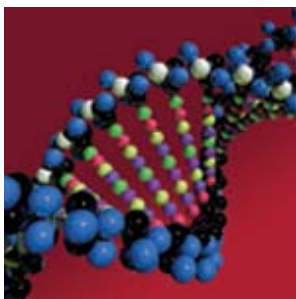


# 2012 Emissions Sensitivity Tests



Presentation to the NETAC Technical Committee

March 12, 2010

Sue Kemball-Cook and Greg Yarwood  
ENVIRON

[skemballcook@environcorp.com](mailto:skemballcook@environcorp.com)

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## 2012 Emissions Sensitivity Tests

- Use 2012 ozone model to test effects of potential emissions growth and new controls
- Run 2012 with the emissions changes from the projected growth or new control and then compare ozone results with 2012 baseline to determine ozone impacts
  - Natural gas development in the Haynesville Shale
  - East Texas Combustion Rule



## Ozone Impacts from Haynesville Shale Development

- Evaluate the effect of forecast Haynesville Shale emissions on ozone levels in Northeast Texas
  - Developed emissions estimates for future Haynesville Shale, low, medium and high development scenarios
  - Used 2012 ozone model to quantify potential near-term ozone impacts of development of the Haynesville Shale
  - Emission inventory projects increases in emissions through end of inventory period in 2020



# Ozone Impacts from Haynesville Shale Development



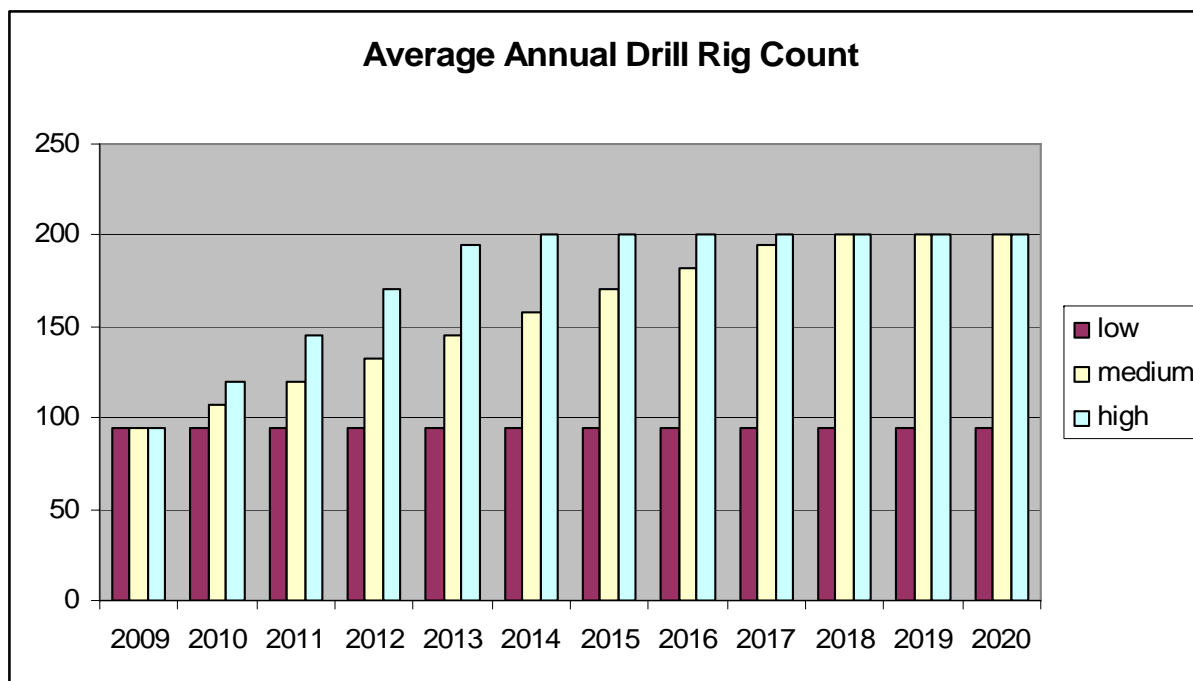
## Forecast NO<sub>x</sub> Emissions (Tons/Day)

Scenario	2012	2020
Low	61	64
Medium	82	127
High	140	267

- Show results from low and high scenarios; ozone impacts from medium scenario fell between those of the low and high cases
- Emissions projections are highly uncertain, so treat as a sensitivity test



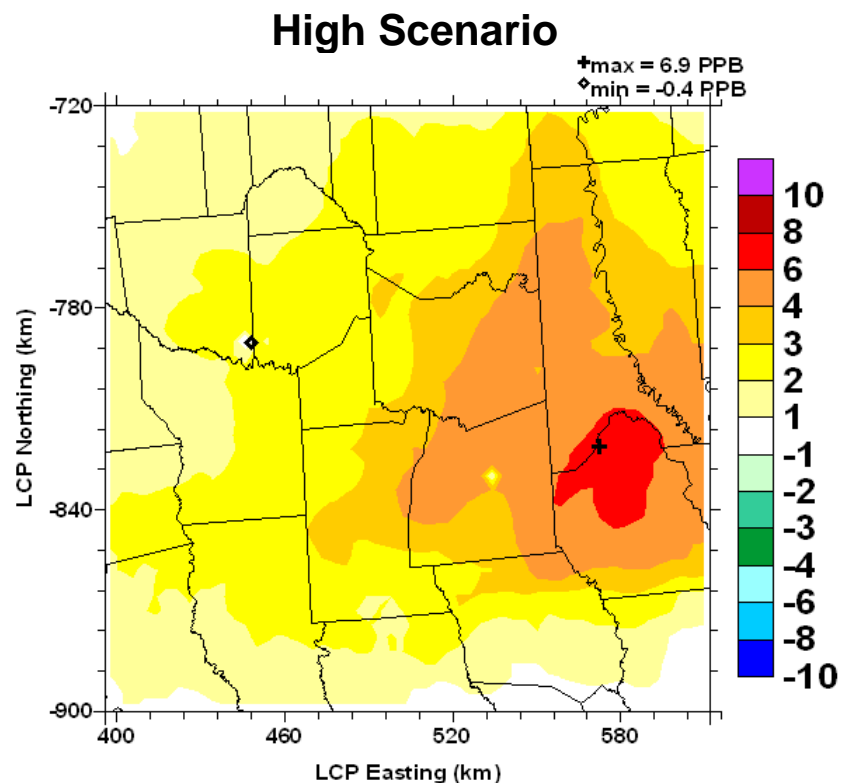
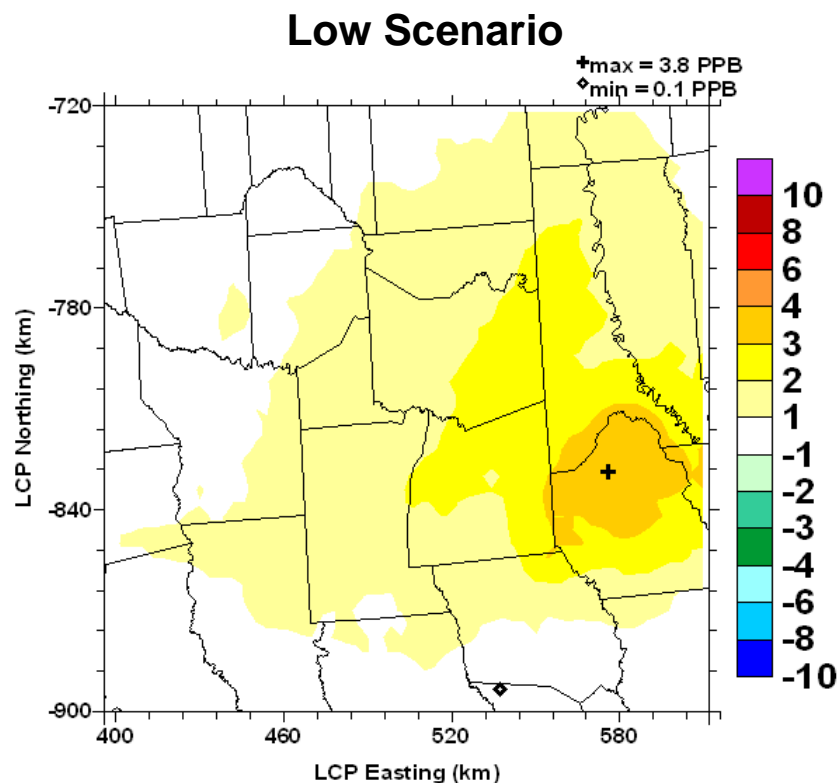
# Drill Rig Projections: 3 Scenarios



- Start with current rigs operating in Haynesville as of March 2009
- Low scenario: leave current number of drill rigs fixed
- High scenario: use 2001-2008 Barnett Shale rig count growth, cap growth at 200 rigs
- Moderate: 50% of aggressive scenario



# Episode Average Difference in Daily Max 8-Hour Ozone: Haynesville-Baseline, 4 km Grid

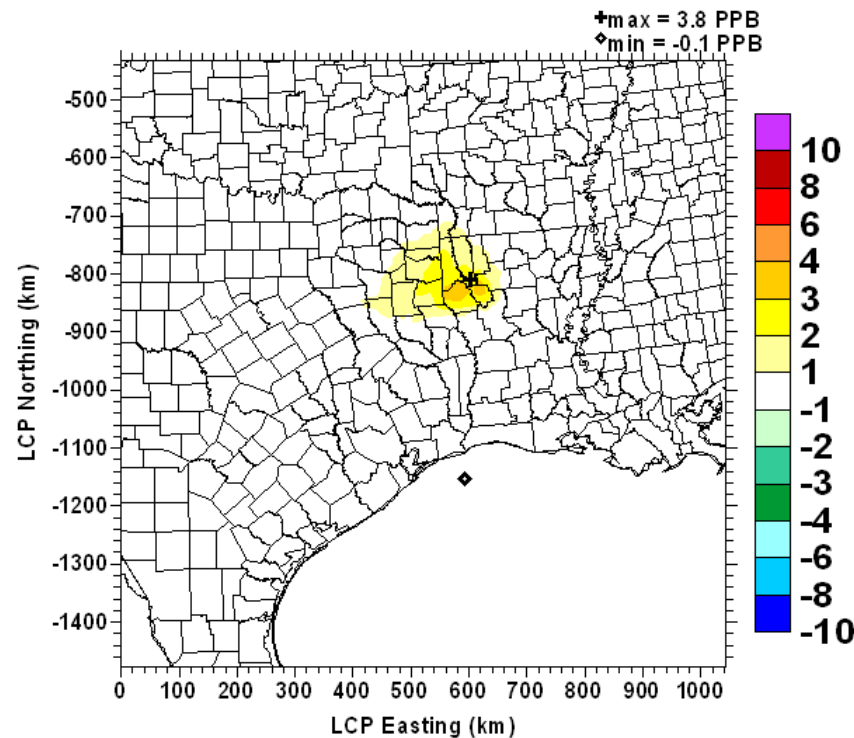


- Average 8-hour ozone impacts in Northeast Texas range from 0-6 ppb
- Largest impacts occur in Louisiana

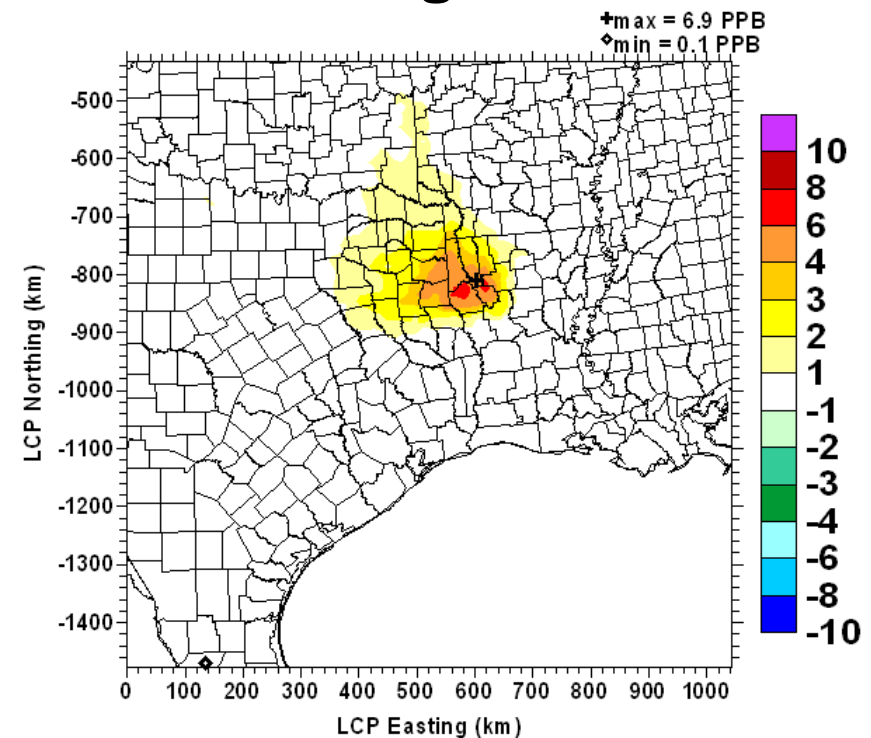


# Episode Average Difference in Daily Max 8-Hour Ozone: Haynesville-Baseline, 12 km Grid

## Low



## High

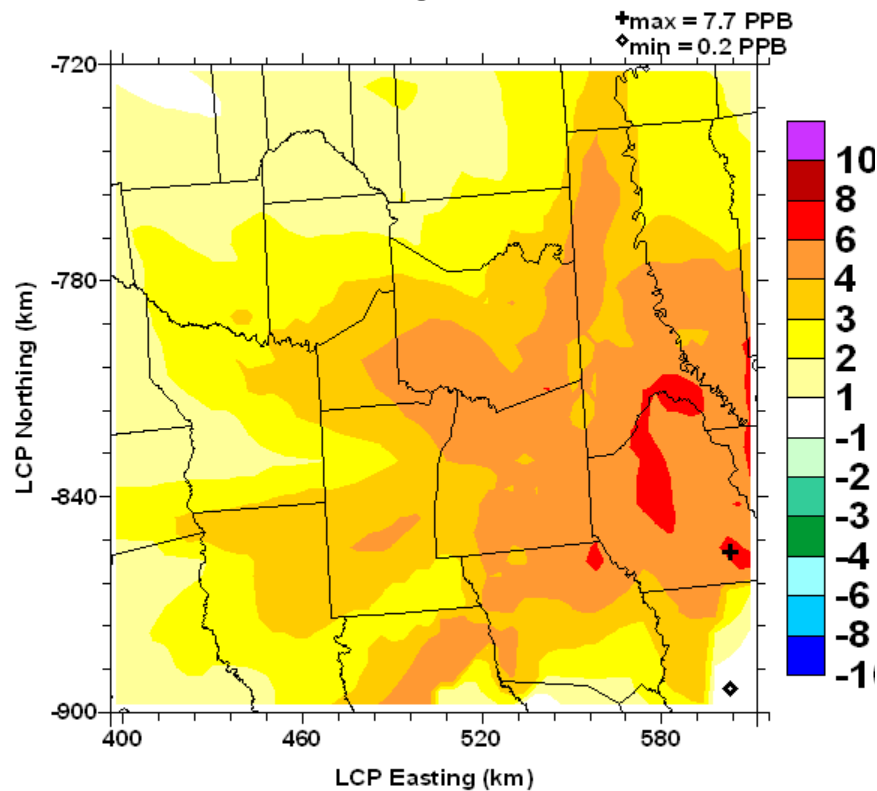


- Average impacts  $> 1$  ppb restricted to Northeast Texas, Louisiana, Arkansas and Oklahoma

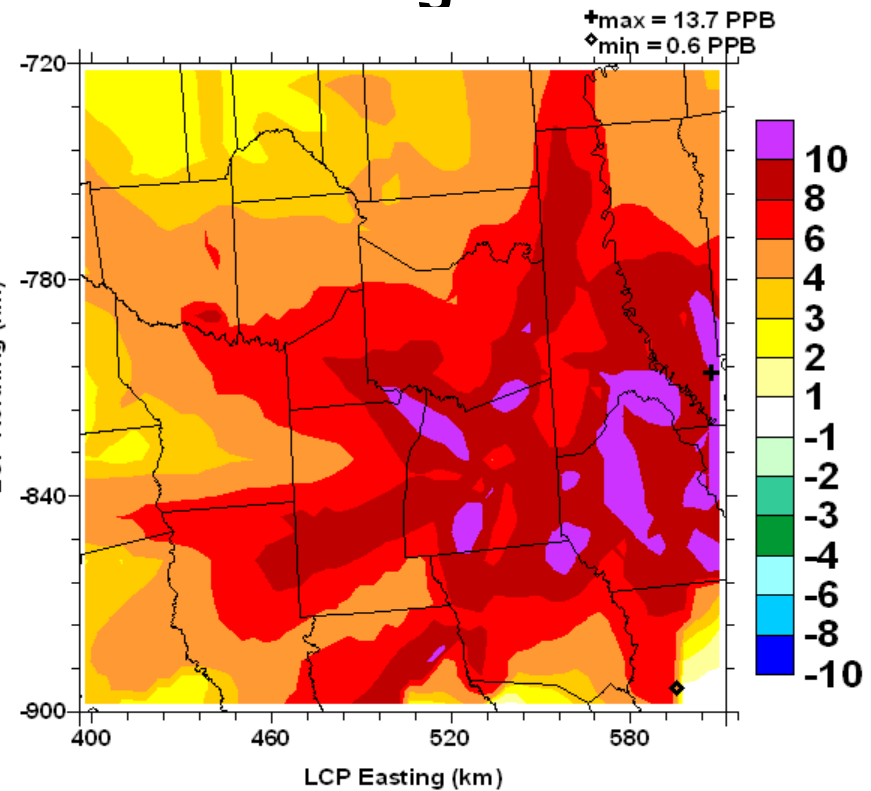


# Episode Maximum Difference in Daily Max 8-Hour Ozone: Haynesville-2012 Baseline, 4 km Grid

## Low



## High

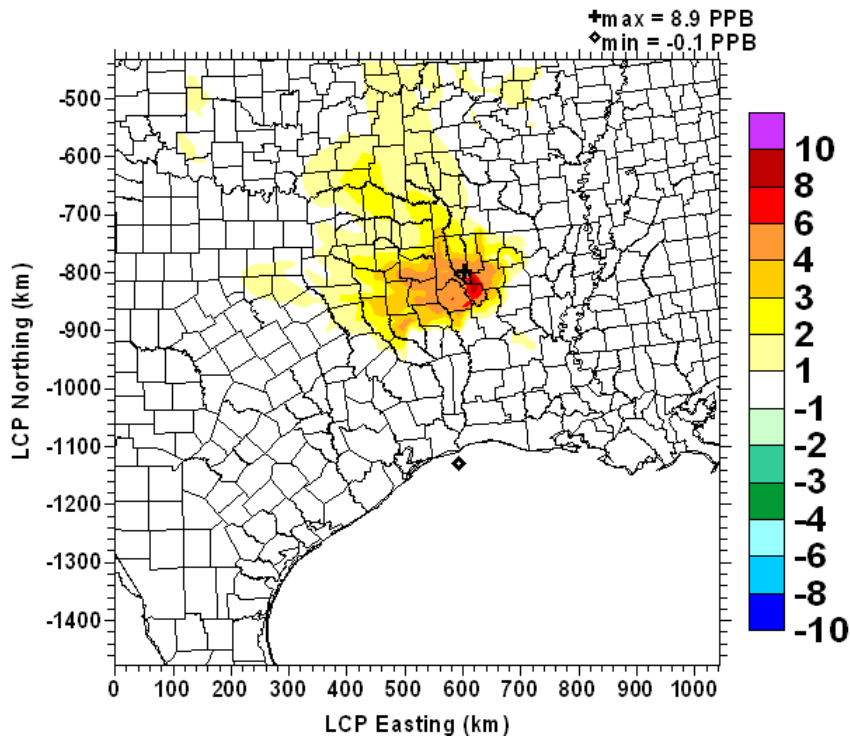


- Maximum 8-hour impacts  $> 10$  ppb within Northeast Texas in high development scenario
- Peak Northeast Texas impacts in low scenario 6-8 ppb

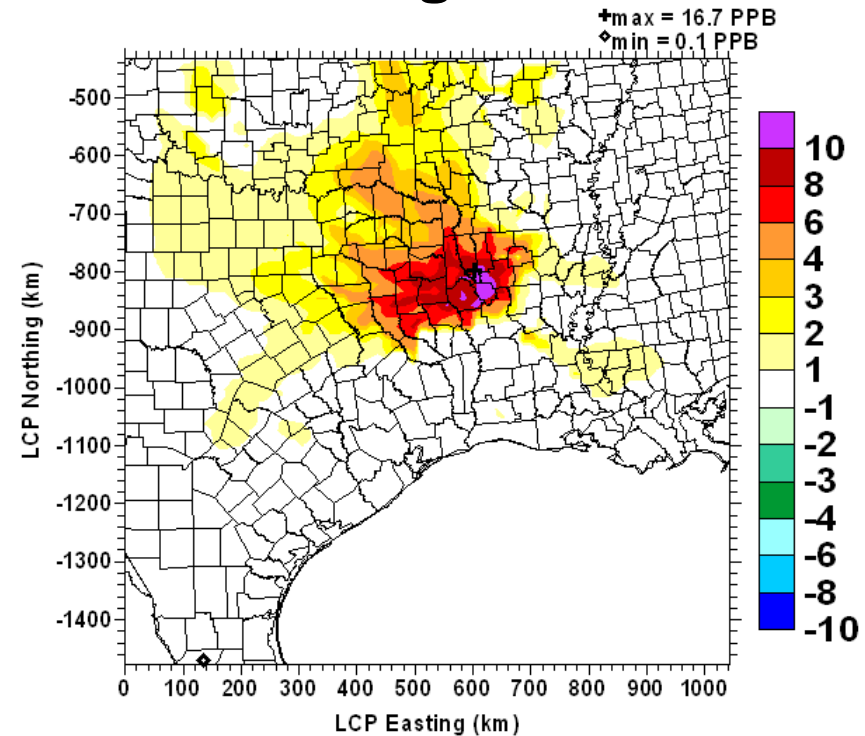


# Episode Maximum Difference in Daily Max 8-Hour Ozone: Haynesville-2012 Baseline, 12 km Grid

Low



High



- Maximum impacts extend outside Northeast Texas into other regions of Texas in both low and high scenarios



## Summary

- Haynesville Shale development is an area of concern for future air quality in Northeast Texas
- Emissions scenarios here assumed minimal well site compression-this may cause NO<sub>x</sub> emissions to be underestimated
- Additional study is required and would benefit from more data regarding well site compression, well decline curves, etc.
  - Input from energy companies would be very useful in constraining the emissions projections



## East Texas Combustion Rule Test

- In June 2007, the TCEQ adopted an East Texas Combustion Rule as part of the Dallas-Fort Worth 8-Hour Ozone SIP Revision
  - The Rule applies to rich-burn engines with horsepower greater than 240 hp
  - The rule applies in 33 East Texas Counties; compliance deadline is March 1, 2010
- NO<sub>x</sub> emissions reduction of ~17 tons/day in the 5-County area in 2012
- What are the effects of the ETxCR on 8-hour daily max ozone in 2012?



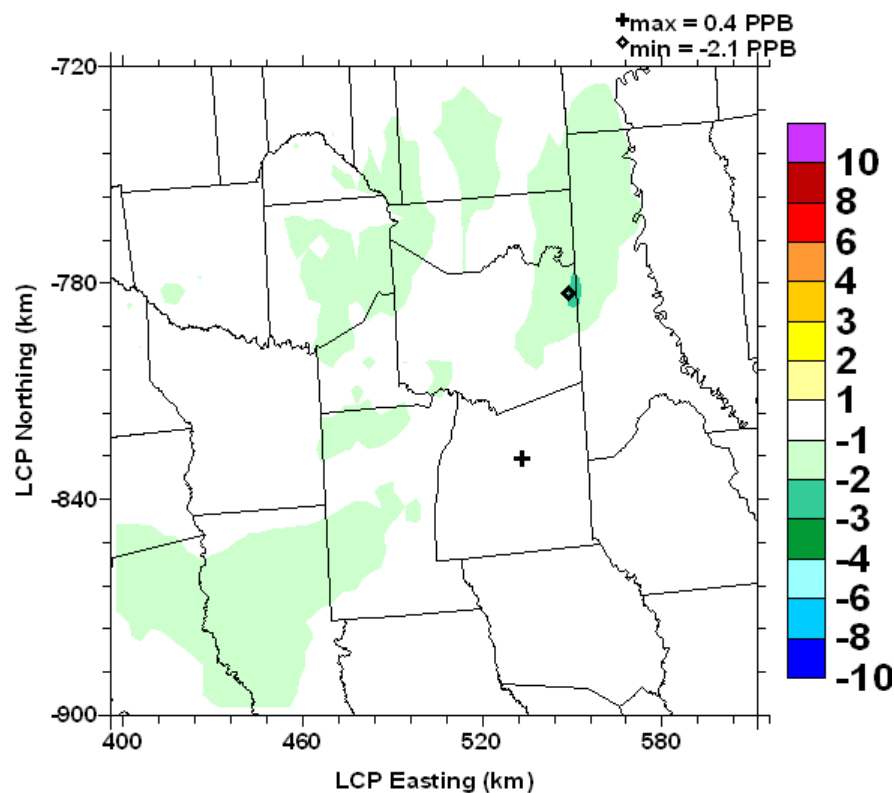
## Evaluate Impact of East Texas Combustion Rule on Northeast Texas Ozone

- 2012 Baseline simulation includes the effects of forecast growth in gas production in 5-County Area and the East Texas Combustion Rule
  - Assumes 80% rule effectiveness
- Performed a second CAMx simulation identical to the 2012 Baseline, but without the effects of the ETxCR
  - Removed effects of ETxCR in 5-County Area gas compressor engine inventory
    - Removed ETxCR from TCEQ point source EI
    - TCEQ area source O&G inventory used outside the 5-County Area did not include the ETxCR
    - This test will therefore underestimate the effects of the ETxCR

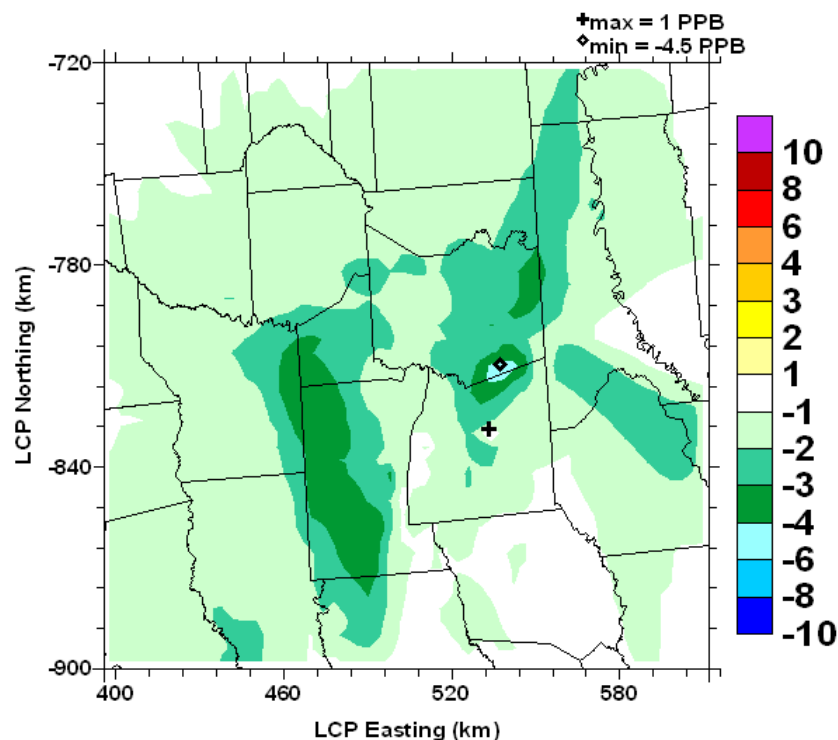


# Ozone Impacts of the East Texas Combustion Rule

## Episode Average Difference In Daily Max 8-Hour Ozone



## Episode Maximum Difference In Daily Max 8-Hour Ozone



- In 2012, ETxCR results in reductions in daily max ozone averaged over episode that reach 1-2 ppb
- Maximum reduction from East Texas Combustion Rule over episode is ~5 ppb



## Summary

- Development in Haynesville Shale may have significant effects on air quality in Northeast Texas
  - Updating Haynesville Shale emission inventory should be a priority
- East Texas Combustion Rule provides ozone benefits to Northeast Texas
  - Track compliance for future inventory and modeling efforts



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**End**