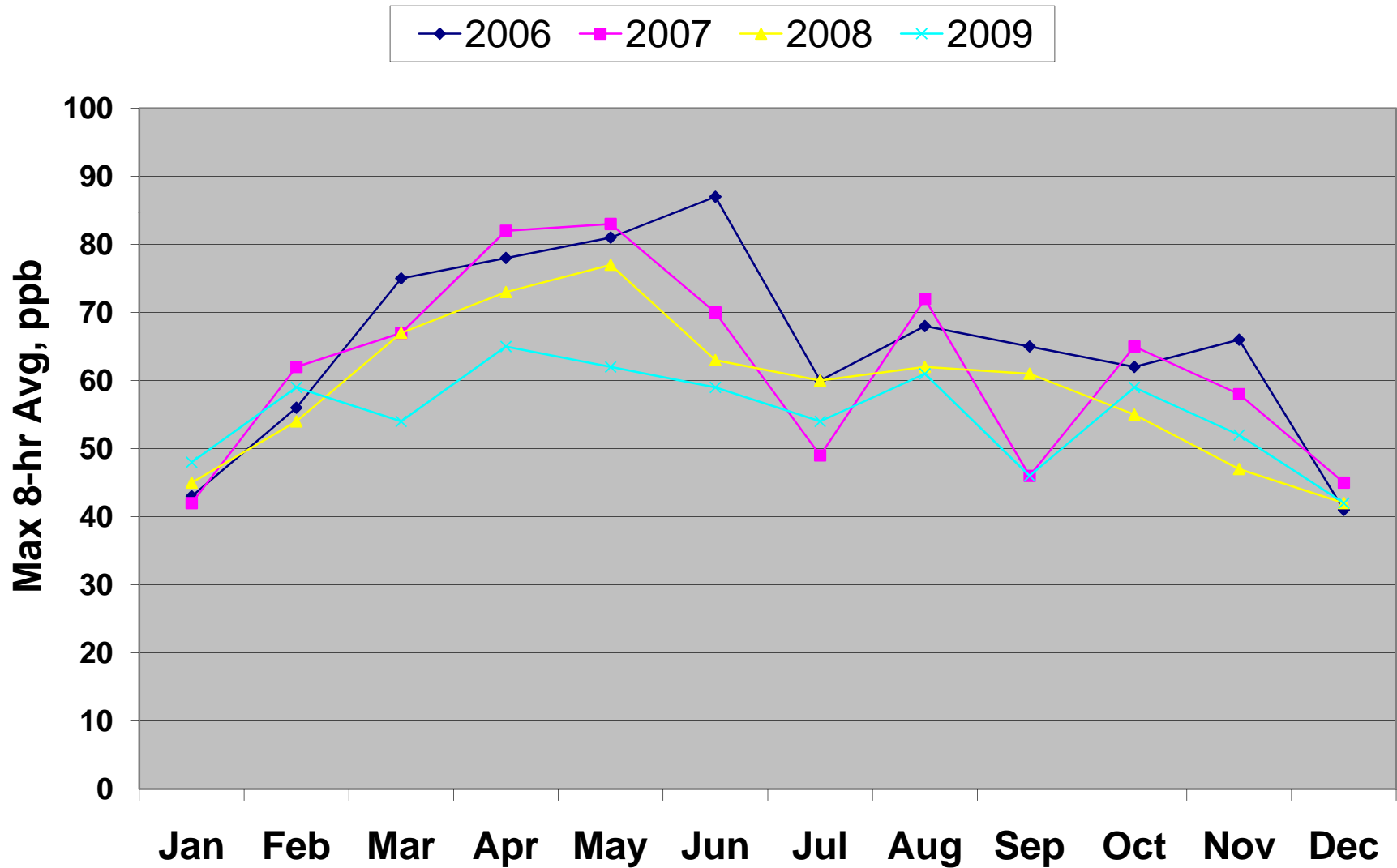
Ozone Pattern: Osceola County

maximums by month for 4 years



Ozone Pattern: SSC

maximums by month for 4 years



[We are Flirting with Non-Attainment!]

Year	Monitor Location	4 th Highest 8-hr Avg.
2006	Winter Park	80
2007	South Orlando	78
2008	Osceola County	71
2009	South Orlando	66

Current standard is 75 ppb (averaged over 3 years), but may drop to 65 at the end of this year

VOC and NOx Source Inventory in Orange, Seminole & Osceola

2008 VOCs, tons/year

- On-road: 23,600
- Non-road: 15,200
- Point sources: 1,800
- Area sources: 37,500
- Total ~ 78,000 tons/yr

2008 NOx, tons/year

- On-road: 37,700
- Non-Road: 10,200
- Point sources: 11,500
- Area Sources: 1,700
- Total ~ 61,000 tons/yr



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Main Sources of VOCs and NOx in Central Florida

VOCs

Cars, SUVs
Lawn equip, boats
Printing, chemicals
paints, gasoline
stations, solvent use
Open burning

NOx

Trucks, cars, SUVs
Construction equip
Industrial and
commercial equip
Power plants
Airports
Open burning

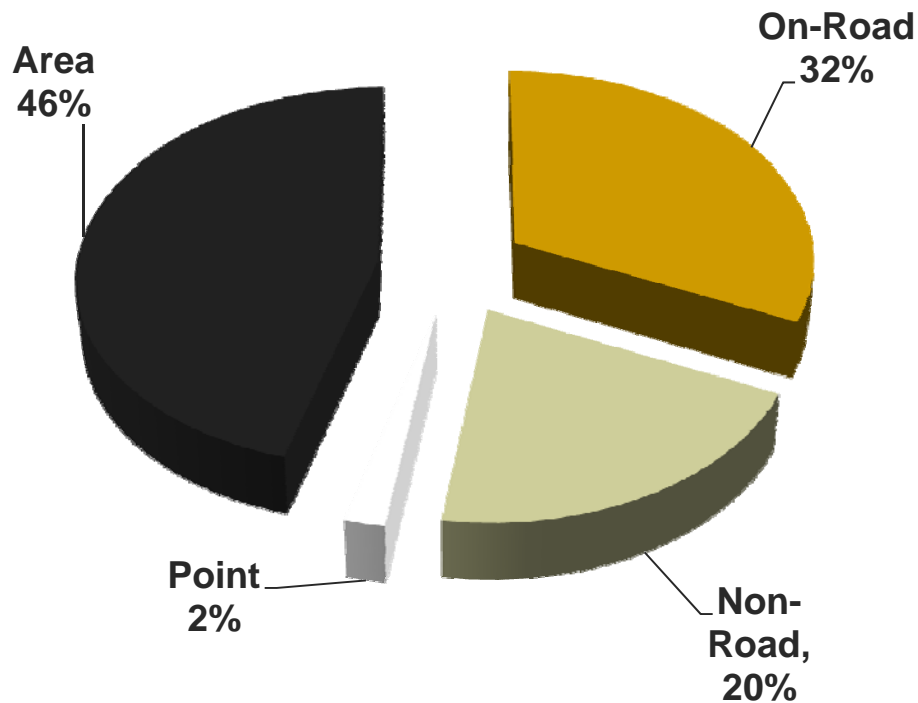


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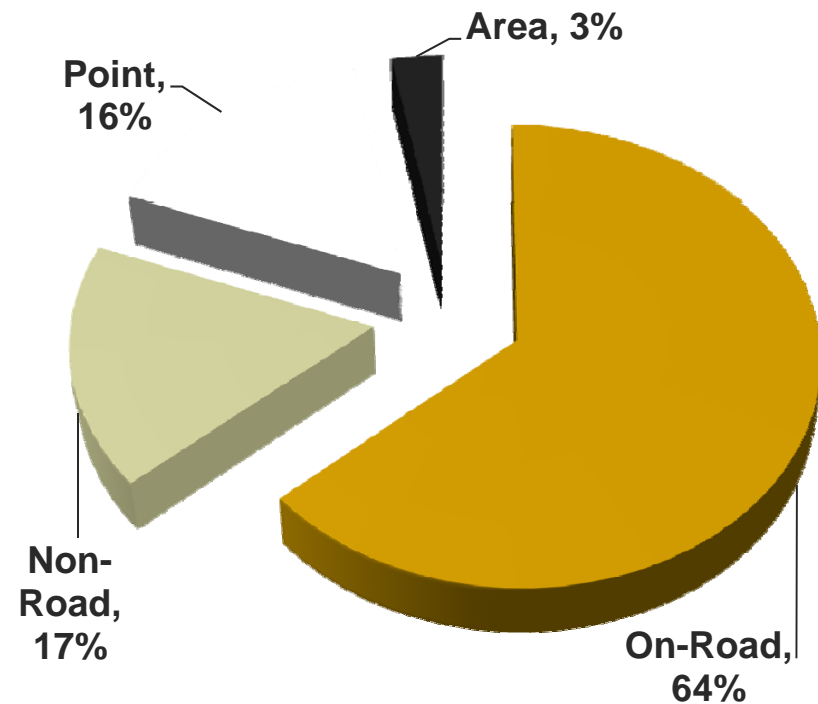


VOC & NOx Emissions in Central Florida

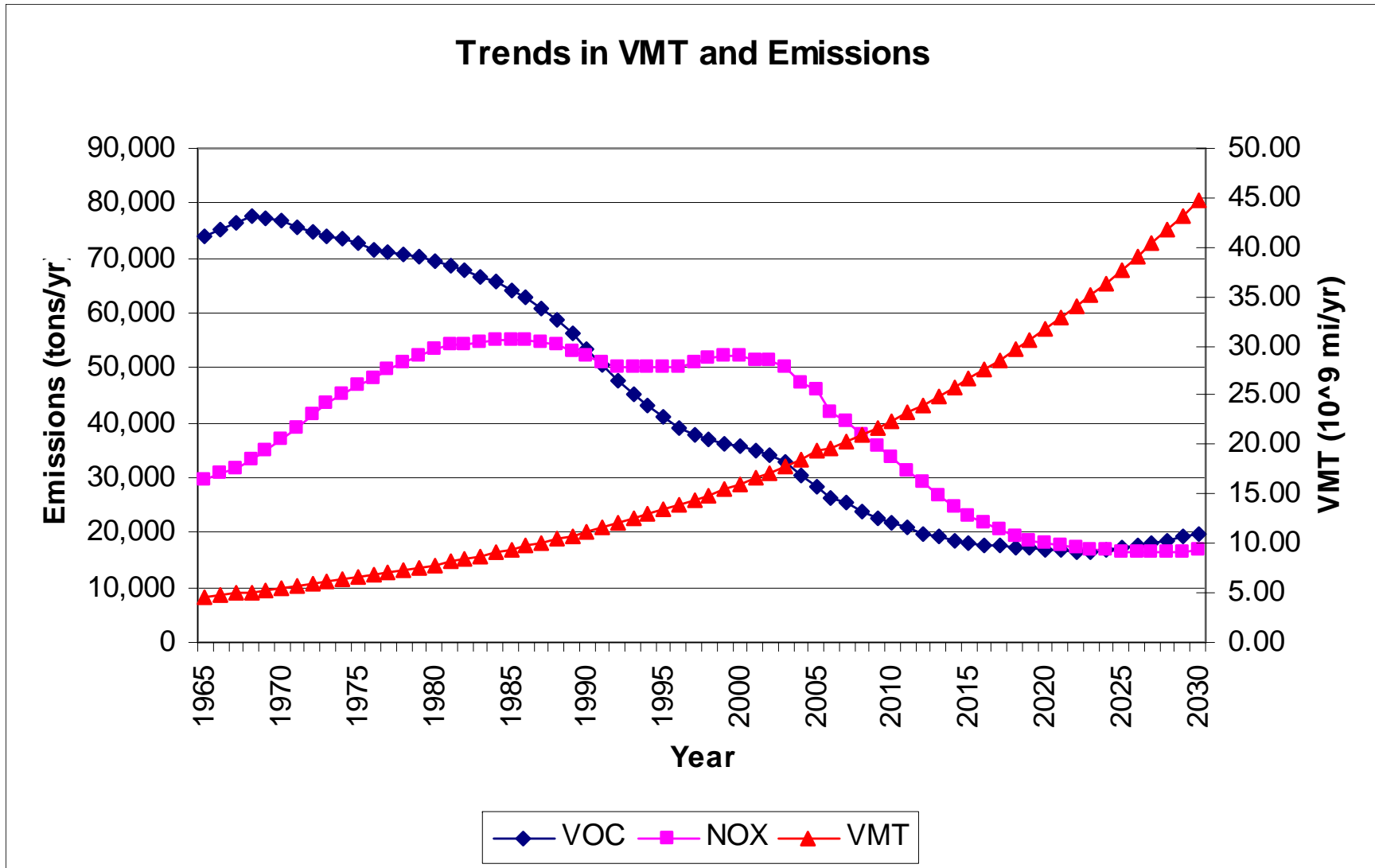
VOC by source, tons/yr
2008 total = 78,000



NOx by source, tons/yr
2008 total = 61,000



On-road mobile sources – the largest category



On-Road Mobile

- Personal vehicles (cars, SUV's, pick-ups, motorcycles) emit 90% of the VOC's and 45% of the on-road NOx
- Large trucks emit 10% of the VOCs and 55% of the on-road NOx
- I-4 and other limited access roads, and major arterial roads have a large percent of the VMT

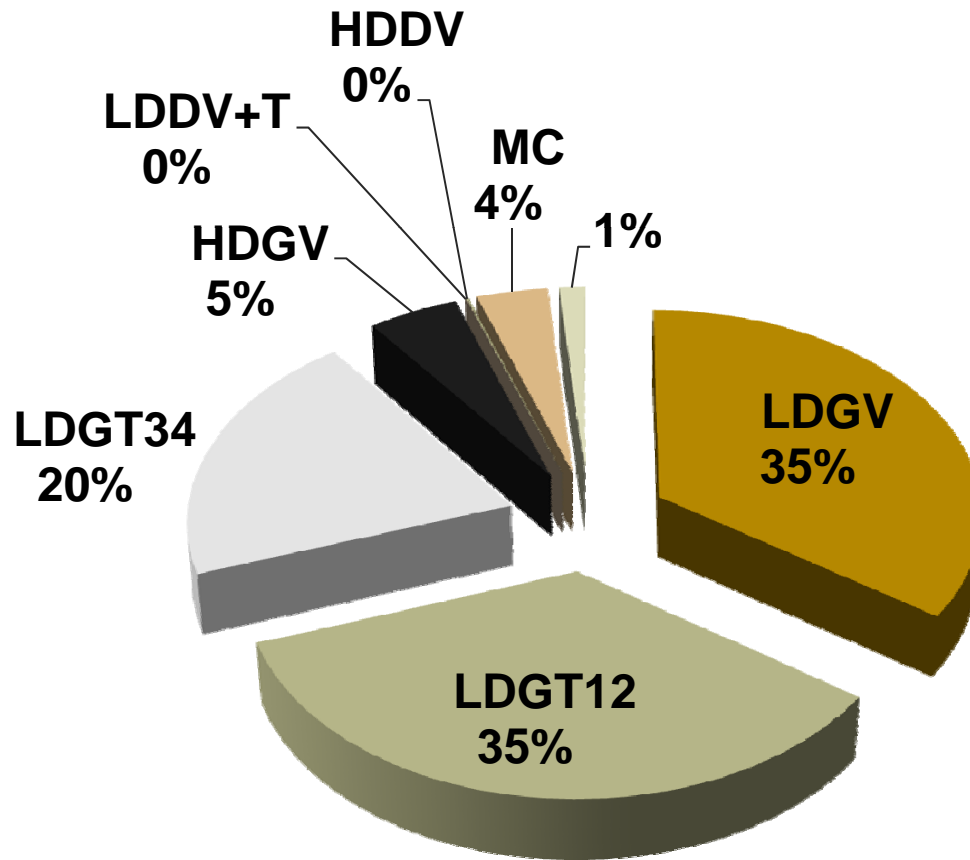


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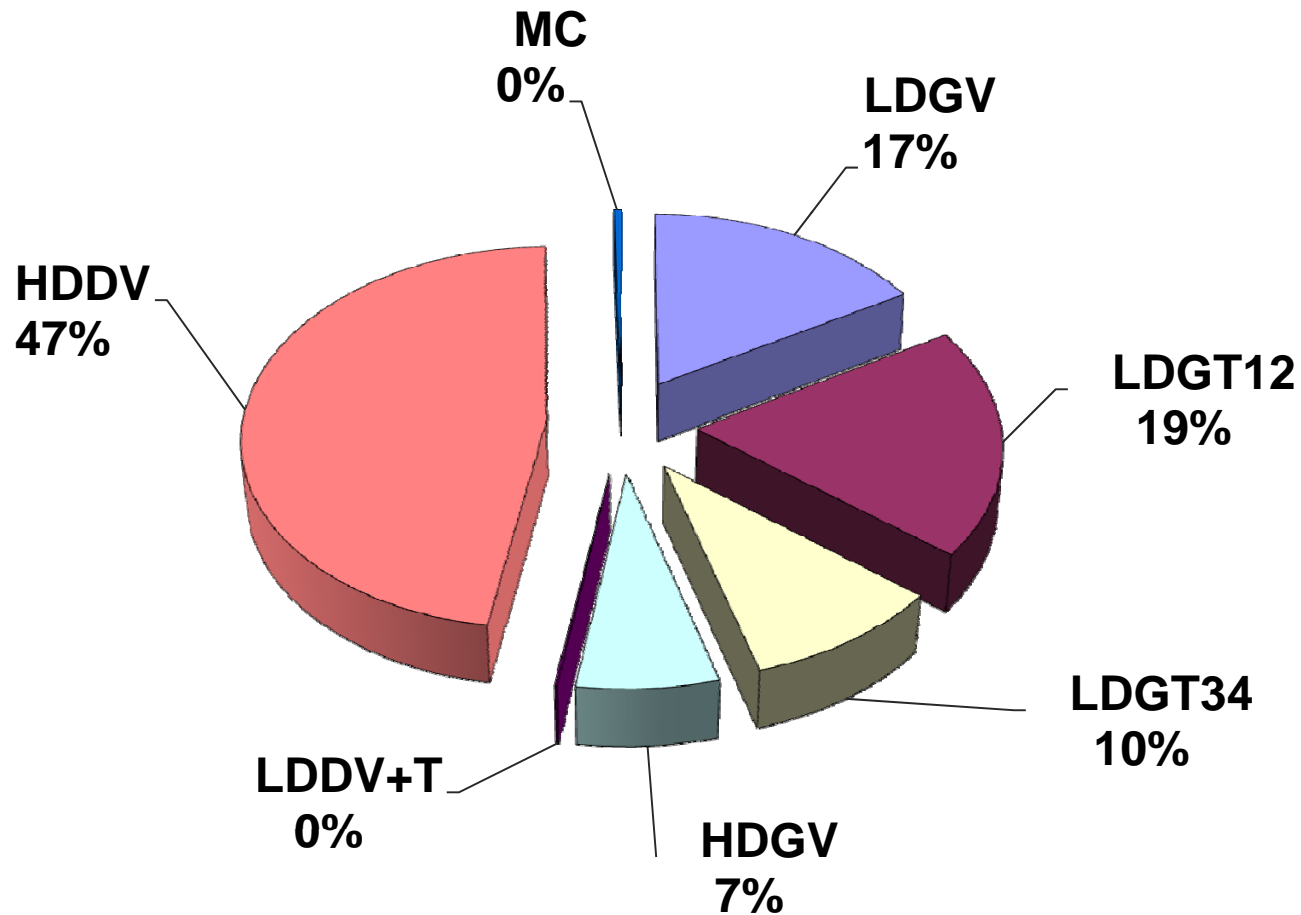
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On-road VOC emissions by vehicle type



On-road NOx emissions by vehicle type



Non-Road Mobile

- Lawn & Garden Equipment - VOCs
- Boats - VOCs
- Construction Equipment - NOx



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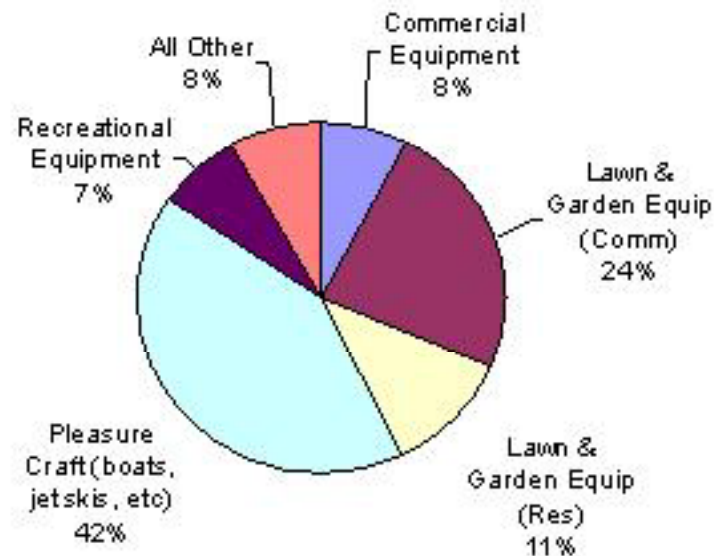
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Non-Road Emissions in Central Florida

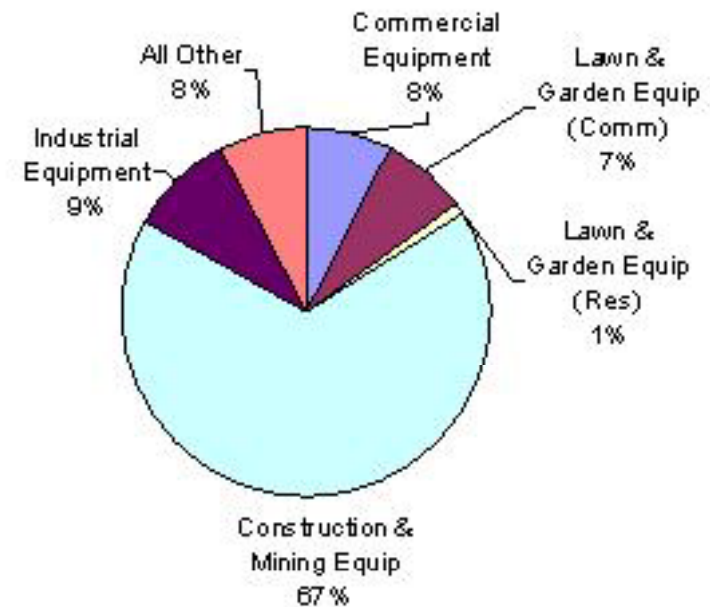
VOCs

2008 Non-Road VOC Emissions in O-S-O
(Total 2008 = 15,191 tons)



NOx

2008 Non-Road NOx Emissions in O-S-O
(Total 2008 = 10,172 tons)



Point and Area Sources

- OUC Stanton Plant, other power plants, and large industrial combustion units are large sources of NO_x but not much VOCs
- Area Sources include gas stations, dry cleaners, printers, painters, open burns, solvent cleaning - low NO_x but substantial VOCs



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Contingency Plan – Recommended Action Steps

- **On-road mobile sources**
 - Encourage neighborhood car-pooling
 - Low-tech but effective – 2-10 tons/yr
 - Saves users money & reduces pollution
 - Van or Car Pool programs
 - Lynx Van Plan is good & can be expanded
 - Employers can sponsor car-pool programs
 - Users save gasoline & money, and reduce area-wide pollution – 5-10 tons/yr



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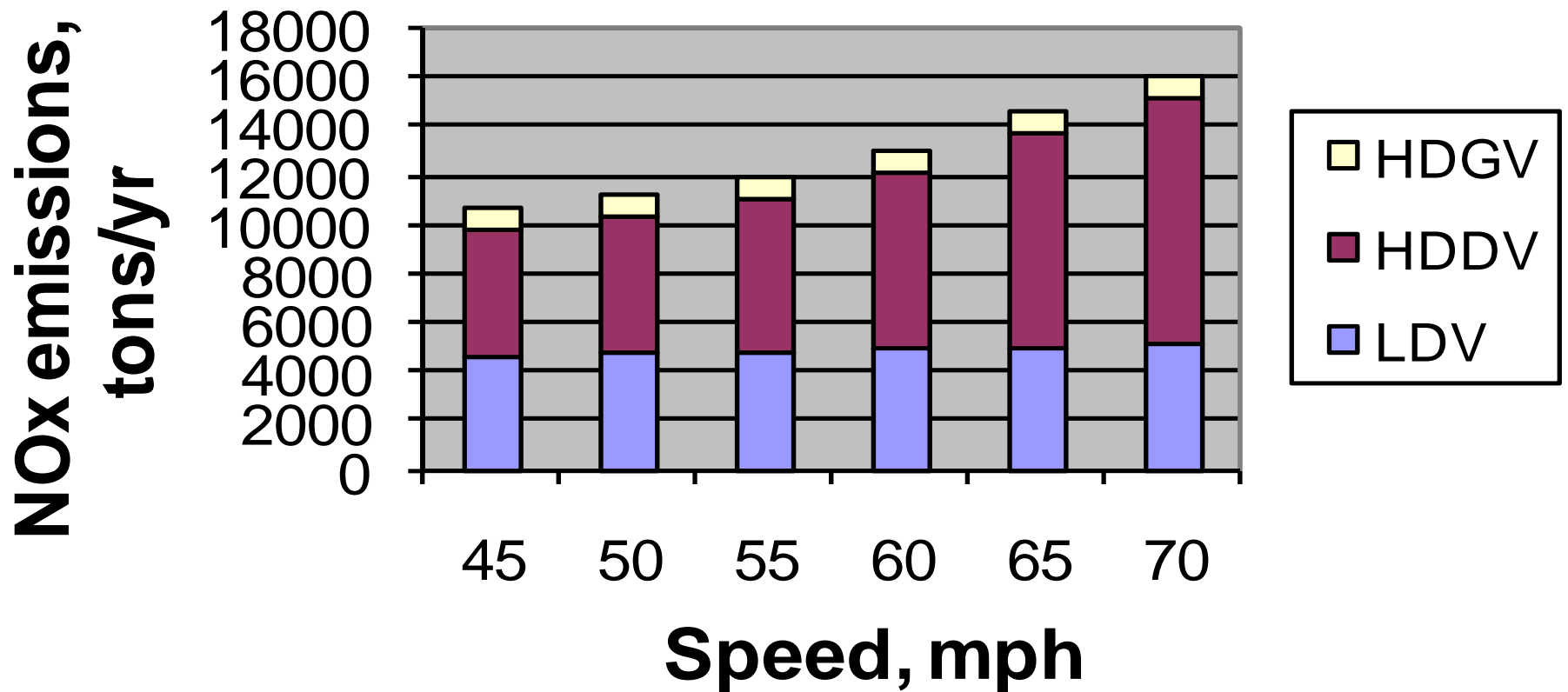


Recommendations (cont.)

- Parking cash-out programs – 5-10 tons/yr
 - Employers pay employees not to drive cars, and thus reduce company cost for leased parking spaces
 - Encourages transit, carpooling, biking
 - Successful in California
- Reduce truck speeds on I-4 and other highways in three-county area
 - May reduce NOx substantially



Modeled effect of speed on NOx emissions in Central Florida



Recommendations (cont.)

■ Lawn & Garden Equipment

- Small engines have been getting cleaner, and EPA will require catalytic converters on new lawn mowers by 2011-2012
- Voluntary Exchange – replace older gasoline-driven equipment with electric now
 - Mowers – 5-10 tons/yr
 - Hand-held Equip – 5-10 tons/yr



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Recommendations (cont.)

- Mow less frequently in April-June
 - Mowing every other week reduces VOCs in peak ozone period by 300-400 tons (in 3 mos.)
 - These are the key months – can we tolerate longer grass to reduce ozone?
 - Governments and homeowners save money
- Catalytic converters on mowers, boats, jet skis, etc
 - EPA likely to regulate within next 2-3 years



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Recommendations (cont.)

- Scrap Programs/Public Education Campaigns
 - Convince people to turn in older, more polluting lawn equipment for new ones – 2-4 tons/yr
- Ban leaf blowers (my personal favorite)
 - Polluting, noisy, useless (just blows trash around!)
 - Can save 300 tons/year VOCs



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Recommendations (cont.)

- **Construction equipment**
 - Aggressive anti-idling programs
 - Saves fuel (& money) for the company
 - Reduces NOx (100-150 tons/yr)
 - Install catalytic converters
 - Switch fuels
 - Biodiesel
 - PuriNOx (water-emulsified) diesel fuel



Conclusions

- **On-road Mobile Sources are largest**
 - Emissions are declining year-over-year
 - This is an area of METROPLAN ORLANDO expertise
- **Non-Road Sources are significant**
 - VOCs – Lawn equipment and boating
 - NOx – Construction equipment
- **Point & Area Sources – important part of the overall picture**
 - METROPLAN ORLANDO should partner with DEP and others, and reduce emissions from all sources

Summary

- **Ozone Regulations have gotten tight (from 85 ppb → 75) and may get even tighter**
- **If regulation drops to 65 ppb, the Orlando Urban Area will become non-attainment**
- **Inventory shows that:**
 - On-road and non-road mobile sources emit significant amounts of both VOCs and NO_x
 - Point sources a big part of NO_x emissions
 - Area sources a big part of VOC emissions



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Summary (cont.)

- **Several action steps have been identified**
 - Public education/promotions for carpooling, transit, and for lawn mowing & leaf blowing
 - Employers - parking cash-out & van pooling
 - Construction industry - reduce idling
 - Trucks on I-4 – separate lanes, lower speeds



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Questions?



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