

# **Evaluation and Recommendations for the Austin Area Ozone Monitoring Network**

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## EXECUTIVE SUMMARY

The purpose of this report is to evaluate the existing ozone monitoring network for the Austin area to recommend potential changes to the monitoring locations. The analysis presented in this report relies heavily on the results of the most recent ozone conceptual model for the Austin area (UT, 2010), which was based on measurement data collected during 1993 - 2009. During 2009, there were seven active ozone monitoring stations in the Austin area. This evaluation assumes that the number of Austin area monitors will remain at seven.

Based on the analysis presented in this report, it is recommended that:

1. The Audubon, Murchison, McKinney Roughs and Lake Georgetown monitoring sites should remain at their current locations.
2. The monitoring site in Dripping Springs should be moved to a location approximately 10 miles to the east-northeast of its current location.
3. The monitoring site in Round Rock should be moved to a location near the intersection of US 290 and SH 130.
4. The monitoring site in San Marcos should be moved to a location in the vicinity of the boundary between Travis and Caldwell counties.
5. The nitrogen oxides (NO<sub>x</sub>) monitor currently located at Dripping Springs should be moved to the Murchison monitoring site.

The recommended changes to the monitoring network configuration are summarized in Figure ES-1, which also shows the local residence time results for days with maximum ozone concentrations  $\geq 70$  ppb at Murchison. The residence time maps show the most frequent geographic areas upwind of Austin prior to high ozone days. The reader is referred to the current report or the ozone conceptual model (UT, 2010) for a description of the methodology used to generate residence time maps.

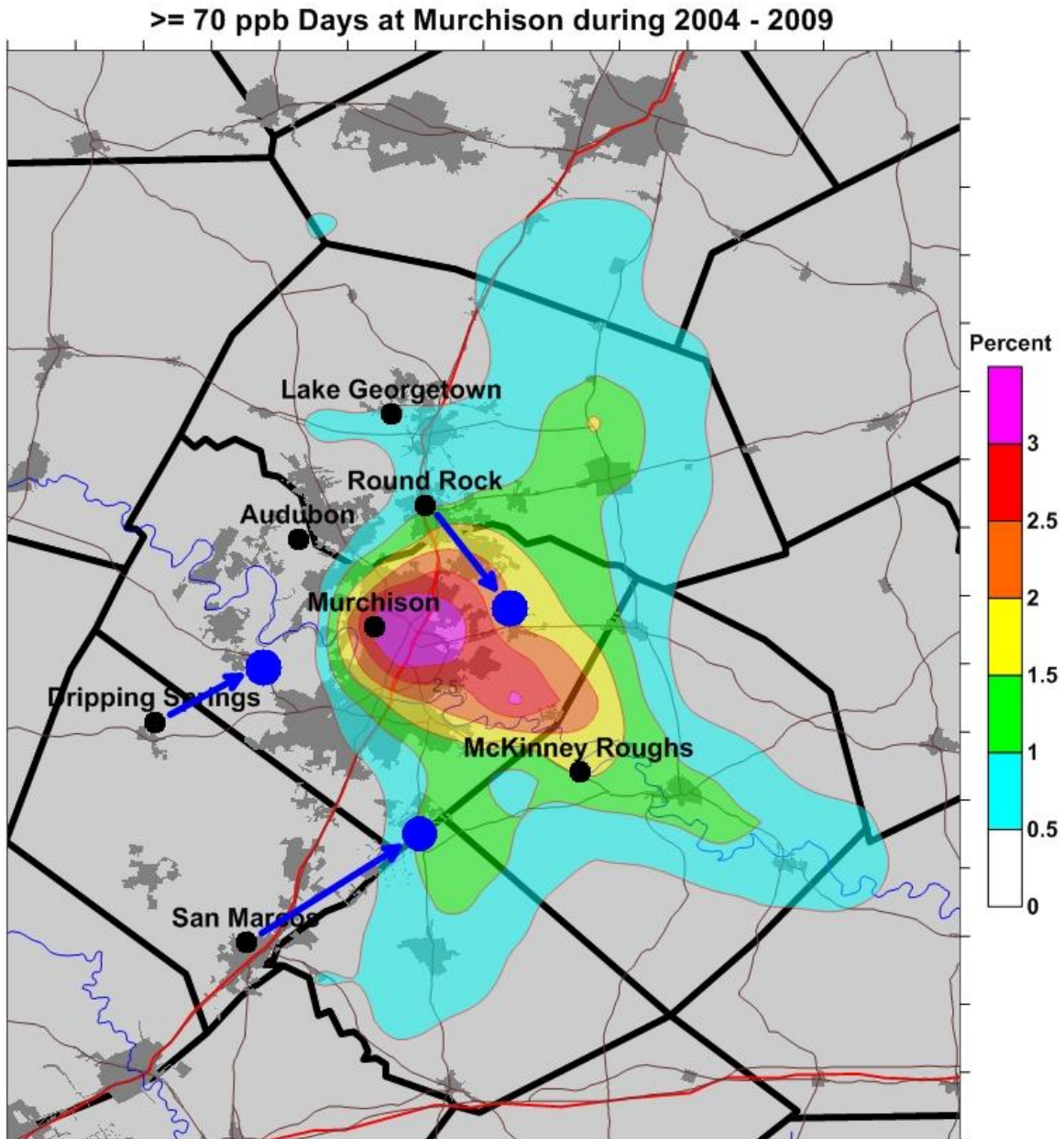
As suggested by the commonly upwind geographic areas shown in Figure ES-1, high ozone days in the Austin area most often have surface winds that blow from the northeast, southeast, and south. The relocation of the monitors currently in Round Rock and San Marcos would enhance the ability of the monitoring network to measure background ozone concentrations transported into the Austin area.

The Audubon, Murchison, Lake Georgetown, and Dripping Springs monitors are sometimes well-positioned to sample a portion of the Austin urban plume and are intended to capture the maximum ozone concentrations in the Austin area. The Dripping Springs monitor has been operational since 2003 and has not often measured high ozone concentrations compared to other Austin monitors. The re-location of the Dripping Springs monitor to a location closer to the Austin metropolitan area is intended to enhance the potential for capturing high ozone concentrations when winds are from the northeast or east. Following the 2011 ozone season, the data collected at the new monitoring location should be re-evaluated to confirm that relatively high ozone

concentrations are measured on days with northeasterly or easterly winds. If high ozone concentrations are not measured during 2011, the monitor may be better used at a difference location, especially since it will not be well-positioned to serve as a background ozone monitor during high ozone episodes in the Austin area.

NO<sub>x</sub> measurements are currently collected at Audubon, Lake Georgetown, and Dripping Springs. It is recommended that the NO<sub>x</sub> monitor currently located in Dripping Springs be moved to Murchison. Murchison most often measures the Austin area maximum ozone concentration. Coincident sampling of NO<sub>x</sub> and ozone at Murchison would provide data to analyze the relationship between these two pollutants at a location characterized by fresh emissions of NO<sub>x</sub> from urban emissions sources.

**Figure ES-1.** Local trajectory residence time (based on 24-hour surface wind back-trajectories initiated at Murchison) in percent for days during 2004 – 2009 characterized by a maximum ozone concentration averaged over 8 hours  $\geq 70$  ppb. The map also shows the location of the active Austin area ozone monitors during 2009 and the suggested re-location of three of the seven monitors.



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## 1.0 Introduction

The purpose of this report is to evaluate the existing ozone monitoring network for the Austin area to recommend potential changes to the monitoring locations. This evaluation assumes that the number of monitors within the Austin network will remain the same as during 2009.

The analysis presented in this report relies heavily on the results of the most recent ozone conceptual model for the Austin area (UT, 2010), which was based on measurement data collected during 1993 - 2009. For the purposes of conceptual model development, high ozone days were partitioned into three classes (with the nomenclature used in the conceptual model in parenthesis):

Days when the maximum ozone concentration was greater than or equal to 60 ppb  
(denoted as 60 ppb days or  $\geq 60$  ppb days)

Days when the maximum ozone concentration was greater than or equal to 65 ppb  
(denoted as 65 ppb days or  $\geq 65$  ppb days)

Days when the maximum ozone concentration was greater than or equal to 70 ppb  
(denoted as 70 ppb days or  $\geq 70$  ppb days)

Or three ranges:

Days when the maximum ozone concentration was 60 to 64 ppb  
(denoted as 60 - 64 ppb days)

Days when the maximum ozone concentration was 65 to 69 ppb  
(denoted as 65 - 69 ppb days)

Days when the maximum ozone concentration was greater than or equal to 70 ppb  
(denoted as  $\geq 70$  ppb days)

## 2.0 Austin Area Ozone Monitoring

During 2009, ozone data were collected at seven monitors in the Austin area. Table 2-1 presents a summary of identification and geographic data for these monitoring stations. A map showing the monitoring locations is provided in Figure 2-1. The Murchison (CAMS 3) and Audubon (CAMS 38) monitors are operated continuously throughout the year. The remaining monitors shown in Table 2-1 are operated during the ozone season only (i.e., April – October). Nitrogen oxides (NO<sub>x</sub>) were measured at Audubon, Lake Georgetown (CAMS 690) and Dripping Springs (CAMS 614).

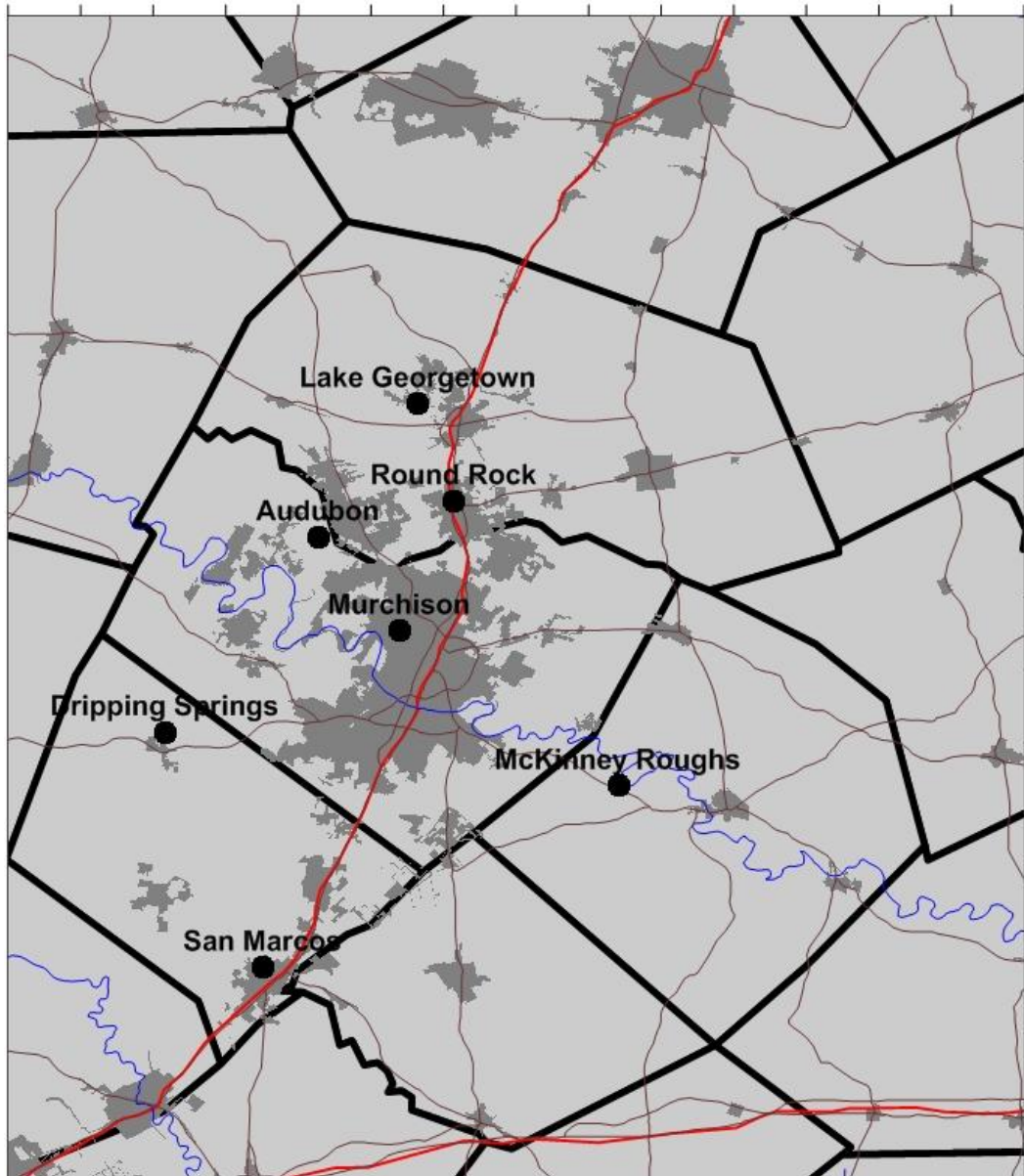
**Table 2-1.** Description and location of Austin area ozone monitoring stations.

<b>Monitoring Station</b>	<b>CAMS #</b>	<b>AIRS ID</b>	<b>County</b>	<b>Address</b>	<b>Operating Entity</b>	<b>Operational Period (since 1993)</b>
Audubon <sup>1</sup>	38	48-453-0020	Travis	12200 Lime Creek Rd.	TCEQ	Mar. 1997 - present
Dripping Springs <sup>1,2</sup>	614	48-209-0614	Hays	29400 Ranch Rd. 12	CAPCOG	Mar. 2003 - present
Lake Georgetown <sup>1,2</sup>	690	48-491-0690	Williamson	500 Lake Overlook Dr.	CAPCOG	Sep. 20, 2007 - present
McKinney Roughs <sup>2</sup>	684	48-021-0684	Bastrop	1884 State Hwy 71 W	CAPCOG	Aug. 22, 2006 - present
Murchison	3	48-453-0014	Travis	3724 North Hills Dr.	TCEQ	1993 – present
Round Rock <sup>2</sup>	674	48-491-0674	Williamson	212 Commerce St.	CAPCOG	Jun. 7, 2006 - present
San Marcos <sup>2</sup>	675	48-209-0675	Hays	222 Sessoms Dr.	CAPCOG	Jun. 15, 2006 - present

<sup>1</sup>NOx is monitored in addition to ozone.

<sup>2</sup>Ozone seasonal (April – October) monitoring stations.

**Figure 2-1.** Active ozone monitoring monitors in the Austin area during 2009.



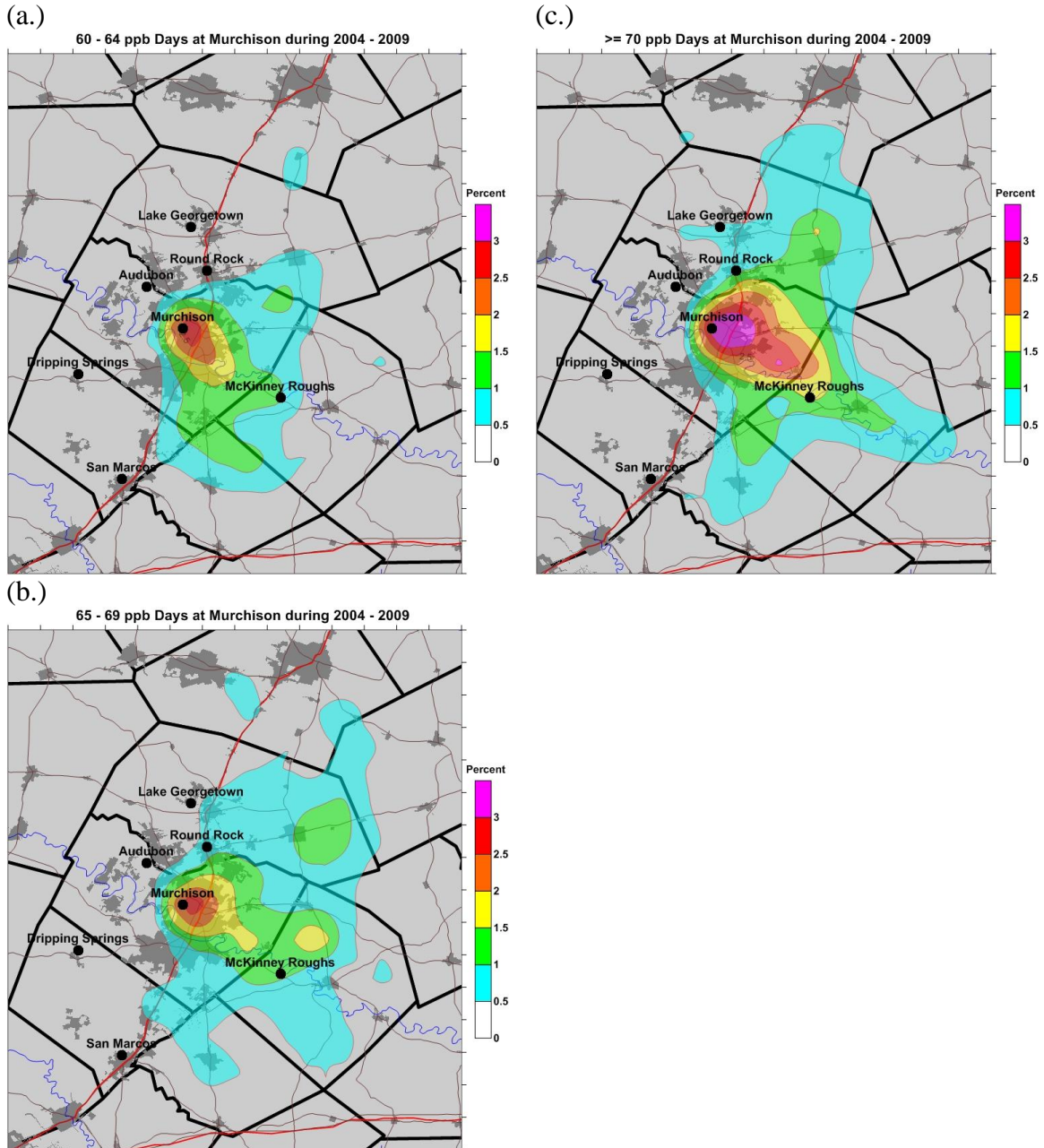
### 3.0 Trajectory Residence Time Maps

In support of the ozone conceptual model, residence time maps were developed to visually summarize the most frequent geographic areas upwind of the Austin area prior to days characterized by high ozone concentrations. These maps can be used to: (1) visualize the most common wind flow patterns prior to high ozone days in Austin, and (2) identify potential emissions source regions of background ozone entering the Austin area prior to high ozone days in Austin.

The residence time maps were generated from individual back-trajectories calculated for days that occurred during 2004 – 2009. Maps used to investigate local transport patterns in the Austin area were based on 24-hour back-trajectories calculated from 5-minute averaged surface wind measurements collected at Central Texas monitoring locations. In addition to the local maps, transport patterns within Texas were investigated using intra-state residence time maps based on three-day HYSPLIT back-trajectories initiated at a height of 10 meters above the surface. Both the local and intra-state back-trajectories were initiated daily at 1700 CST. The reader is referred to the recently completed ozone conceptual model for the Austin area (UT, 2010) for a description of the methodology used to generate the residence time maps and to view the complete results.

The discussions reported here use the residence time results for days with maximum ozone concentrations averaged over 8 hours of: (1) 60 – 64 ppb, (2) 65 – 69 ppb, and (3)  $\geq 70$  ppb. Figure 3-1 (a) – (c) shows the local residence time maps for the 60 – 64 ppb, 65 – 69 ppb, and  $\geq 70$  ppb ozone ranges, respectively, based on the maximum ozone concentrations measured at Murchison. The spatial patterns that identify the local geographic areas upwind of Murchison prior to high ozone days are consistent with northeasterly, southeasterly, or southerly winds. Winds with a westerly component are relatively rare in the Austin area.

**Figure 3-1.** Local trajectory residence time (based on 24-hour surface wind back-trajectories initiated at Murchison) in percent during 2004 – 2009 for days characterized by a maximum ozone concentration averaged over 8 hours (a.) 60 – 64 ppb, (b.) 65 – 69 ppb, and (c.)  $\geq 70$  ppb. These maps also show the locations of active ozone monitors during 2009.

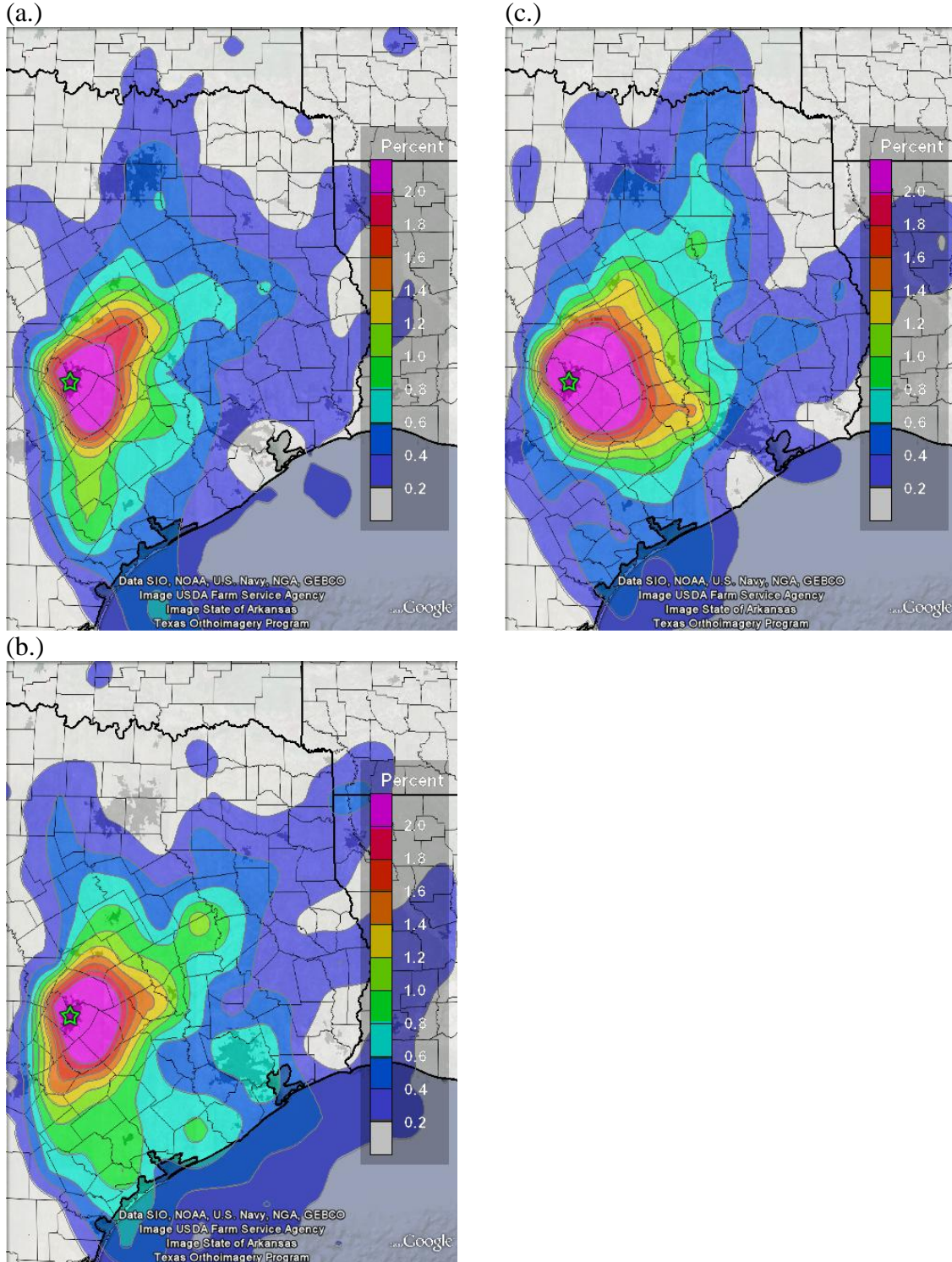


The intra-state residence time maps, which are based in the 3-day HYSPLIT back-trajectories, are shown in Figure 3-2 (a) – (c) for the 60 – 64 ppb, 65 – 69 ppb, and  $\geq 70$  ppb ozone ranges, respectively. The purpose of these maps is to identify potential geographic source areas within Texas impacting ozone concentrations anywhere within the Austin area; therefore, ozone days were defined by the maximum ozone concentration measured at any Austin monitor. The back-trajectories were initiated at Murchison, which is the monitor that most often measures the maximum ozone concentration in Austin.

The overall spatial coverage of potential ozone source regions within Texas is similar for all three ozone ranges, and is consistent with wind directions in the lower troposphere that range from north-northeasterly clockwise to southerly. The 60 – 64 ppb and 65 – 69 ppb maps are consistent with two general patterns of transport within Texas associated with southerly winds and northeasterly winds. In comparison to the two lower ozone categories, the residence time map for  $\geq 70$  ppb ozone days extends farther eastward into Houston/Galveston/Brazoria (HGB) and farther northeastward into areas located to the east of Dallas/Fort Worth (DFW). Overall the 70 ppb spatial pattern is consistent with flow from the east-southeast and northeast.

Across all ozone categories, the most common upwind geographic areas in Texas (roughly defined by the 0.4% contour interval) includes a region bounded by Austin to the west, DFW to the north, HGB to the southeast, and Corpus Christi to the south. In the immediate Austin area, portions of Travis, Caldwell, Bastrop, Lee, Milam, and Williamson counties are often within the 2.0% contour interval. This region is largest for the 70 ppb ozone range, expanding southeastward to include Fayette County and northeastward to include Bell County.

**Figure 3-2.** Intra-state trajectory residence time in percent (based on 3 day HYSPLIT back-trajectories initiated at 10-meters at Murchison) during 2004 – 2009 for days characterized by an Austin maximum ozone concentration averaged over 8 hours (a.) 60 – 64 ppb, (b.) 65 – 69 ppb, and (c.)  $\geq 70$  ppb.



## 4.0 Results and Discussion

This section provides a summary of results for each of the seven Austin area monitors shown in Table 2-1.

### 4.1 Audubon and Murchison

The ozone measurement data collected at the Audubon and Murchison monitoring stations are used by TCEQ to determine whether Austin is in compliance with the NAAQS for ozone. These monitors have a long monitoring history at their present locations and were not considered for re-location in this analysis.

**Recommendation:** The Audubon and Murchison monitoring sites should remain at their current locations.

### 4.2 Dripping Springs

The results of the ozone conceptual model found that winds near and above the surface often blow from the northeast or east on high ozone days in Austin. In 2003, the Dripping Springs monitor was installed 20 miles to the west-southwest of downtown Austin to capture a portion of the Austin urban ozone plume during periods of northeasterly or easterly winds. Murchison is located in the immediate metropolitan area, which is a region characterized by fresh emissions from urban sources. The Dripping Springs monitor was sited to measure ozone concentrations within a more aged portion of the urban plume that has had more time for chemical reactions to occur.

Figure 4-1 presents the daily maximum ozone concentrations versus the 0600 – 1800 CST (i.e., daytime) wind directions measured at Dripping Springs during March 2003 – October 16, 2010. The high ozone concentrations during northeasterly and easterly winds are likely measurements within a portion of the downwind Austin plume. Note that high ozone concentrations are also measured during days with southerly/southeasterly winds. In contrast to high ozone days during northeasterly winds, the overall frequency of high ozone days during southerly/southeasterly winds is relatively lower when compared to the frequency of occurrence of southerly/southeasterly winds.

Figure 4-2 presents a scatterplot of the maximum ozone concentrations measured at Murchison and Dripping Springs when at least one monitor measured an ozone concentration  $\geq 60$  ppb. A one-to-one line is shown on the chart. Observations that fall on the one-to-one line would indicate no difference between the Murchison and Dripping Springs concentrations. Observations located farthest from the one-to-one line demonstrate the largest differences between the minimum and maximum ozone concentrations. The majority of the observations show that the Dripping Springs concentrations were relatively lower than those measured at Murchison (i.e., the observations are located below the one-to-one line), especially for days with maximum ozone concentrations  $\geq 65$  ppb.

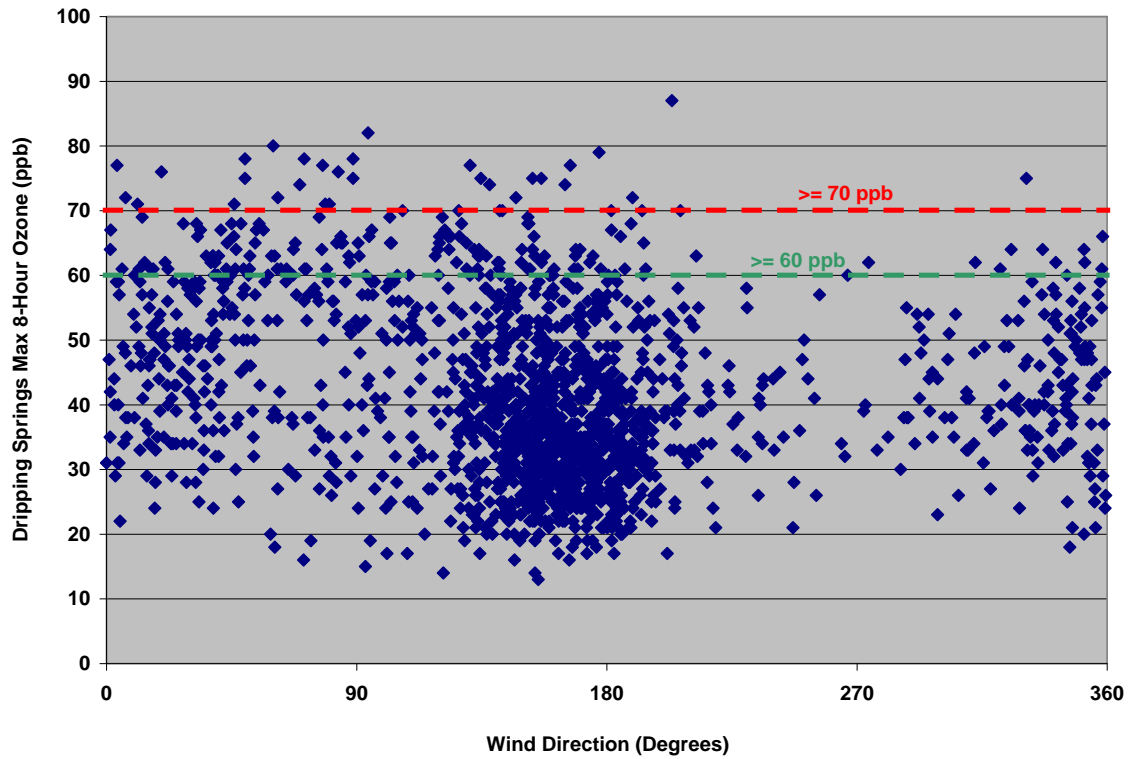
Figure 4-3 presents a scatterplot of the ratio of the maximum ozone concentrations at Dripping Springs compared to Murchison for the days shown in Figure 4-2 versus the 0600 – 1800 CST resultant wind direction at Dripping Springs. Days with higher concentrations at Dripping Springs relative to Murchison are most frequent on days with either northeasterly or easterly winds.

At its current location, the Dripping Springs concentration is rarely higher than that measured at Murchison. There may be a number of reasons for this trend (e.g., spatial differences in the relative concentrations of ozone precursor compounds, local variation in atmospheric mixing associated with terrain, important local emissions sources that impact the Dripping Springs monitor). One hypothesis for the relatively lower ozone concentrations at Dripping Springs is that the monitor is located too far downwind to capture the maximum concentrations within the downwind urban plume. This may be because ozone concentrations have become too dispersed at this distance. In addition, afternoon winds tend to blow with a more easterly or southerly component, and these winds may transport the core of the urban plume to the north of the Dripping Springs location.

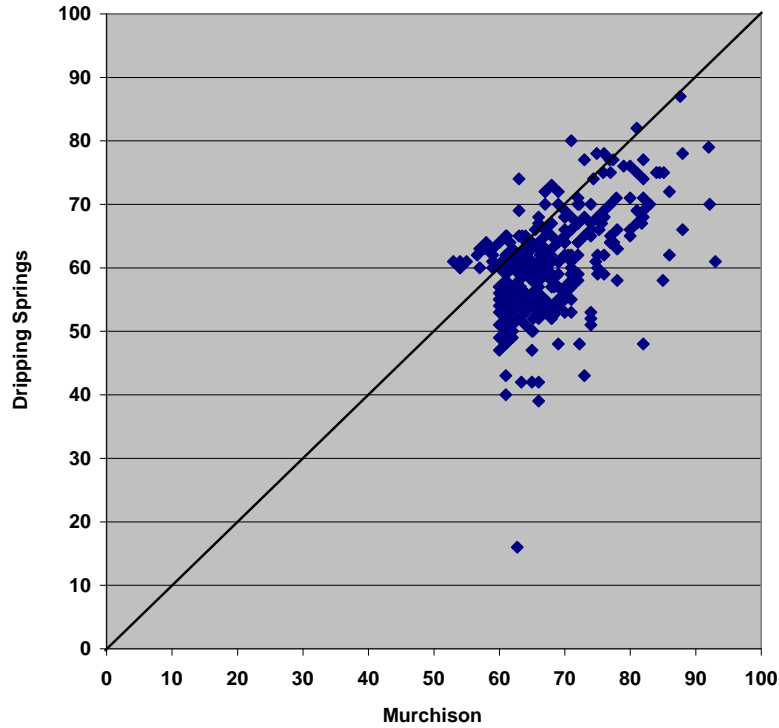
**Recommendation:** CAMS 614, which is currently located in Dripping Springs, should be moved closer to the Austin area to a position approximately 10 miles to the west-southwest of downtown Austin. The suggested general location is shown in Figure 4-4. Following the 2011 ozone season, the data collected at CAMS 614 should be re-evaluated to confirm that relatively high ozone concentrations are captured on days with northeasterly or easterly winds. If high ozone concentrations are not measured during 2011, CAMS 614 may be better used at a different location, especially since it is not well-positioned to serve as a background ozone monitor during high ozone episodes in the Austin area.

In addition, it is recommended that the NO<sub>x</sub> monitor currently located in Dripping Springs be moved to Murchison. Murchison most often measures the Austin area maximum ozone concentration. Coincident sampling of NO<sub>x</sub> and ozone at Murchison would provide data to analyze the relationship between these two pollutants at a location characterized by fresh emissions of NO<sub>x</sub> from urban emissions sources.

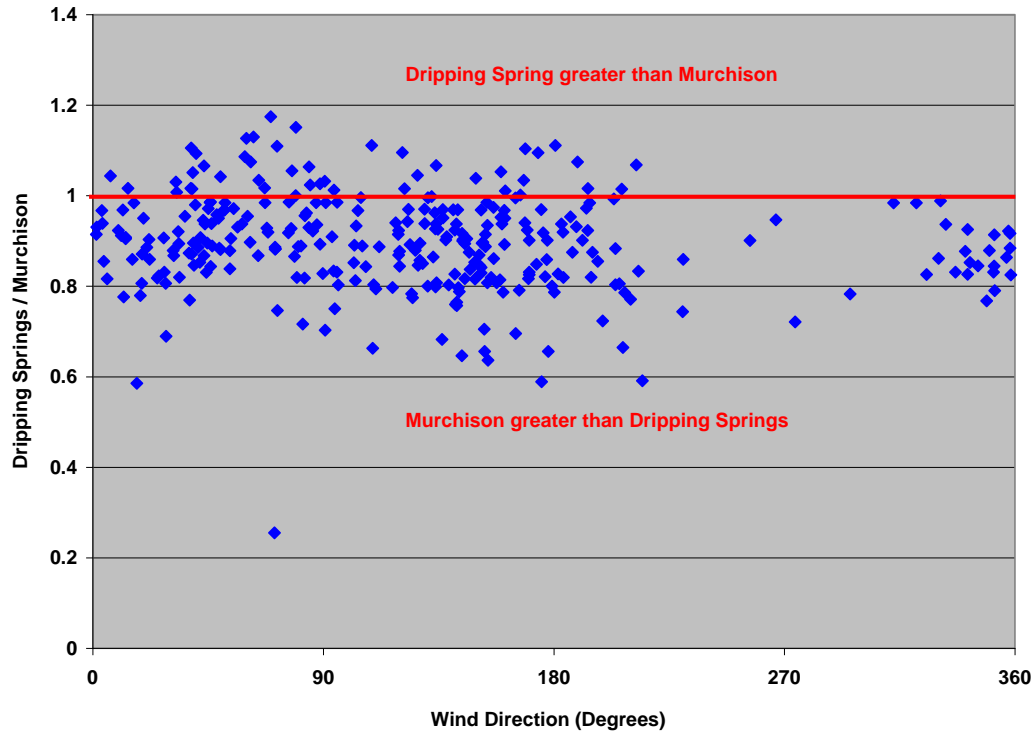
**Figure 4-1.** Daily maximum ozone concentrations versus the 0600 – 1800 CST resultant wind directions at Dripping Springs.



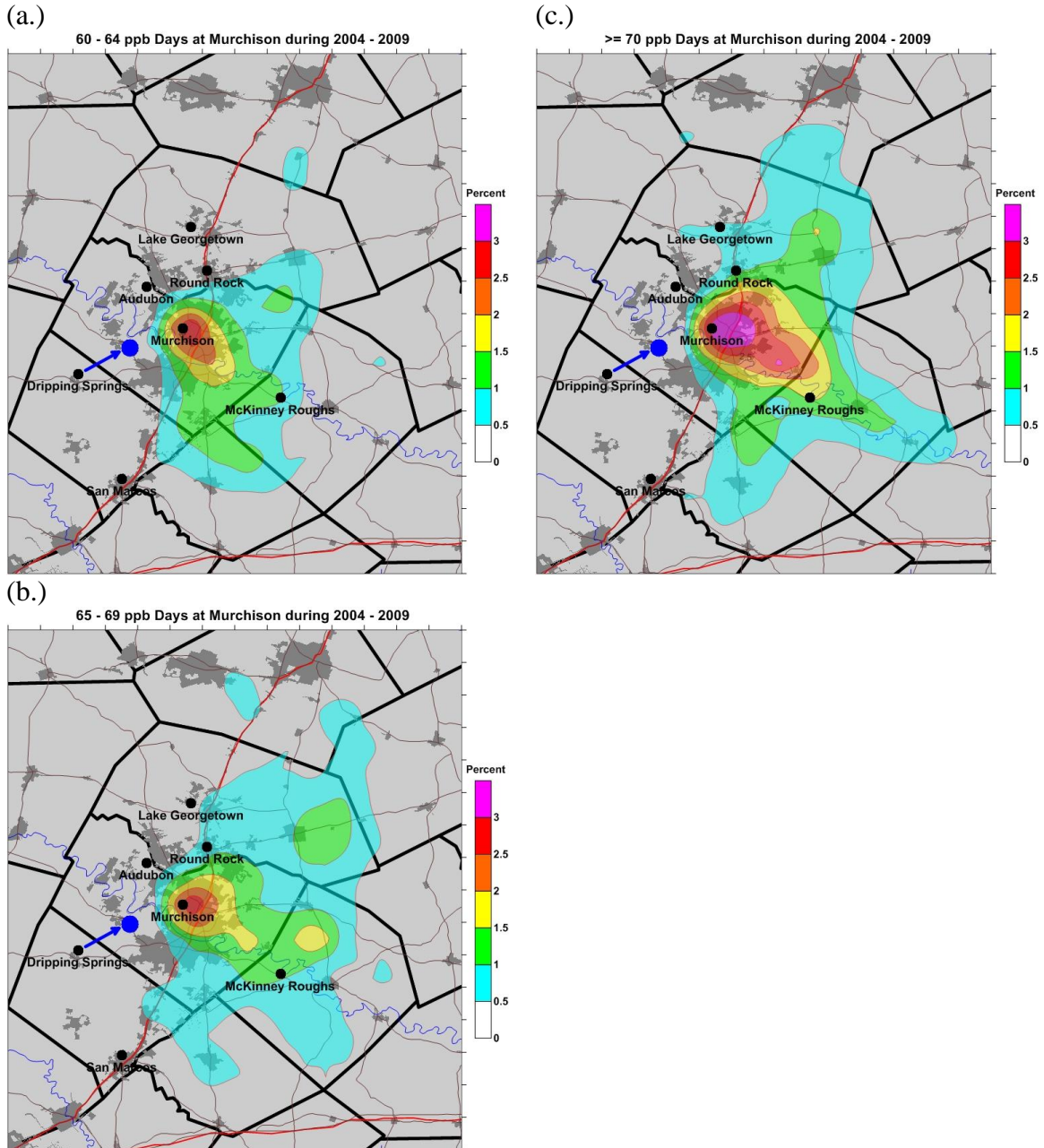
**Figure 4-2.** Daily maximum ozone concentrations at Murchison and Dripping Springs when the maximum ozone concentration at one or both monitors was  $\geq 60$  ppb.



**Figure 4-3.** Ratios of the daily maximum ozone concentration at Dripping Springs to that measured at Murchison when one or both monitors measured  $\geq 60$  ppb.



**Figure 4-4.** Local trajectory residence time (based on 24-hour surface wind back-trajectories initiated at Murchison) in percent during 2004 – 2009 for days characterized by a maximum ozone concentration averaged over 8 hours (a.) 60 – 64 ppb, (b.) 65 – 69 ppb, and (c.)  $\geq 70$  ppb. The maps show the recommended re-location of CAMS 614 currently located in Dripping Springs.



### 4.3 San Marcos

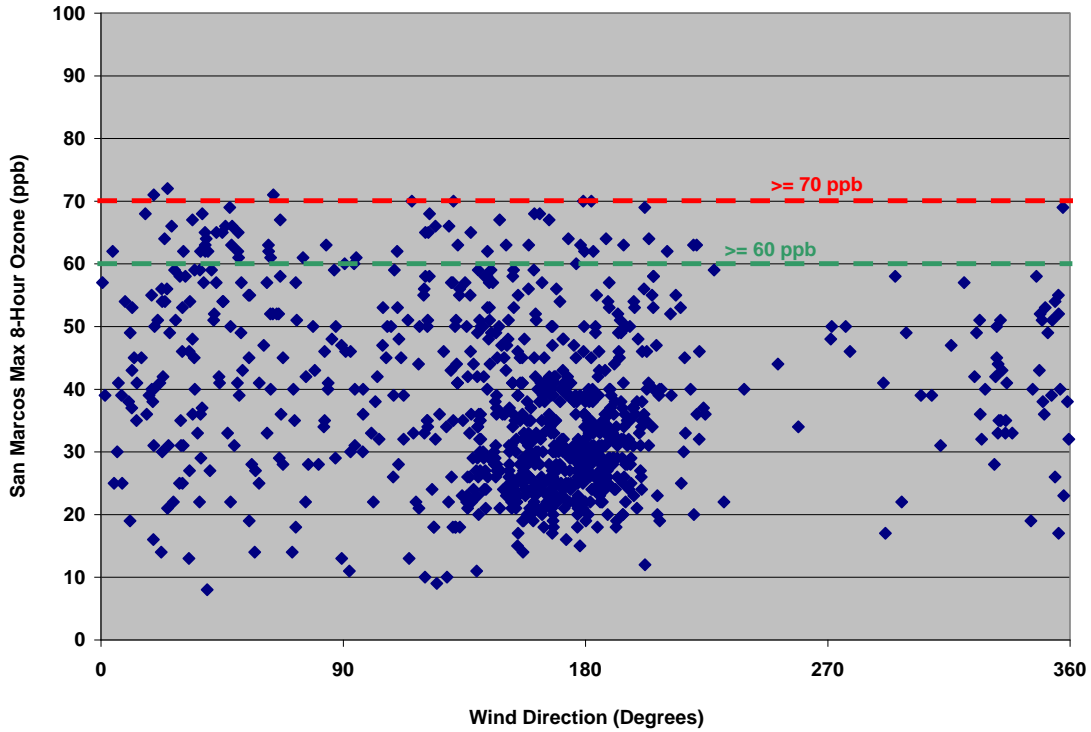
The results of the ozone conceptual model found that the frequency of occurrence of high ozone days as a percentage of total days with northeasterly/easterly winds is relatively high for Austin; however, high ozone concentrations also commonly occur during southeasterly/southerly winds. The upwind geographic source areas consistent with southerly flow on high ozone days is clearly evident in several of the local and intra-state residence time maps shown in Figures 3-1 and 3-2, respectively.

Figure 4-5 presents the daily maximum ozone concentrations at San Marcos versus the 0600 – 1800 CST (i.e., daytime) wind directions measured at San Marcos during June 2006 – October 16, 2010. Ozone concentrations  $\geq 60$  ppb are most often measured on days with northeasterly or southeasterly/southerly winds. Figure 4-6 presents a scatterplot of the maximum ozone concentrations measured at Murchison and San Marcos when at least one monitor measured an ozone concentration  $\geq 60$  ppb. A one-to-one line is shown on the chart. The majority of observations show that the San Marcos concentrations are typically lower than those measured at Murchison (i.e., the observations are located below the one-to-one line).

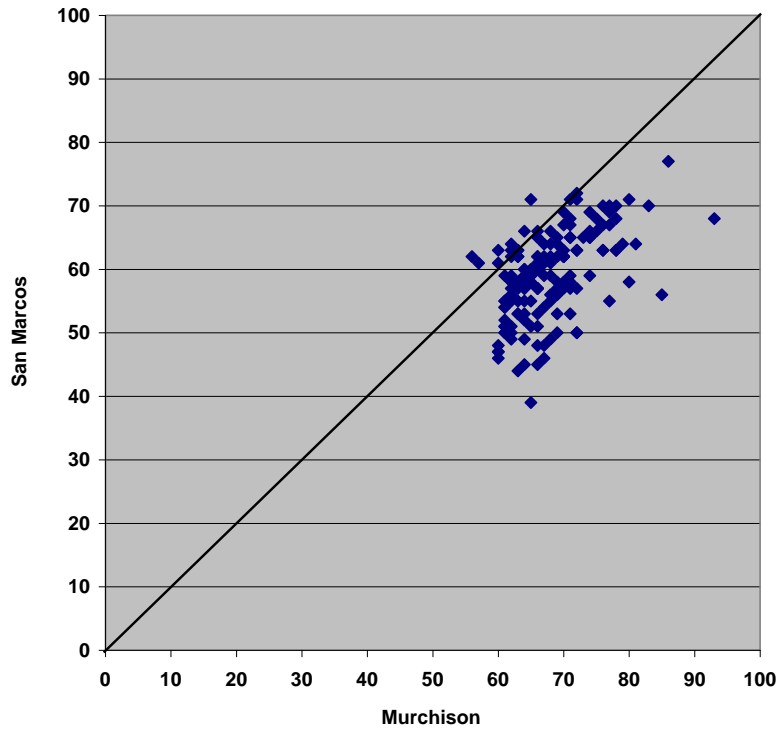
At the current location, the San Marcos monitor provides data to establish maximum concentrations in the San Marcos metropolitan area. The San Marcos monitor rarely measures the maximum concentrations in the Austin area and is also rarely well-positioned to measure background ozone concentrations entering the Austin area. For example, as shown in the local residence time maps in Figure 3-1, San Marcos is located well to the west of the upwind geographic areas that represents southerly flow into Austin prior to high ozone days.

**Recommendation:** CAMS 675, which is currently located in San Marcos, should be repositioned to more effectively sample background ozone concentrations entering the Austin area on days characterized by southerly winds. The suggested new location is shown in Figure 4-7, which places the monitor approximately 15 miles to the south of downtown Austin along the boundary between Travis and Caldwell counties. Following 2011, the ozone concentrations measured at this new location should be analyzed and, if necessary, CAMS 675 could be moved to a different location.

**Figure 4-5.** Daily maximum ozone concentrations versus the 0600 – 1800 CST resultant wind directions at San Marcos.



**Figure 4-6.** Daily maximum ozone concentrations at Murchison and San Marcos when the maximum ozone concentration at one or both monitors was  $\geq 60$  ppb.





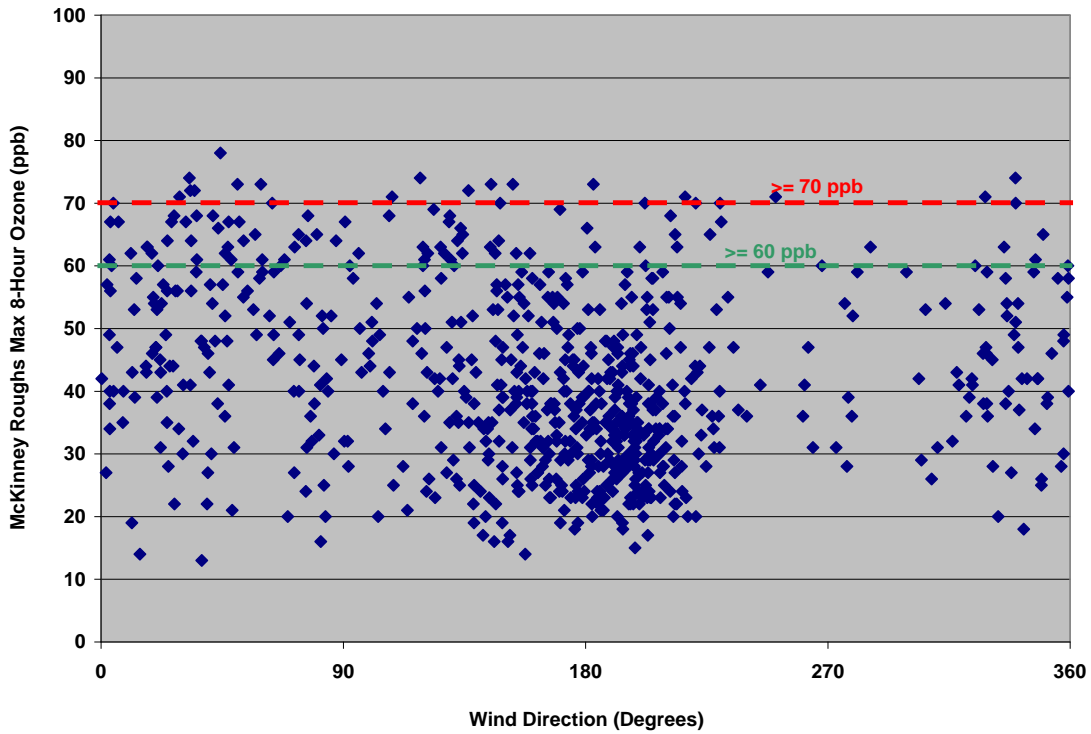
#### 4.4 McKinney Roughs

As shown in the local residence maps in Figure 3-1, the McKinney Roughs monitor is located within the upwind geographic area that extends southeast from Murchison on high ozone days. The McKinney Roughs monitor is well-positioned to measure background ozone concentrations entering the Austin area on days with east-southeasterly or southeasterly daytime winds, and we recommend that the monitor remain at the current location.

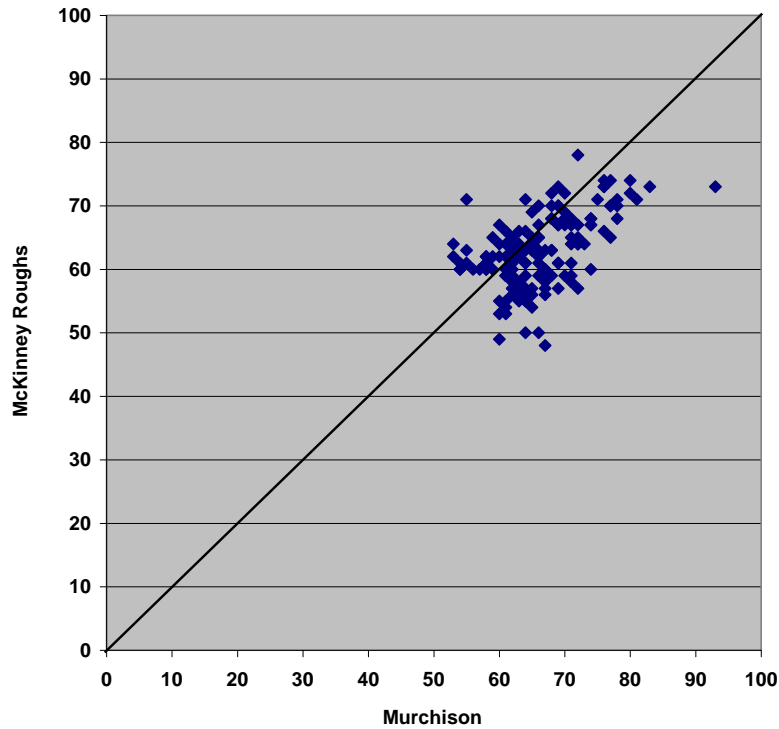
Figure 4-8 presents the daily maximum ozone concentrations versus the 0600 – 1800 CST (i.e., daytime) wind directions measured at McKinney Roughs during August 2006 – October 16, 2010. Similar to other Austin area monitors, ozone concentrations  $\geq 60$  ppb are most commonly measured on days with northeasterly or southeasterly winds. Figure 4-9 presents a scatterplot of the maximum ozone concentrations measured at Murchison and McKinney Roughs when at least one monitor measured an ozone concentration  $\geq 60$  ppb. A number of days are characterized by a relatively higher concentration at McKinney Roughs compared to Murchison. Figure 4-10 presents a scatterplot of the ratio of the maximum ozone concentrations at McKinney Roughs to Murchison for the days shown in Figure 4-9 versus the 0600 – 1800 CST resultant wind direction at McKinney Roughs. Interestingly, higher concentrations are measured at McKinney Roughs for all wind directions (e.g., for days when McKinney Roughs is both upwind and downwind of Murchison). McKinney Roughs is directly upwind of downtown Austin during periods of southeasterly winds, and the relatively higher ozone concentrations on some of these days suggests that background concentrations entering Austin could account for 100% of the ozone measured at Murchison.

**Recommendation:** The McKinney Roughs monitoring site should remain at its current location.

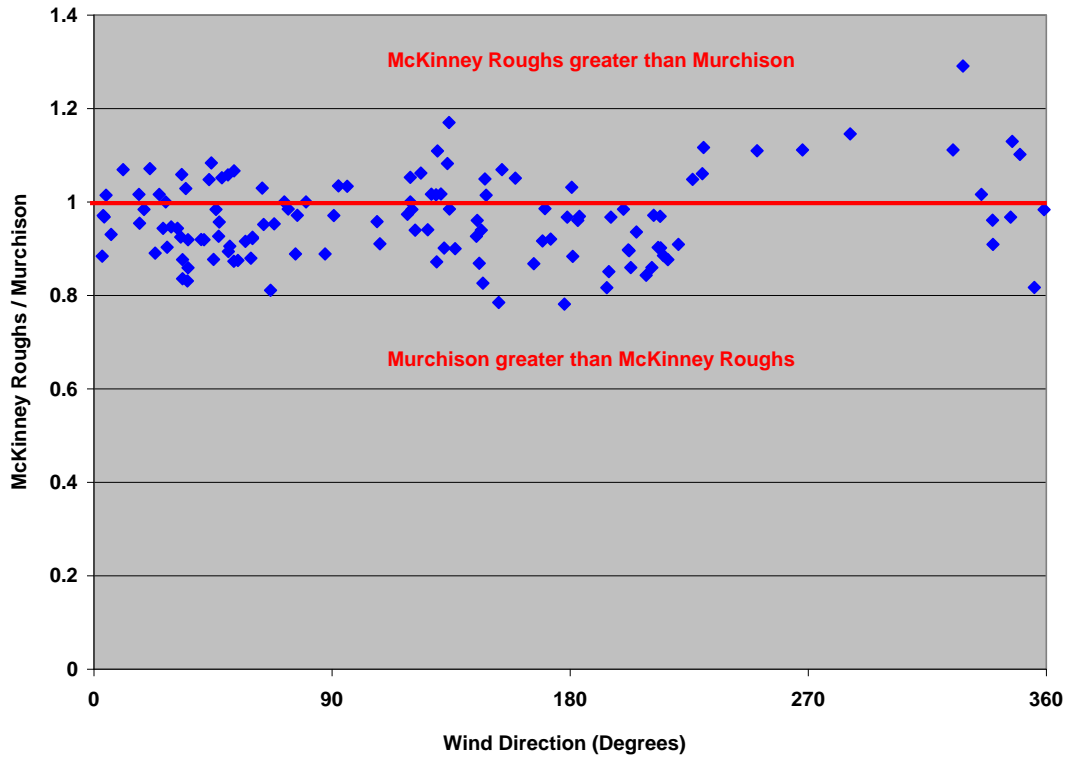
**Figure 4-8.** Daily maximum ozone concentrations versus the 0600 – 1800 CST resultant wind directions at McKinney Roughs.



**Figure 4-9.** Daily maximum ozone concentrations at Murchison and McKinney Roughs when the maximum ozone concentration at one or both monitors was  $\geq 60$  ppb.



**Figure 4-10.** Ratios of the daily maximum ozone concentration at McKinney Roughs to that measured at Murchison when one or both monitors measured  $\geq 60$  ppb.

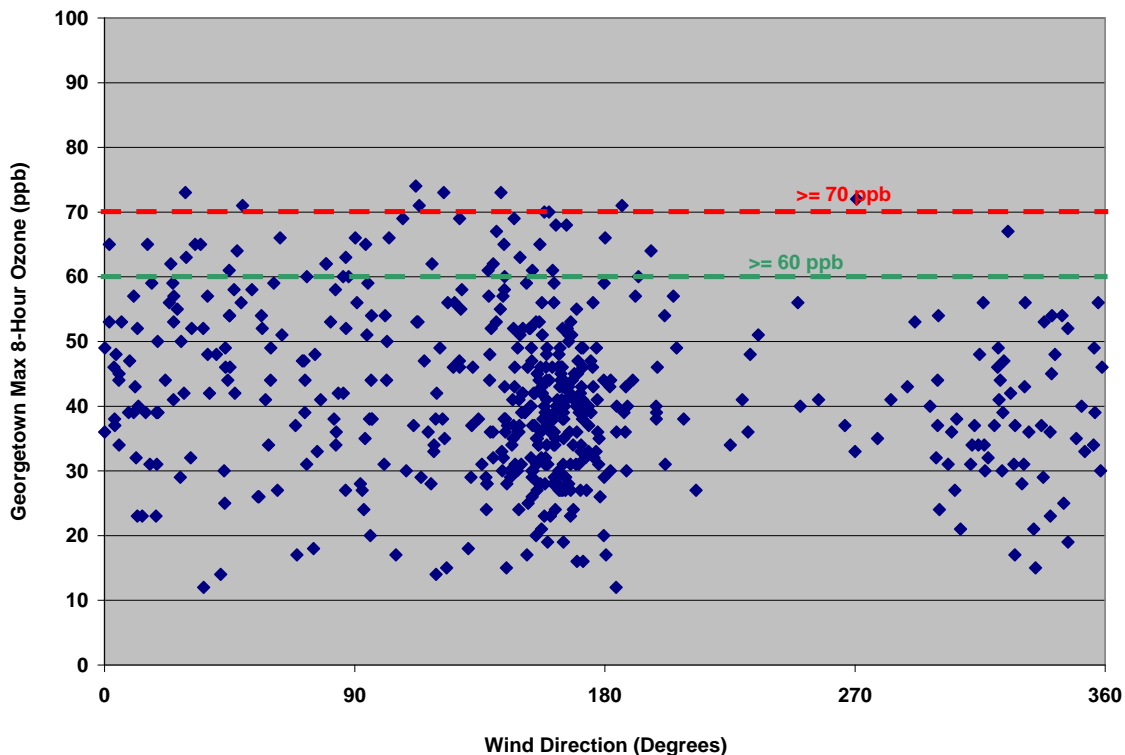


#### 4.5 Lake Georgetown

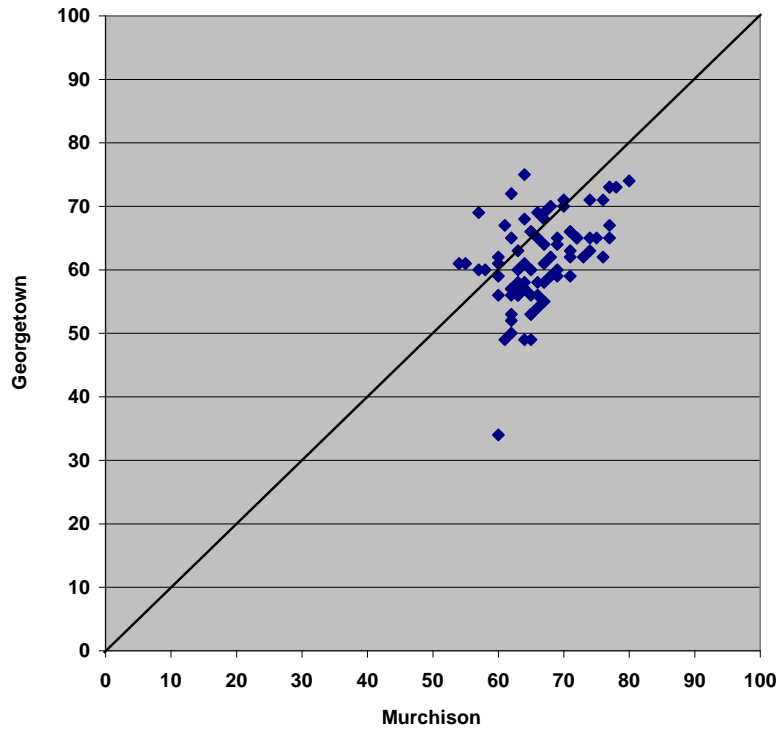
Figure 4-11 presents the daily maximum ozone concentrations versus the 0600 – 1800 CST (i.e., daytime) wind directions measured at Lake Georgetown during September 2007 – October 16, 2010. Ozone concentrations  $\geq 60$  ppb are most often measured on days with northeasterly, easterly, or southeasterly winds. Figure 4-12 presents a scatterplot of the maximum ozone concentrations measured at Murchison and Lake Georgetown when at least one monitor measured an ozone concentration  $\geq 60$  ppb. Murchison typically measures a higher ozone concentration compared to that measured at Lake Georgetown. Figure 4-13 presents a scatterplot of the ratio of the maximum ozone concentrations at Georgetown compared to Murchison for the days shown in Figure 4-12 versus the 0600 – 1800 CST resultant wind direction at Lake Georgetown. On days with southeasterly and south-southeasterly winds, the maximum ozone concentrations are greater at Lake Georgetown compared to Murchison, consistent with Lake Georgetown being well-positioned to capture a portion of the downwind Austin urban plume. Most days for the remaining wind directions have higher concentrations at Murchison compared to Lake Georgetown. The Lake Georgetown monitor is in position to measure background ozone concentrations entering the immediate Austin area on days characterized by winds with a northerly component.

**Recommendation:** The Lake Georgetown monitoring site should remain at its current location.

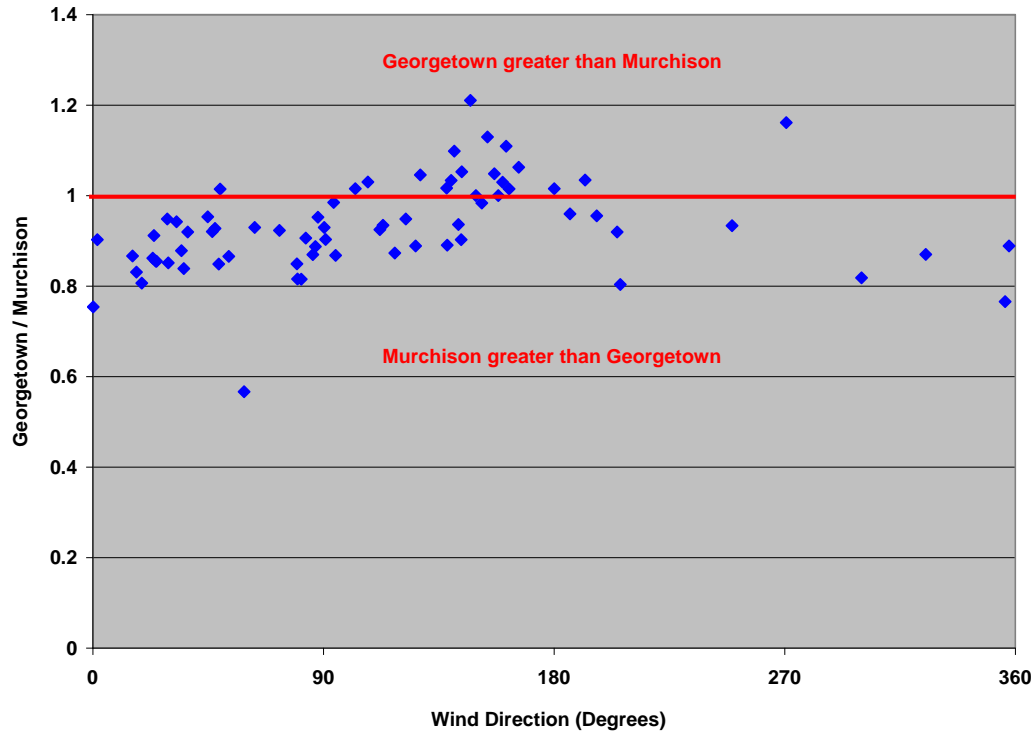
**Figure 4-11.** Daily maximum ozone concentrations versus the 0600 – 1800 CST resultant wind directions at Lake Georgetown.



**Figure 4-12.** Daily maximum ozone concentrations at Murchison and Lake Georgetown when the maximum ozone concentration at one or both monitors was  $\geq 60$  ppb.



**Figure 4-13.** Ratios of the daily maximum ozone concentration at Lake Georgetown to that measured at Murchison when one or both monitors measured  $\geq 60$  ppb.

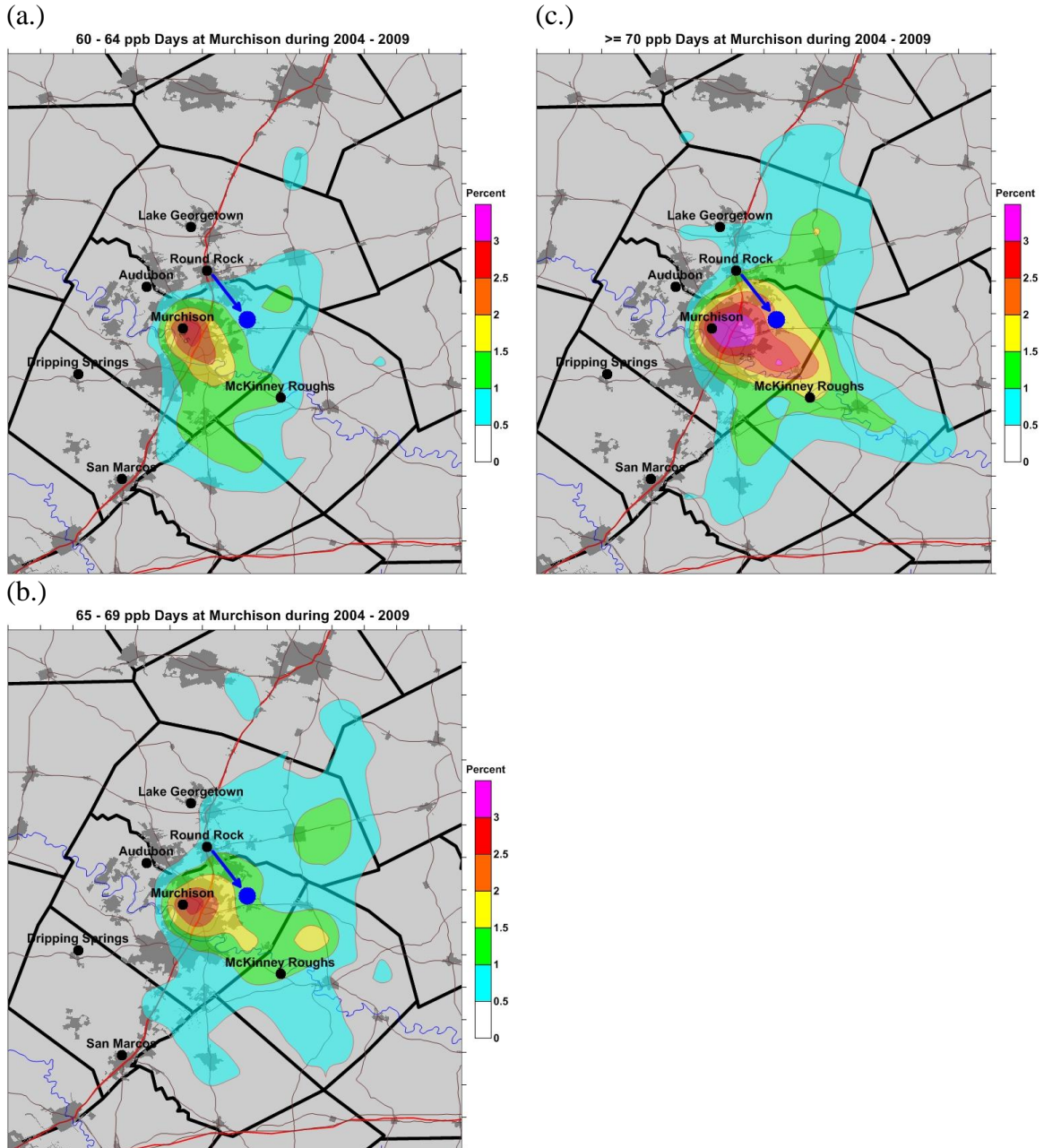


#### 4.6 Round Rock

CAPCOG has indicated that CAMS 674, which is currently located in Round Rock, will need to be moved from its current location following the 2010 ozone season (Bill Gill, CAPCOG, personal communication).

**Recommendation:** The CAMS 674 monitor should be moved to a location to the east of the Austin metropolitan area to provide measurements of background ozone entering the Austin area during periods of northeasterly or easterly winds. Figure 4-14 shows the suggested general location, which is located just to the northeast of the intersection of US Highway 290 East and State Highway 130. Following 2011, the ozone concentrations measured at this new location should be analyzed and, if necessary, CAMS 674 could be moved to a different location.

**Figure 4-14.** Local trajectory residence time (based on 24-hour surface wind back-trajectories initiated at Murchison) in percent during 2004 – 2009 for days characterized by a maximum ozone concentration averaged over 8 hours (a.) 60 – 64 ppb, (b.) 65 – 69 ppb, and (c.)  $\geq 70$  ppb. The maps also show the recommended re-location of CAMS 674, which is currently located in Round Rock.



## 5.0 Summary

Based on the analysis presented in this report, it is recommended that:

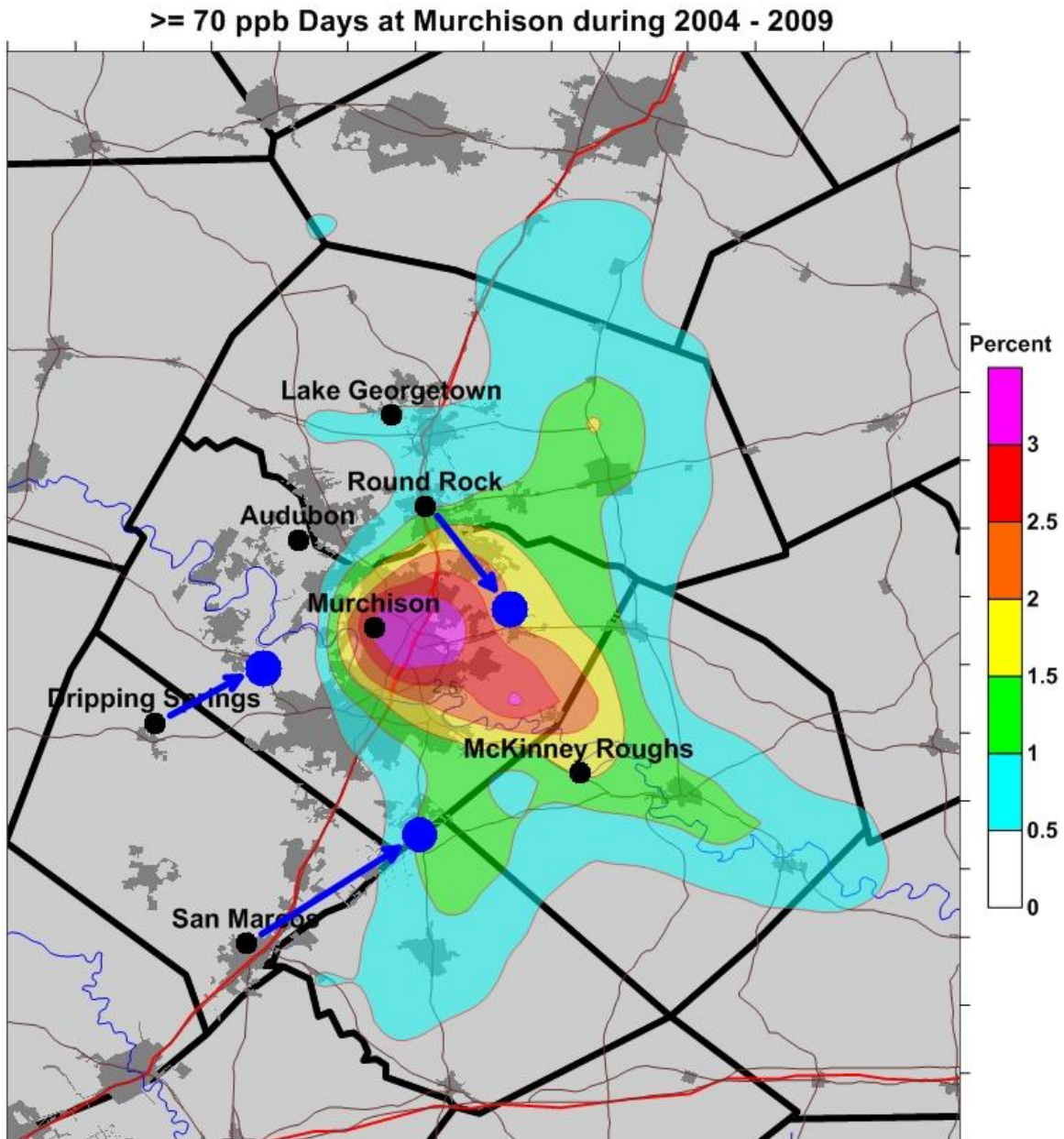
1. The Audubon, Murchison, McKinney Roughs and Lake Georgetown monitoring sites should remain at their current locations.
2. The monitoring site in Dripping Springs should be moved to a location approximately 10 miles to the east-northeast of its current location.
3. The monitoring site in Round Rock should be moved to a location near the intersection of US 290 and SH 130.
4. The monitoring site in San Marcos should be moved to a location in the vicinity of the boundary between Travis and Caldwell counties.
5. The NO<sub>x</sub> monitor currently located at Dripping Springs should be moved to the Murchison monitoring site.

The recommended changes to the monitoring network configuration are summarized in Figure 5-15, which also shows the local residence time results for days with maximum ozone concentrations  $\geq 70$  ppb at Murchison. As suggested by the commonly upwind geographic areas shown in Figure 5-1, high ozone days in the Austin area most often have surface winds that blow from the northeast, southeast, and south. The relocation of the monitors currently in Round Rock and San Marcos would enhance the ability of the monitoring network to measure background ozone concentrations transported into the Austin area on high ozone days in Austin.

The Audubon, Murchison, Lake Georgetown, and Dripping Springs monitors are sometimes well-positioned to sample a portion of the Austin urban plume and are intended to capture maximum ozone concentrations in the Austin area. The re-location of the Dripping Springs monitor to a location closer to the Austin metropolitan area is intended to enhance the potential for capturing high ozone concentrations when winds are from the northeast or east. In addition, it is recommended that the NO<sub>x</sub> monitor at Dripping Springs be moved to Murchison. Murchison most often measures the Austin area maximum ozone concentration. Coincident sampling of NO<sub>x</sub> and ozone at Murchison would provide data to analyze the relationship between these two pollutants at a location characterized by fresh emissions of NO<sub>x</sub> from urban emissions sources.

Following 2011, the ozone concentrations measured at the three new locations should be evaluated to verify that the monitors are fulfilling their intended function. In particular, the data collected at CAMS 614 (currently located in Dripping Springs) should be re-evaluated to verify that relatively high ozone concentrations are captured on days with northeasterly or easterly winds. If high ozone concentrations are not measured during 2011, the monitor may be better used at a difference location, especially since it will not be well-positioned to serve as a background ozone monitor during high ozone episodes in the Austin area.

**Figure 5-1.** Local trajectory residence time (based on 24-hour surface wind back-trajectories initiated at Murchison) in percent during 2004 – 2009 for days characterized by a maximum ozone concentration averaged over 8 hours  $\geq 70$  ppb. The map also shows the location of the active Austin area ozone monitors during 2009 and the suggested re-location of three of the seven monitors.



## **6.0 References**

UT, 2010. *Conceptual Model for Ozone for the Austin Area*. Prepared by University of Texas at Austin for Capital Area Council of Governments (CAPCOG) and the Texas Commission on Environmental Quality, July 2010.

## **7.0 Acknowledgements**

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