

## **Appendix A**

### **Results of Preliminary Regional Modeling for Texas**

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### Summary of Modeling Results

The TNRCC modeling staff have completed a preliminary modeling assessment of potential benefits from regional mobile source strategies. The conclusions of this preliminary modeling are:

- Modeling of regional **mobile source** reductions (cleaner burning gasoline, NLEVs, and Stage I vapor recovery) indicates potential peak 8-hour average ozone reductions of **between 1 and 4 ppb in much of East and South Texas**, with the **greatest reductions in the Austin-San Antonio areas** (see Figures 1-3).
- Modeling of regional **point source** reductions (assuming a reduction of 50%) indicates widespread reductions in the peak 8-hour average ozone, with **benefits of more than 12 ppb in some areas. Benefits of 3 to 6 ppb can be seen along a broad band stretching from Corpus Christi to Tyler and Longview** (see Figures 4-6).
- Modeling of the **combined point and mobile source** strategies shows a **larger area of reductions** in peak 8-hour average ozone above 3 ppb than either of the strategies modeled individually (see Figures 7-9).

### Model Formulation

- We conducted preliminary modeling to evaluate the potential benefit of regional mobile and point source emission reductions to ozone levels in Texas:
  - ◆ Emissions were projected to the future year 2007, assuming current<sup>1</sup> controls only.
  - ◆ National diesel regulations were assumed region-wide.
- We modeled a mobile source strategy consisting of the following elements:
  - ◆ National Low Emitting Vehicles (NLEV)<sup>2</sup>.
  - ◆ Cleaner burning fuels.
  - ◆ Stage I vapor recovery.
- We also modeled a 50% regional point source NO<sub>x</sub> reduction.
- *We then modeled the combined point source/mobile source scenario.*
- Reductions were modeled in the appropriate geographic regions

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<sup>1</sup>Current as of the 1993 base year upon which the modeling was based.

<sup>2</sup>We modeled a "mature" NLEV program, assuming the entire fleet of light-duty vehicles were NLEVs. In 2007, it is expected that about 40% of vehicles will be NLEVs.

### **Important Points to Remember About the Preliminary Regional Modeling:**

- We used an “off-the-shelf” model formulation, which was developed for a different purpose.
  - ◆ Emissions were based on an early version of the OTAG inventory.
  - ◆ Future projections to 2007 were based on OTAG statewide growth assumptions.
  - ◆ Nonattainment area-specific controls beyond 1993 were not included in the future inventory.
  - ◆ The 1993 base case model performance evaluation was based on a limited set of rural monitors.
- Only one time period (September 8-11, 1993) was analyzed.
  - ◆ Ozone levels across eastern Texas were generally high during the time period modeled.
  - ◆ Other time periods may show more or less benefit from other regional strategies
- The reductions modeled were based on rather general assumptions, and may ultimately differ from the reductions actually achieved.
- The modeling reported here is preliminary. AQP staff plan to conduct much more in-depth modeling beginning this fall, after completion of the Dallas/Fort Worth SIP modeling.
  - ◆ We plan to model additional episodes to ensure that a wide range of meteorological conditions are represented.
  - ◆ We plan to use much improved emissions data, including data collected locally by the near-nonattainment area MPOs.

**Table of Modeled Reductions**

Regional Component	Applicable Region	Inventory Component	NO <sub>x</sub> Reduction	VOC Reduction
NLEVs	Statewide	On-Road Mobile Sources	10%/12.5% <sup>1</sup>	10%/12.5% <sup>1</sup>
		Area/Nonroad Mobile Sources		
		Point Sources		
Stage I Vapor Recovery	Central and East Texas Counties	On-Road Mobile Sources		
		Area/Nonroad Mobile Sources		3%
		Point Sources		
Cleaner Burning Gasoline	Area Proposed for Cleaner Burning Gasoline	On-Road Mobile Sources	5%	12%/25% <sup>2</sup>
		Area/Nonroad Mobile Sources		10%
		Point Sources		
Point Source NO <sub>x</sub> Controls	Central and East Texas Counties	On-Road Mobile Sources		
		Area/Nonroad Mobile Sources		
		Point Sources	50%	

<sup>1</sup>NLEV reductions assume 100% of light-duty fleet. Reductions of 10% (VOC and NO<sub>x</sub>) were assumed within area proposed for cleaner burning gasoline, while reductions of 12.5% were assumed elsewhere in Texas.

<sup>2</sup>In areas which already have phase I RFG (Houston/Galveston and Dallas/Fort Worth nonattainment areas), cleaner burning gasoline was assumed to reduce VOC by 12%. The reduction in the remainder of the proposed cleaner burning gasoline area was assumed to be 25%.

Figure A1

Difference of Daily Maximum Hourly Average O<sub>3</sub> Concentrations (ppb) for 09/08/93

Regional Mobile Source Strategy – Base

CAMx 1.13 TCAS Regional Model, Layer 1

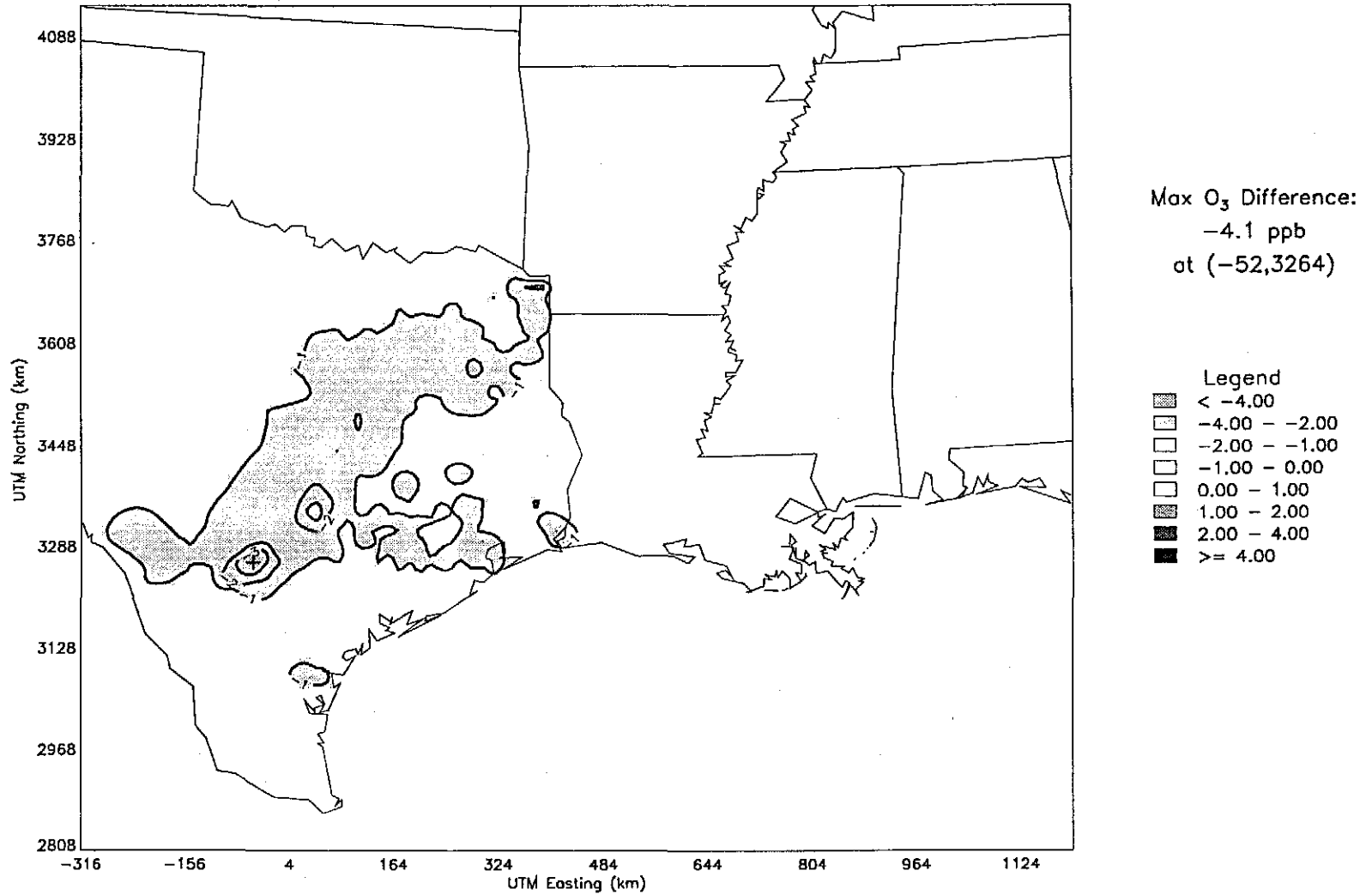


Figure 1: Modeled Regional Mobile Source Strategy Benefit for 9/8/93 (Emissions Projected to 2007).

Figure A2

### Difference of Daily Maximum Hourly Average O<sub>3</sub> Concentrations (ppb) for 09/09/93

Regional Mobile Source Strategy – Base

CAMx 1.13 TCAS Regional Model, Layer 1

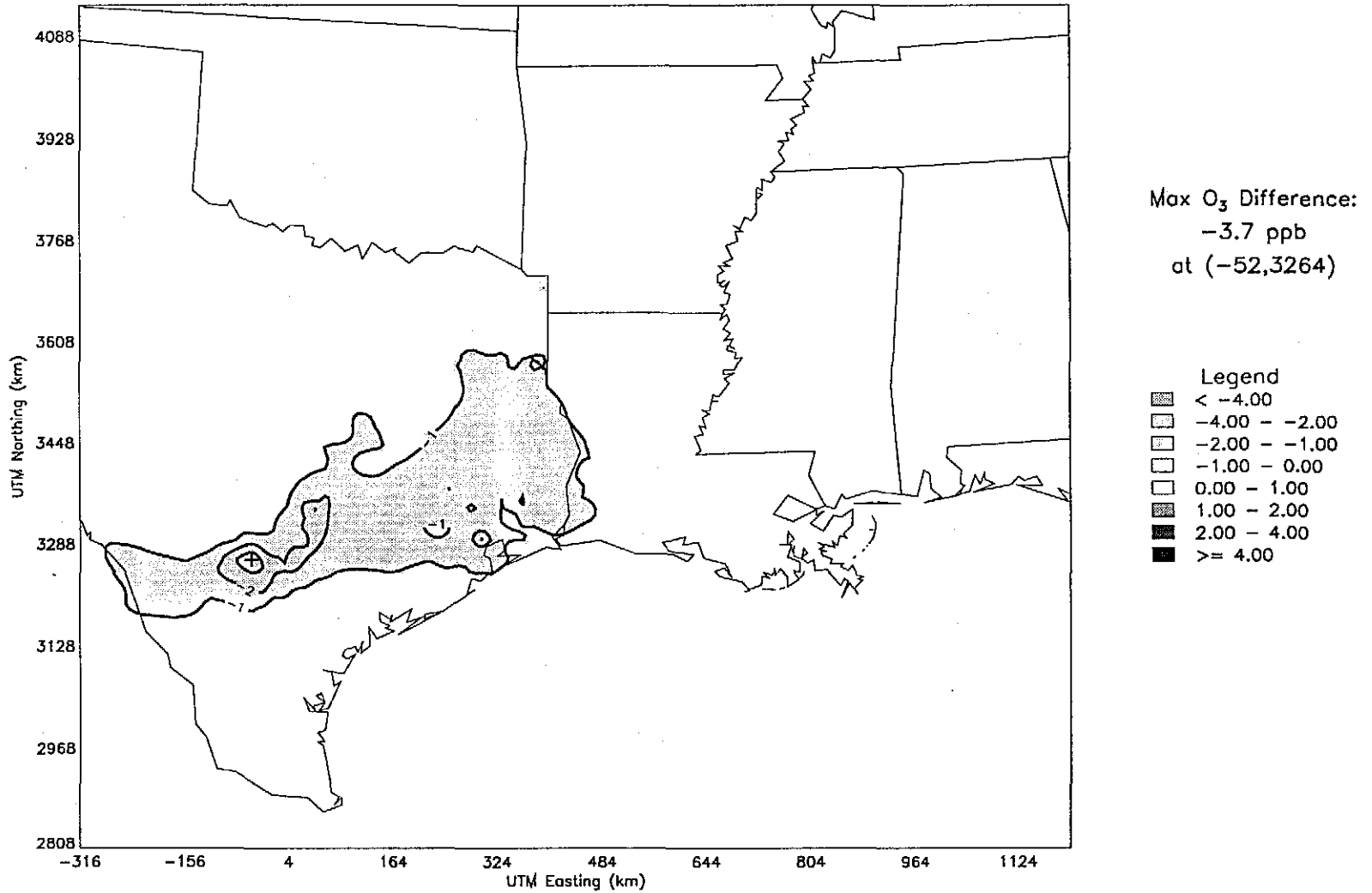


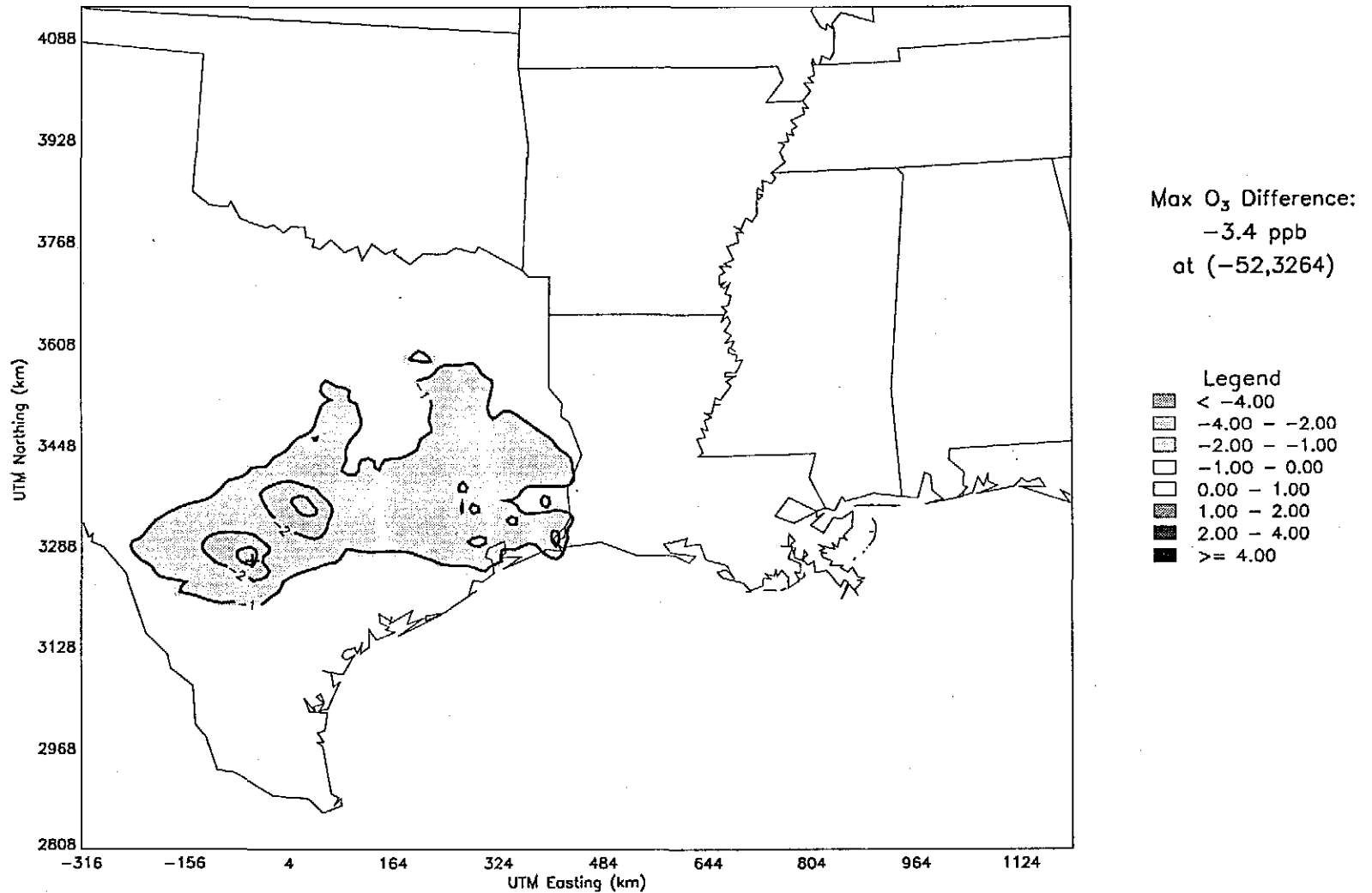
Figure 2: Modeled Regional Mobile Source Strategy Benefit for 9/9/93 (Emissions Projected to 2007).

Figure A3

### Difference of Daily Maximum Hourly Average O<sub>3</sub> Concentrations (ppb) for 09/10/93

Regional Mobile Source Strategy – Base

CAMx 1.13 TCAS Regional Model, Layer 1

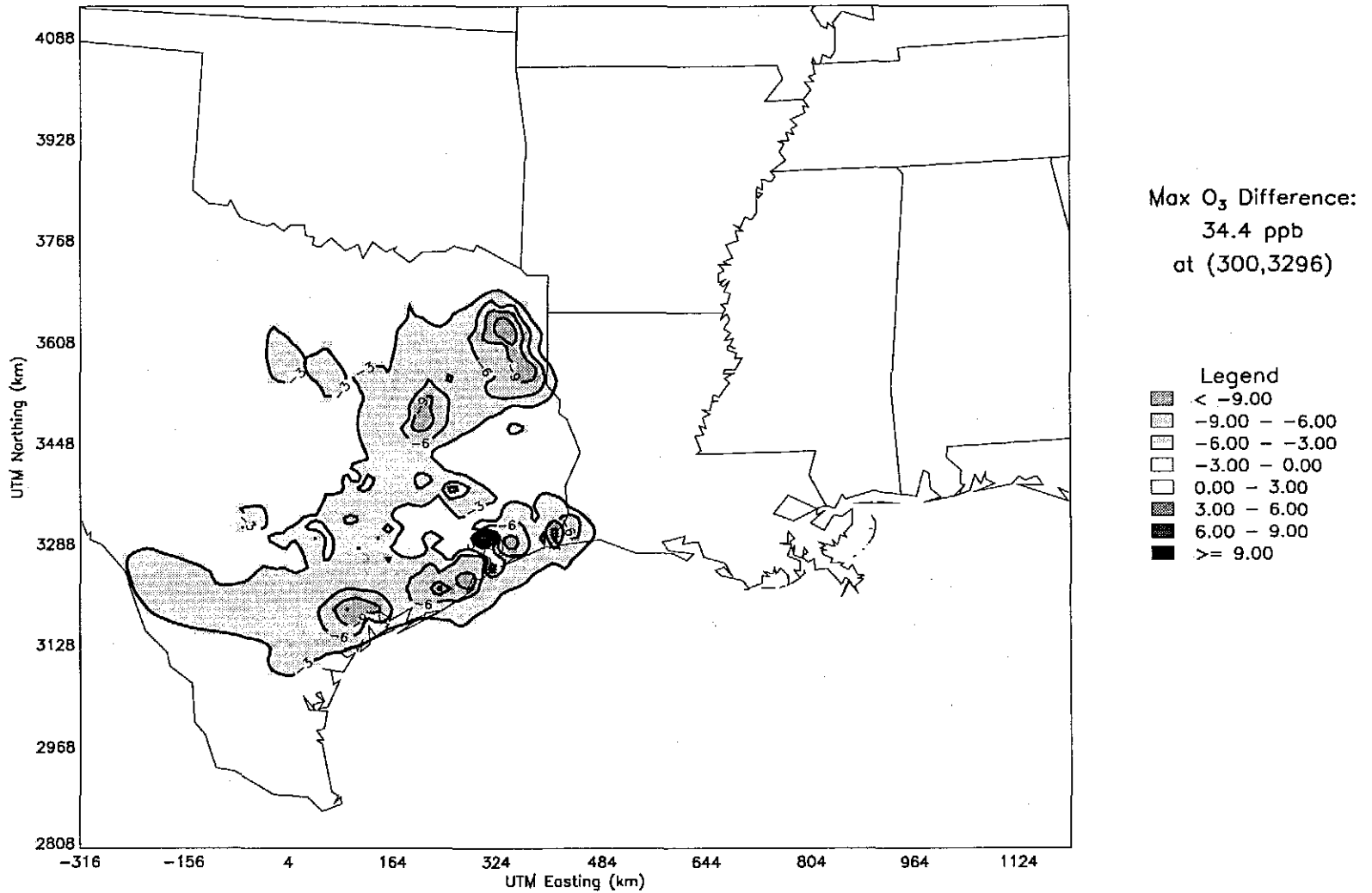


TNREC JHS: 05/22/1998 11:28:43: /uomv\_eut6/REGIONAL\_Coms/AverageFile/coms\_ovrg.tcos.930910.new\_base2.regular.regional\_16km; /uomv\_eut6/REGIONAL\_Coms/AverageFile/coms\_ovrg.tcos.930910.new\_base2.mobstrot.regional\_16km

Figure 3: Modeled Regional Mobile Source Strategy Benefit for 9/10/93 (Emissions Projected to 2007).

Figure A4

Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/08/93  
Regional 50% Point Source NO<sub>x</sub> Reduction – Base  
CAMx 1.13 TCAS Regional Model, Layer 1



THRC JHS: 06/24/1998 11:13:33: /uamv\_out6/REGIONAL\_comx/AverageFile/comx\_avg.tcas.930908.new\_base2.regular.regional.18km; /uamv\_out6/REGIONAL\_comx/AverageFile/comx\_avg.tcas.930908.new\_base2.0501xpH.regional.18km

Figure 4: Modeled Regional Point Source Strategy Benefit for 9/8/93 (Emissions Projected to 2007).

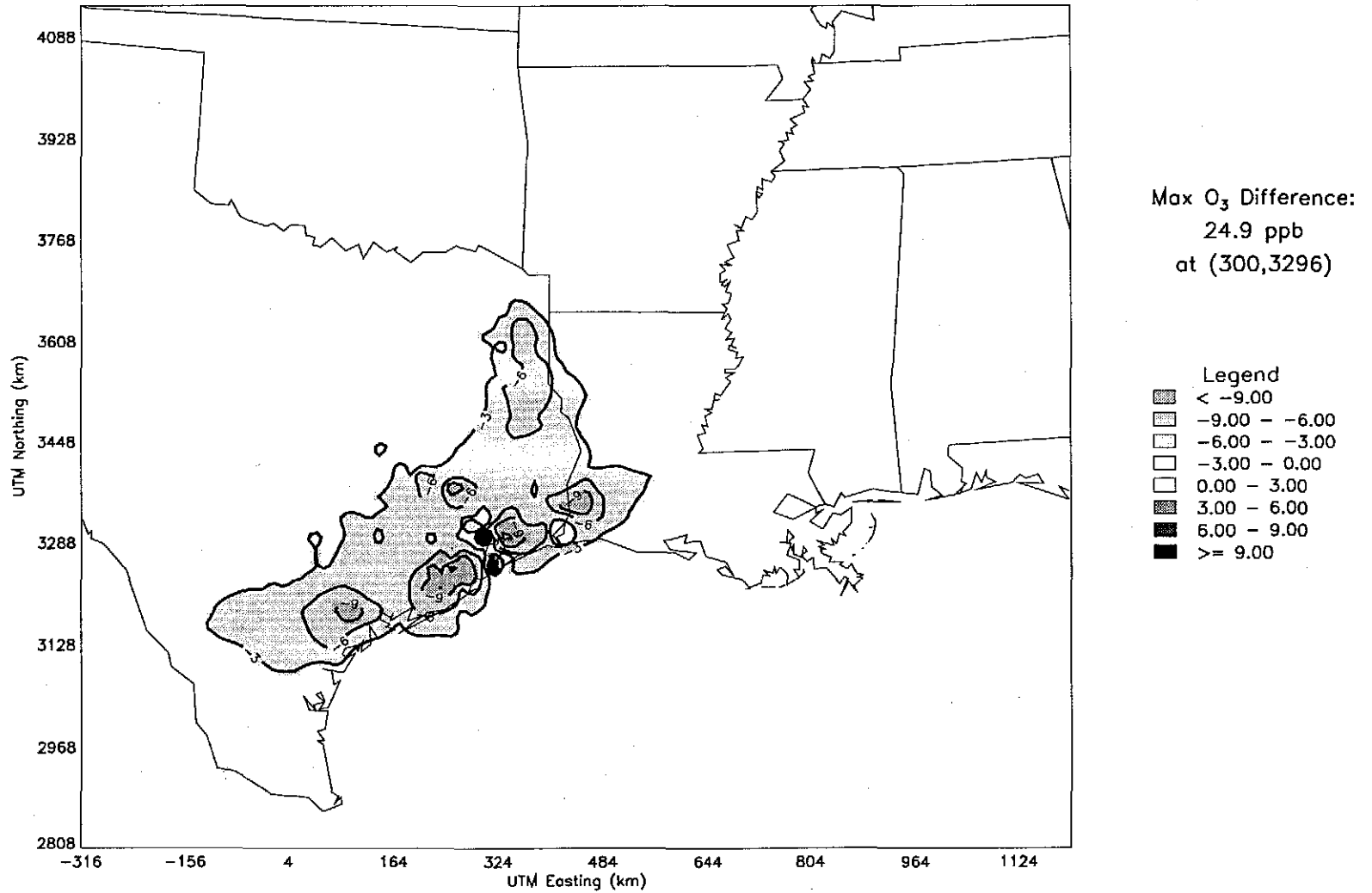


Figure A5

Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/09/93

Regional 50% Point Source NO<sub>x</sub> Reduction - Base

CAMx 1.13 TCAS Regional Model, Layer 1



TRACC JHS: 06/24/1998 11:24:53: /uomv\_out6/REGIONAL\_cams/AverageFile/cams\_ovrg.tcos.930909.new\_base2.regular.regional\_16km; /uomv\_out6/REGIONAL\_cams/AverageFile/cams\_ovrg.tcos.930909.new\_base2.050TxN.regional\_16km

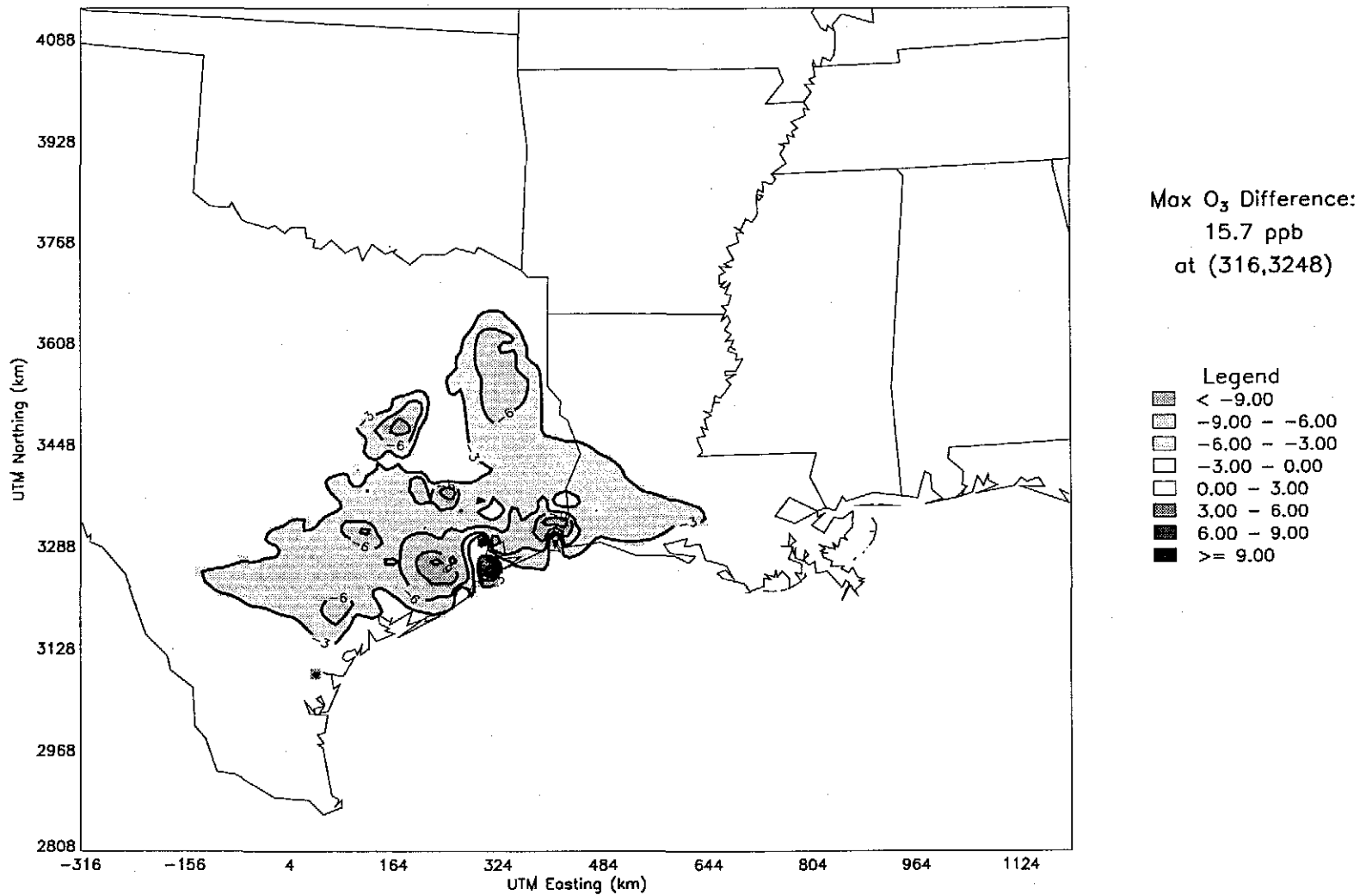
Figure 5: Modeled Regional Point Source Strategy Benefit for 9/9/93 (Emissions Projected to 2007).

Figure A6

### Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/10/93

Regional 50% Point Source NO<sub>x</sub> Reduction - Base

CAMx 1.13 TCAS Regional Model, Layer 1



TNRCC JHS: 06/24/1998 11:36:03: /uomv\_out6/REGIONAL\_cams/AverageFile/camx\_ovrg.tcos.930910.new\_base2.regular.regional\_16km; /uomv\_out6/REGIONAL\_cams/AverageFile/camx\_ovrg.tcos.930910.new\_base2.0507xPn.regional\_16km

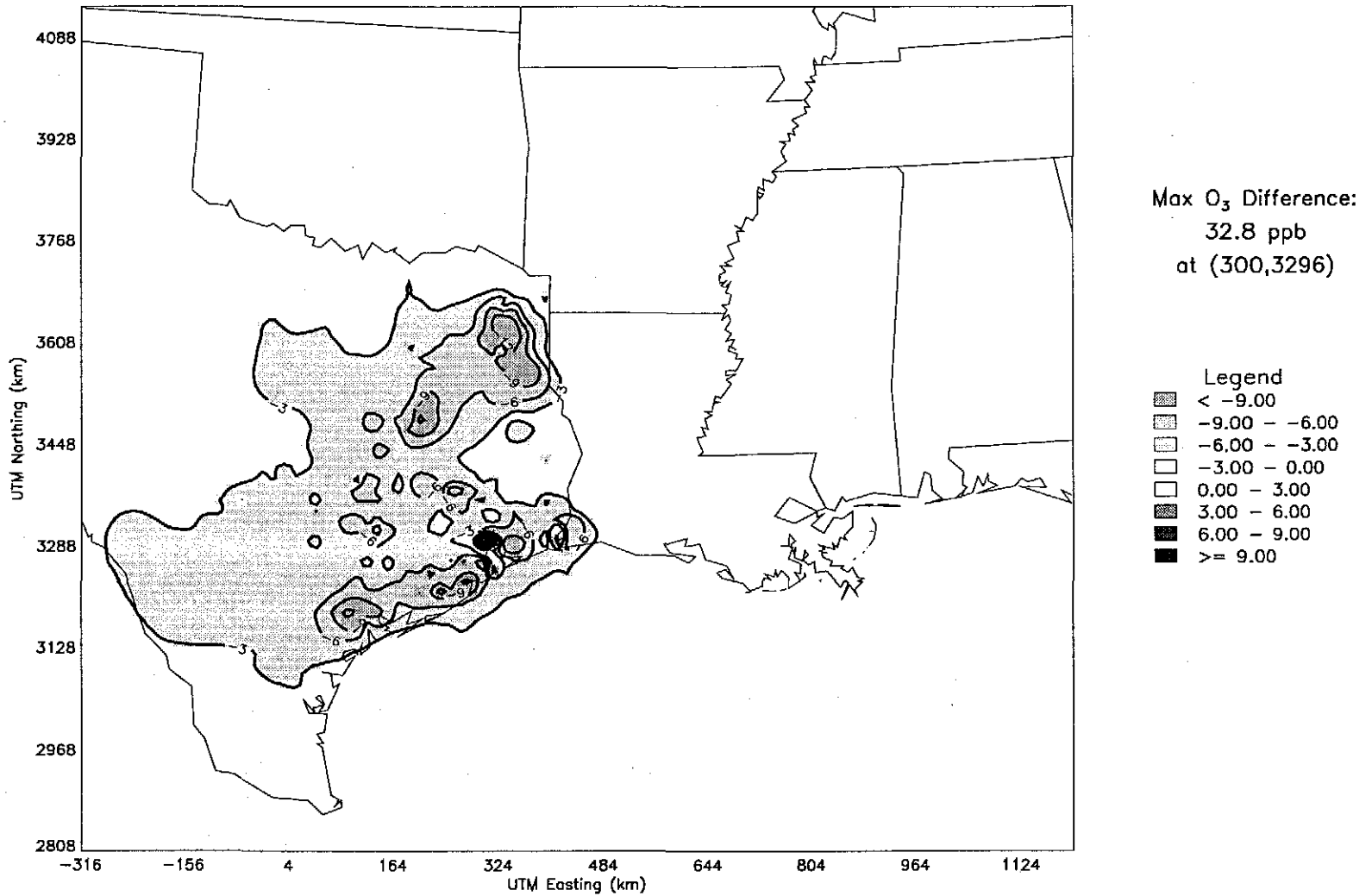
Figure 6: Modeled Regional Point Source Strategy Benefit for 9/10/93 (Emissions Projected to 2007).

Figure A7

Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/08/93

Regional 50% Point Source NO<sub>x</sub> Reduction + Mobile Source Strategy - Base

CAMx 1.13 TCAS Regional Model, Layer 1

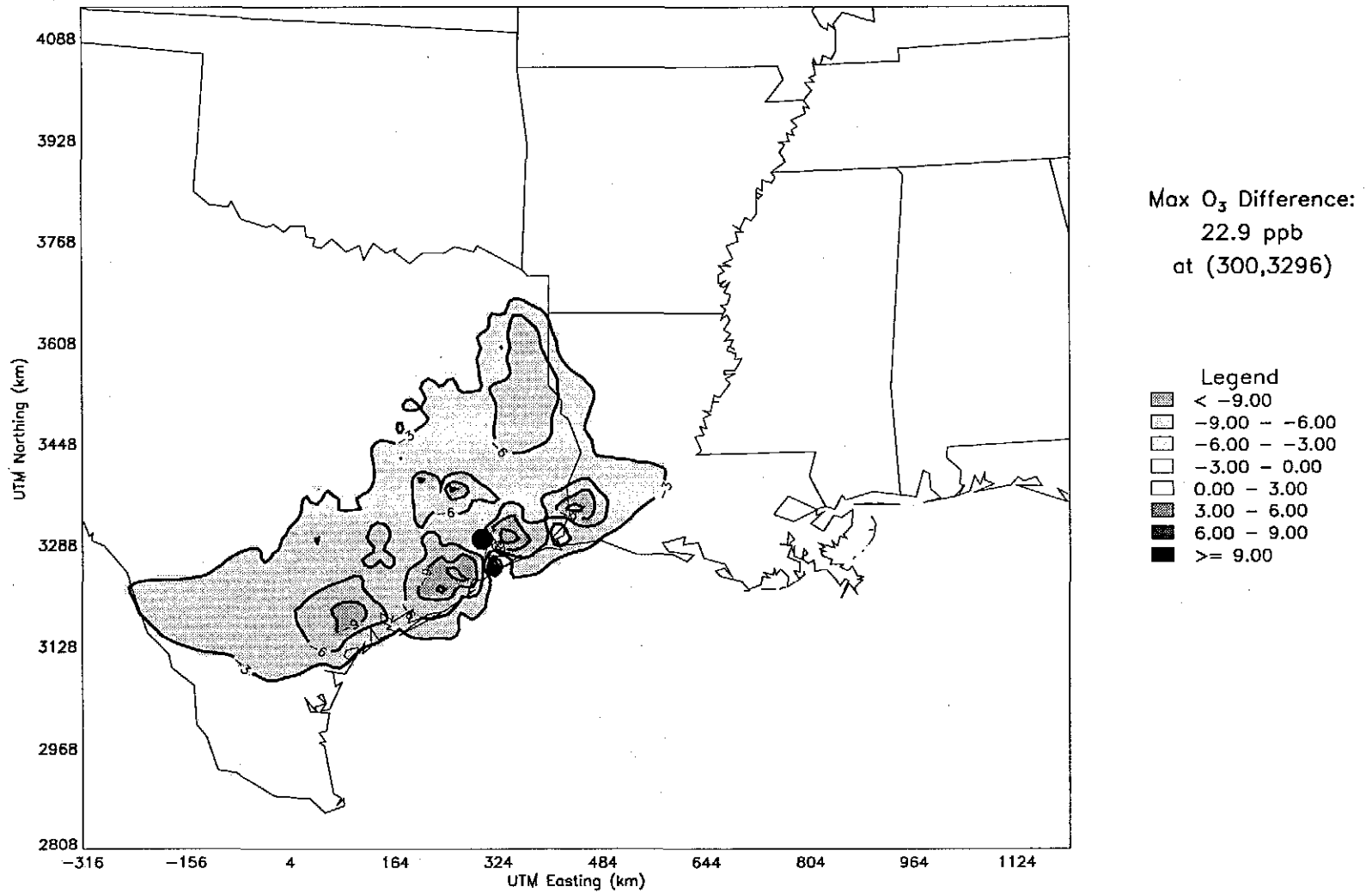


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Figure 7: Modeled Combined Regional Mobile/Point Source Strategy Benefit for 9/8/93 (Emissions Projected to 2007).

Figure A8

Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/09/93  
Regional 50% Point Source NO<sub>x</sub> Reduction + Mobile Source Strategy - Base  
CAMx 1.13 TCAS Regional Model, Layer 1

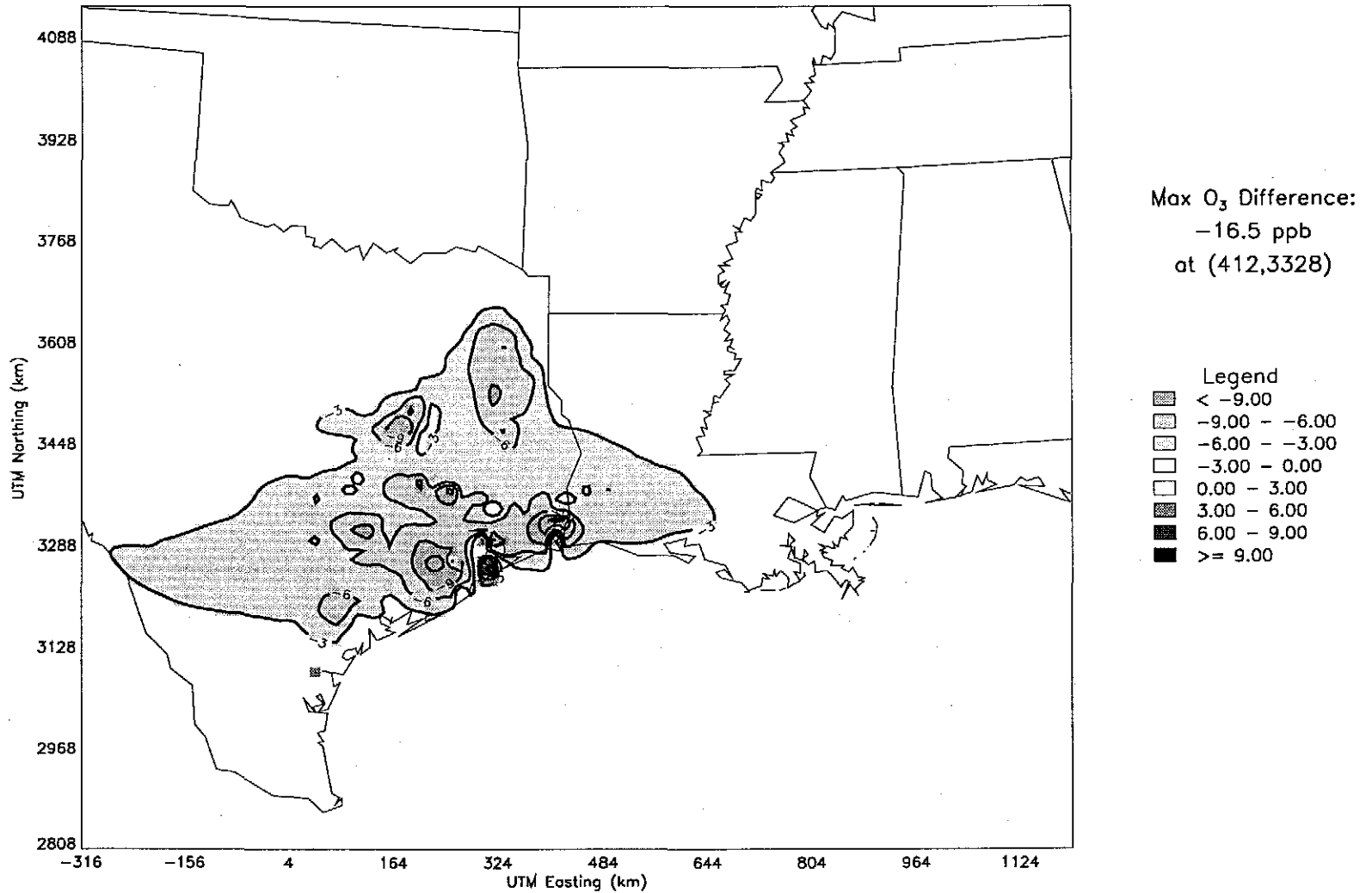


THRC JHS: 06/22/1998 14:41:57: /uomv\_out6/REGIONAL\_comx/AverageFile/comx\_avg.tcas.930909.nes\_base2.regular.regional.18km; /uomv\_out5/REGIONAL\_comx/AverageFile/comx\_avg.tcas.930909.nes\_base2.mobstrat.050T.pN.regional.16km

Figure 8: Modeled Combined Regional Mobile/Point Source Strategy Benefit for 9/9/93 (Emissions Projected to 2007).

Figure A9

Difference of Daily Maximum 8-Hour Moving Average O<sub>3</sub> Concentrations (ppb) for 09/10/93  
Regional 50% Point Source NO<sub>x</sub> Reduction + Mobile Source Strategy - Base  
CAMx 1.13 TCAS Regional Model, Layer 1



TRCC JHS: 06/22/1998 14:54:16: /uomv\_out6/REGIONAL\_comx/AverageFile/comx\_ovrg.tcax.930910.new\_base2.regular.regional\_16km; /uomv\_out6/REGIONAL\_comx/AverageFile/comx\_ovrg.tcax.930910.new\_base2.mobatrot\_050TspN.regional\_16km

Figure 9: Modeled Combined Regional Mobile/Point Source Strategy Benefit for 9/10/93 (Emissions Projected to 2007).