Chapter 2
AIR QUALITY/TRANSPORTATION

2.1 INTRODUCTION

An evaluation of air quality control plans and measures must begin with a firm understanding of the mechanisms at work in the Lake Tahoe Basin (Basin). Airborne pollutants in the Basin primarily come from three areas. Populated areas of the Basin generate airborne anthropogenic materials such as road dust, vehicle exhaust, chimney smoke, etc. Undeveloped areas in the Basin produce airborne dust and smoke, some of which is "natural," and some which results from the direct and indirect effects of land management practices (prescribed fires, road work, etc). Finally, airborne materials generated in upwind areas, including the San Francisco Bay area and the Central Valley, are carried into the Basin by the region's prevailing winds. This document is an evaluation of the current policies, standards, management strategies, and present conditions of the air quality threshold, along with recommendations for future improvements.

2.2 BACKGROUND

The TRPA Compact, amended in 1980, called for TRPA to adopt environmental threshold carrying capacities ("thresholds") to protect the values of the region. The first set of comprehensive air quality thresholds were adopted by TRPA in August 1982. The Compact requires that the goal of transportation planning shall be to reduce dependency on the automobile and, to the extent feasible, reduce air pollution caused by motor vehicles.

The TRPA Goals and Policies is a key Regional Plan Document for the Lake Tahoe Region. Article V(c)(1) of the Tahoe Regional Planning Compact calls for a "land use plan for the…standards for the uses of land, water, air space and other natural resources within the Region…" The Land Use Element includes the Air Quality sub-element that is introduced with the following language:

The Air Quality Element of the integrated Regional Transportation Plan– Air Quality Plan focuses on the need for air quality control strategies required to meet the air quality related goals for the Tahoe Region.

The Transportation Element of the TRPA Goals and Policies lists five regional goals and ten policies and objectives. One of the goals calls for attaining and maintaining Environmental Threshold Carrying Capacities (thresholds). Policies and objectives focus on regional coordination, alternative transportation, land use changes to promote alternative transportation, limiting highway improvements, and providing mobility for transit-dependent populations.

Regional Transportation Plan – Air Quality Plan for the Lake Tahoe Region

The purpose of the integrated Regional Transportation Plan – Air Quality Plan (RTP-AQP) is to attain and maintain the pertinent thresholds established in 1982, and all applicable federal, state, and local standards established for transportation air quality, and visibility. Furthermore, TRPA is required to propose amendments to the Regional Transportation Plan – Air Quality Plan to assure compliance with these standards based on air quality monitoring data. The Compact requires that the goal of transportation planning shall be to reduce dependency on the automobile and, to the extent feasible, reduce air pollution caused by motor vehicles.

TRPA's thresholds, federal National Ambient Air Quality standards (NAAQS), and state standards establish multiple air quality standards and air quality parameters, including carbon monoxide (CO), ozone, particulate matter less than 10 microns in size (PM_{10}) particulate matter less than 2.5 microns in size ($PM_{2.5}$), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), visibility, lead, hydrocarbons, sulfates, hydrogen sulfates, oxides of nitrogen (NO_x), wood smoke, suspended soil particles and NO_x transport.

As the regional planning agency and Tahoe Metropolitan Planning Organization (TMPO), the TRPA has multiple responsibilities that include both land use and transportation related programs. The land use responsibilities are similar to those of a typical planning agency and include programmatic and regulatory guidelines for the development and management of the area. The transportation portion includes a wide range of diverse responsibilities, including long- and short-range transportation planning in the Basin that fall under the responsibilities of the TMPO and the Regional Transportation Planning Agency (RTPA) in the Basin portions of El Dorado and Placer Counties.

Pursuant to Chapter 32 of the Code, the TRPA has adopted air quality threshold indicators in order to determine the progress toward attainment of the thresholds and standards; identify supplemental measures to ensure progress on the attainment of thresholds and standards; and review projects in light of progress on the attainment of thresholds and standards. It must also be noted that there are additional state, local and federal air quality standards that have been adopted by the TRPA in addition to the current air quality indicators. Although these standards are not used for reporting threshold attainment, they carry the same programmatic importance as the official threshold indicators.

The current air quality threshold indicators and associate standards are described in Table 2-1 and in more detail in the following text.

Table 2-1: Summary of Existing Air Quality Indicators and Standards

Threshold Area	Indicator	Standard
AQ-1 Carbon Monoxide (CO)	Second highest CO concentration measured at Stateline, CA air quality station (measured in ppm)	States and TRPA: 6 ppm (eight-hour avg.) Federal: 9 ppm (eight-hr. avg.) California: 20 ppm (one-hr. avg.) Federal and Nevada: 35 ppm (one-hr. avg.)
AQ-2 Ozone (O_3)	Number of 1-hour periods that equal or exceed the applicable federal, Nevada, or TRPA standards at any of the permanent monitoring sites.	Federal: 0.12 ppm (one-hour av.) California: 0.09 ppm (one-hr. av.), not to be exceeded Nevada: 0.10 ppm (one-hour av.) TRPA: 0.08 ppm (one-hour av.) not to be equaled or exceeded
AQ-3 $PM_{(10)}$	Number of 24-hr periods exceeding the applicable federal or state standards at any permanent monitoring station (unitless); Annual average PM10 concentrations at any permanent monitoring station (μg/m^3)	**24-Hour** Federal: 150 μg/m^3 (24-hr mean, three yrs. running) California: 50 μg/m^3 **Annual Geometric Mean** Federal: 50 μg/m^3 (ann. avg., three yrs. running) California: 30 μg/m^3 (ann. avg)
AQ-4 Visibility	***Regional Visibility*** Visual range calculated from speciated aerosol and nephelometer data from the TRPA visibility-monitoring program. ***Sub-regional Visibility*** Visual range calculated from speciated aerosol and nephelometer data collected at the Lake Tahoe Boulevard station (km). For state visibility standards, visual range calculated from nephelometer data collected at Bliss State Park and Lake Tahoe Boulevard for periods in which relative humidity is less than 70 percent (miles).	***Regional Visibility*** NUMERICAL STANDARD: Achieve an extinction coefficient of 25 Mm^{-1} at least 50 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 156 km, 97 miles); and achieve an extinction coefficient of 34 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 115 km, 71 miles). Calculations will be made on three year running periods using the existing 1991-1993 monitoring data as the performance standards to be met or exceeded. ***Sub-regional Visibility*** NUMERICAL STANDARD: Achieve an extinction coefficient of 50 Mm^{-1} at least 50 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 78 km, 48 miles); and achieve an extinction coefficient of 125 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 31 km, 19 miles).
	Regional Wood Smoke	Reduce wood smoke emissions by 15 percent of the 1981 base values through technology, management practices, and educational programs.
AQ-5 U.S. 50 Traffic Volumes	Although the threshold does not specify a location on US 50, or the specific winter period, TRPA traditionally looked at two different measurements to assess progress at reducing winter traffic volumes. These included: the traffic volumes recorded at Park Avenue and US 50 from 4:00 p.m. to 12:00 midnight for all days during the winter months of November through February, and on the Saturday of President's Day Weekend, coinciding with the period of the most frequent exceedences of the CO standards, historically. The latter measurement has been used as the indicator to determine compliance with the threshold.	Seven percent reduction in traffic volume on the U.S. 50 corridor from 1981 values, winter, 4 p.m. to 12 a.m. Traffic Counts conducted by Caltrans in 1981 indicate that at the Park Avenue – U.S. 50 Intersection 25,173 vehicles were counted between 4:00 PM and 12:00 Midnight. Attainment of this standard requires traffic volumes to be less than 23,411 vehicles on the Saturday of Presidents Day Holiday between 4:00 PM and 12:00 Midnight. The traffic volume includes the count in both directions during this day and time period.
AQ-6 Wood Smoke Emissions	Aerosol samples analyzed for organic and light-absorbing carbon collected in South Lake Tahoe and at Bliss State Park serve as indirect indicators of wood smoke.	Reduce wood smoke emissions by 15 percent of the 1981 base values through technology, management practices, and educational programs.
AQ-7 VMT (Vehicle Miles Traveled)	VMT calculated by TRPA staff for peak summer day using TRANPLAN transportation model or equivalent model. In 1988, TRPA adopted interim performance targets for the VMT threshold standard, as follows: Indicator: VMT calculated for peak summer day using QRS (Quick Response System) transportation model or equivalent model.	The 1981 VMT estimate is a modeled value that has been calculated over the years using various travel demand software programs. The 1981 VMT estimate has been determined to be 1,648,466 VMT, making the attainment level for this indicator (10% Reduction) 1,483,619 VMT for a peak summer day.
AQ-8 Atmospheric Nutrient Loading	Annual average concentration of particulate NO_3 at the Lake Tahoe Boulevard air quality monitoring station (μg/m3)	Reduction in direct DIN (dissolved inorganic nitrogen) load on Lake Tahoe from atmospheric sources by approximately 20 percent of the 1973-1981 annual average. Measurements taken at the Lake Tahoe Boulevard monitoring station.

2.2.1 MEASUREMENT AND MONITORING OF INDICATORS AND STANDARDS

AQ-1 Carbon Monoxide

Carbon monoxide (CO) is a tasteless, odorless, and colorless gas that is slightly lighter than air. It affects humans by reducing the supply of oxygen to the tissues of the body and is of concern to public health. The primary source of CO emissions is associated with the combustion of hydrocarbon fuels by motor vehicles, home heating devices such as fireplaces, stoves, and furnaces, and industrial processes. In the Tahoe Basin, the primary source of CO emissions is from mobile sources such as motor vehicles and boats. For this reason, it is important to concentrate on transportation improvements within the Basin as a control method for reducing CO levels.

The TRPA threshold for carbon monoxide states that CO concentrations shall be maintained at or below 6.0 parts per million (ppm), averaged over eight hours. This is also the California and Nevada 8-hour CO standard for the Tahoe Region. The indicative value for attainment of this standard is the second highest CO concentration measured at the Stateline California monitoring station. In addition, there is a federal 8-hour standard of 9 ppm and California and Nevada 1-hour average standards of 20 and 35 ppm, respectively.

AQ-2 Ozone

Ozone is defined as a secondary pollutant and is created by a photochemical reaction between hydrocarbons, oxides of nitrogen, and sunlight. This pollutant posses a significant health risk especially to the young and elderly in the form of lung and other respiratory illnesses. Ozone also damages trees and plants, particularly ponderosa pines, Jeffrey pines, and quaking aspen which make up a large portion of the Basin's tree population (Davis and Gerhold, 1976).

The primary ozone precursors are produced from human activities such as the combustion of fossil fuel, chemical processing, fuel storage and handling, and solvent usage. Because ozone formation is a photochemical process, higher concentrations are created on sunny summer days when the suns radiation is at its peak. In the Tahoe Basin, vehicle emissions are the primary source of ozone, which makes transportation control measures the best strategy for the control of this pollutant.

The TRPA's indicator for ozone states that ozone levels shall not meet or exceed a 1-hour standard of 0.08 ppm. Attainment is based on the number of 1-hour periods, which equal or exceed the federal, Nevada, or TRPA standard at any of the permanent monitoring sites (unitless), and the number of 1-hour periods that exceed the California standard.

AQ-3 Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles in the air. The primary sources of PM_{10} in the Basin include, motor vehicles, sand, salt and road dust, smoke from both natural and manmade fires, and fugitive dust from construction and the landscape. PM_{10} is among the most harmful of all air pollutants. When inhaled these particles evade the respiratory system's natural defenses and lodge deep in the lungs. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and

reduce the body's ability to fight infections. These effects are particularly harmful to children, exercising adults, and the elderly. In addition, PM_{10} plays a significant role in the decline in visibility in the Basin.

Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lungs. These fine particles are known as Particulate Matter less than 2.5 microns or $PM_{2.5}$. Due to this pollutants tiny size, it can be inhaled deep into the lungs and can actually make its way directly into the bloodstream. Some of these particles are caused from combustion processes and can contain carcinogens. For this reason, California and the federal government have adopted standards and have placed increasing efforts on the study of this pollutant.

The TRPA's indicator for PM_{10} states that particulate matter concentrations shall not exceed the California and Federal standards for 24-hour concentrations (50 and 150 μg/m3, respectively) and the annual average (20 and 50 μg/m3, respectively). Attainment is based on the number of 24-hour periods exceeding the applicable federal or state standards at any permanent monitoring station (unitless) and the annual average PM10 concentration (μg/m3) at any permanent monitoring station.

AQ-4 Visibility

The TRPA established thresholds for visibility to protect the unique aesthetic values of the Tahoe Region. These thresholds were divided into Regional Visibility; defined as the overall prevailing visibility in the Lake Tahoe Basin; and Sub-Regional Visibility; defined as the visibility seen over the more urbanized areas. Visibility, or visual range, is directly related to the ambient concentrations of particulate matter in the atmosphere. Because of the optical properties of particles less than 2.5 microns in diameter (PM2.5) and their long retention times in the air, they are the main visibility concern in the Basin. The main contributors of PM2.5 include fine sulfur aerosols, fine soils (some from roadway dust), ammonium nitrate, and smoke.

There are multiple visibility standards that must be achieved in the Tahoe Basin. These include:

Regional Visibility

The standard for regional visibility is to achieve an extinction coefficient of 25 Mm-1 at least 50 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 156 km, 97 miles); and achieve an extinction coefficient of 34 Mm-1 at least 90 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 115 km, 71 miles). Calculations will be made on three year running periods using the existing 1991-1993 monitoring data as the performance standards to be met or exceeded. The indicator for Regional Visibility states that: visual range is calculated from speciated aerosol and nephelometer data collected at the Bliss State Park monitoring station.

Sub-regional Visibility

The standard for sub-regional visibility is to achieve an extinction coefficient of 50 Mm-1 at least 50 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 78 km, 48 miles); and achieve an extinction coefficient of 125 Mm-1 at least 90

percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 31 km, 19 miles). The indicator for Sub-Regional Visibility states that: visual range is calculated from speciated aerosol and nephelometer data collected at the Lake Tahoe Boulevard station.

AQ-5 Traffic Volume

The TRPA established thresholds for traffic volume to reduce the level of carbon monoxide (CO) in the Basin. Although this indicator was originally developed to specifically target CO reductions, it remains an important indicator for other air quality related thresholds because a number of these thresholds are affected by vehicle traffic.

The indicator for TRPA's traffic volume program states that there shall be a 7 percent reduction in the daily traffic volume on the U.S. 50 corridor from the 1981 values. The 1981 traffic count was 25,173 vehicles; therefore attainment of this standard requires a directional daily traffic count of less than 23,411 vehicles. TRPA evaluates this indicator by measuring the traffic volume on the Saturday of Presidents Day Holiday between 4:00 PM and 12:00 Midnight at a site immediately west of the intersection of Park Avenue in the City of South Lake Tahoe (SLT).

AQ-6 Wood Smoke

Increased levels of wood smoke result in high particulate concentrations; causing both health based and visibility concerns. Residential combustion in fireplaces, wood stoves, and forest fuels reduction techniques are the major source of wood smoke in the Basin. The most significant problems generally occur during the fall and winter months when burning activities are conducted and inversion layers are present. Because burning associated with forest fuels reduction programs are expected to dramatically increase in the Basin, future focus will be on Biomass removal versus burning. Research and programmatic improvements are necessary to mitigate associated effects.

The indicator for TRPA's wood smoke program states that Aerosol samples analyzed for organic and light-absorbing carbon collected in South Lake Tahoe and at Bliss State Park serve as indirect indicators of wood smoke.

AQ-7 Vehicle Miles Traveled

TRPA adopted the VMT threshold in 1982 as both a water quality and air quality threshold. The TRPA thresholds for air quality, under both visibility and nitrate deposition, include the following management standard; "reduce vehicle miles of travel by 10 percent of the 1981 base values" The indicator for TRPA's VMT threshold states that there shall be a 10 percent reduction in VMT below the 1981 peak summer day levels. The 1981 VMT was determined to be 1,648,466 VMT and therefore the attainment level for this indicator would be 1,483,619 miles for a peak summer day. The 1981 VMT estimate is a modeled value that has been calculated over the years using various travel demand software programs and interim annual methods based on traffic counts.

AQ-8 Atmospheric Nutrient Loading

Atmospheric deposition affects both air quality and water quality. This threshold was developed to reduce the transport of nitrate into the Basin and reduce oxides of nitrogen (NO_x) produced in the Basin. With regard to water quality, there is

concern that algal nutrients found in the air are absorbed into Lake Tahoe and contribute to water quality problems. One of the primary nutrients of concern is nitrogen, most commonly found in the air in gaseous form (i.e., NO2 and HNO3), and particulate form (i.e., NH3). The other nutrient of concern is phosphorous, which is also found in the air in particulate form. In addition, because both gaseous nitric acid and particulate ammonium nitrate particles are small (less than 2.5 microns in diameter), they do not easily settle out of the air or water. For this reason, they have also been linked to decreased visibility within the Basin. In general, gaseous emissions of nitrogen compounds are associated with combustion processes from automobiles and other sources. Because of their small size and weight, they can be transported from outside as well as from inside the Basin. Scientists are currently studying the effects of airborne nutrients to Lake Tahoe's water quality problem and developing a more accurate inventory of the pollutants and their respective sources. This work is being conducted through a program called the Total Maximum Daily Load (TMDL), and is lead by the Lahontan Regional Water Quality Control Board. Once completed, this information will be instrumental in developing the appropriate control strategies to reduce atmospheric deposition and improve visibility in the Basin.

The threshold for the Atmospheric Nutrient Loading standards requires a reduction in direct dissolved inorganic nitrogen (DIN) load on Lake Tahoe from atmospheric sources by approximately 20 percent of the 1973-1981 annual average. Unfortunately, neither the loading levels from the 1973-1981 time period or an acceptable protocol for measuring this indicator has been developed and therefore the status of this indicator cannot be determined. This issue is currently being addressed through the TMDL program, which will provide not only the appropriate measurement protocols, but also the reductions necessary for the improvement of water quality.

The indicator for Atmospheric Nutrient Loading is measured as the annual average concentration of particulate NO3 at the Lake Tahoe Boulevard air quality monitoring station (µg/m3)

2.3 THRESHOLD STATUS

Table 2-2 provides a brief overview of the attainment status and trend of each indicator. Additional text is found below which will provide more detailed information for each threshold indicator.

Table 2-2: 2006 Air Quality Indicator Attainment Status

#	Threshold Name	1991 Attainment Status	1996 Attainment Status	2001 Attainment Status	2006 Attainment Status	5-Year Trend
1	Carbon Monoxide	Non-Attainment	Attainment	Attainment	Non-Attainment	Positive
2	Ozone	Non-Attainment	Non-Attainment	Non-Attainment	Non-Attainment	Unknown [1]
3	Particulate Matter	Non-Attainment	Non-Attainment	Attainment	Non-Attainment	Unknown
4	Visibility	Attainment	Non-Attainment	Non-Attainment	Attainment	Positive
5	Traffic Volume	Non-Attainment	Attainment	Unknown	Attainment	Positive
6	Wood Smoke	Non-Attainment	Non-Attainment	Unknown	Unknown	Unknown
7	Vehicle Miles Traveled	Non-Attainment	Non-Attainment	Non-Attainment	Non-Attainment	Positive
8	Atmospheric Deposition	Unknown	Unknown	Unknown	Unknown	Unknown

*Information for 1991 to 2001 was from the 2001 Threshold Report
1. More stringent ozone standards became effective in May 2006. This may result in additional ozone violations in the future.
Table 2-2: 2006 A/Q Indicator Attainment Status, 2006 Threshold Evaluation

2.3.1 AQ-1 CARBON MONOXIDE

Status of Indicators

Non-Attainment

The CO status indicator was previously measured at what was called the Park Avenue monitoring station. This station was removed and replaced by one operating at the Harvey's Casino garage at Stateline Nevada. This site is currently managed by the Nevada Department of Environmental Protection and is now used as one of the official measuring sites for this indicator. Based on measurements at this site, the Basin is currently out of attainment for the State 8-hr standards.

At the time of this writing, data is still being collected and analyzed and therefore it is difficult to establish a reliable trend. Although the Basin was in violation at the beginning of the five-year analysis period, no recorded violations have been recorded since 2003 from the stations that have been analyzed. In addition, data indicates the Basin is currently in attainment for the remaining state and federal standards at all other monitored sites in the Basin. For these reasons, this evaluation report concludes that we have a positive trend.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

Previous reports stated the Lake Tahoe Basin was in attainment. Therefore, no threshold targets were established.

Threshold Target Dates

The proposed target date for threshold attainment is 2010.

2.3.2 AQ-2 OZONE

Status of Indicators

Non-Attainment

Over the last 10 years, the TRPA has monitored ozone levels in the Basin at no less than 6 separate sites. As of 2006, only two sites (CSLT airport and Incline Village) remain active. Between 2001 and 2004, the Basin recorded over 29 separate violations of TRPA's 1-hour Ozone standard at two separate AQ stations. For this reason, this indicator has been listed as non-attainment. There have been no violations of any federal or state ozone standards in this reporting period. Because data is still being analyzed, no trend line is available. However, because more stringent standards became effective in May 2006, and only limited historical data was available at the time of this report, the trend was listed as unknown for this indicator.

The Basin has exceeded TRPA's standard for ozone for every threshold report to date. Over 50% of the ozone monitors have been removed and/or relocated in the Basin over the last 5 years making threshold or trend analysis extremely difficult. This has not only hampered our ability to properly assess and make recommendations for improvements, the state of California has stated that because of limited data from the Basin, they were unable to make a determination of attainment or non-attainment status for the Basin. For this reason, they will be issuing a status of "Unclassified" for ozone in the Basin. In addition, because the Basin is out of attainment with TRPA's ozone standards and preliminary data suggest new state standards have been exceeded in the summer of 2006, it is important that improvement strategies are implemented as quickly as possible. Similar to carbon monoxide, the primary need for this indicator would be to establish and maintain permanent monitoring sites within the Basin. Secondly, because ozone precursor emissions come primarily from automobiles, it is imperative that transportation programs be developed that specifically improve the overall emissions contribution from transportation activities in the Basin.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The interim target for this threshold was to have no exceedances of TRPA's ozone standard by 2006, or TRPA will use the data gathered in the study led by the California Air Resources Board to implement local and out-of-Basin control measures to reduce ozone. Although ozone levels in the Basin have significantly improved since the regional plan was developed, the Basin has never-the-less recorded violations of the TRPA ozone standards every year and therefore did not meet the interim target. The California Air Resources Board study to evaluate the proposed control measures is currently under development. When finalized, the TRPA will begin evaluating the recommended mitigation programs. . Although stated as an interim target, it will be difficult to promulgate additional control measures outside the Basin.

Threshold Target Dates

The proposed target date for threshold attainment is 2015.

2.3.3 AQ-3 PM_{10}

Status of Indicators

Non-Attainment

Data were collected by the California Air Resources Board at the Sandy Way site located in South Lake Tahoe between 2001 and 2005. During this period, no exceedances of the national 24-hr standard were recorded and only six exceedances were estimated for the California standard. This indicator was previously in attainment between 1996 and 2001 and we have experienced non-attainment events in recent years. For this reason, this indicator is listed as non-attainment. However, because no data was available for the 2004 or 2005 calendar years, it was not possible to establish a reliable trend.

Previously, PM_{10} was monitored at four separate sites around the Basin; two in Nevada and two in California. At this time, neither TRPA, California, nor Nevada is monitoring PM in the Basin. For this reason, TRPA will work with partnering agencies to establish and maintain permanent monitoring sites in the Basin.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

This indicator was previously listed as in-attainment. Therefore no interim targets were specified.

Threshold Target Dates

The proposed target date for threshold attainment is 2025.

2.3.4 AQ – 4 VISIBILITY

Status of Indicators

Attainment

In March of 2000, TRPA adopted a new monitoring protocol for measuring visibility. This protocol brought our program closer to that used by other regulatory agencies for their haze-monitoring/visibility programs. This program uses a 3-year running average to calculate compliance with the standard using particulate sampling.

Regional visibility data were collected at the Bliss State Park monitoring station from 2000 to 2004. During this period, 503 days were sampled and 96 percent of these days were found to be above the 71-mile standard and 65 percent of these days above the 97-mile standard. Based on information provided by Air Resource Specialists (ARS), the Basin was shown to be in attainment for this sample period.

Sub-regional visibility data was collected at the South Lake Tahoe monitoring station from 2000 to 2004. During this period, 186 days were sampled and 100 percent of these days were found to be above the 19-mile standard and 73 percent of these days above the 48-mile standard. Based on information provided by Air Resource Specialists (ARS) from 2002 through 2004, the Basin was shown to be in attainment for our sub-regional visibility standards.

Due to the significant improvements made on this threshold, the TRPA redirected resources to other areas within air quality and has temporarily suspended the collection and analysis of the visibility data. The TRPA looks forward to

reestablishing and improving this program as new resources are obtained. TRPA continues to be concerned that due to the tremendous variability in visibility and the limited number of days sampled for regional visibility, the attainment status could change if additional sample days are used. TRPA will address this as improvements to the program occur.

Indicator AQ-4 also contains a requirement to reduce suspended particles by 30% from the 1981 base levels. However, because the suspended soil particle levels were never established for the 1981 or subsequent timeframes and no reliable method of establishing suspended soil particle levels has been developed; it is difficult to evaluate this indicator and the status has been listed as unknown.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The interim target for this threshold stated that "Data indicates that transported particulates may be contributing to the reductions in regional visibility. No exceedances of TRPA's visibility standards will occur by 2006, or TRPA will use the data gathered in the study led by the California Air Resources Board to implement local and out-of-Basin control measures to reduce visibility reducing particulates". Information provided by Air Resource Specialists Inc. stated that the Basin was in compliance with both regional and sub-regional visibility standards and therefore no additional measures were necessary to implement.

Threshold Target Dates

The threshold is currently in attainment.

2.3.5 AQ – 5 TRAFFIC VOLUME

Status of Indicators

Attainment

As shown in Table 2-3, the Basin has been in attainment since 2003 and has shown a general improvement in almost every year since this time. An average traffic volume of 17,936 vehicles was recorded in 2006 on the Saturday of the Presidents' Day holiday between 4:00 PM and 12:00 Midnight. This represents a 28.7 percent reduction from the 1981 levels and is well above the 7 percent reduction required by the current standard.

Table 2-3: US 50 Traffic Volumes Saturday of President's Day Weekend

US 50 Traffic Volumes Saturday of President's Day Weekend		
Year	**Traffic Volume (vehicles) (4 PM to 12 Midnight)**	**% Change from 1981** (25,173)
2001	N/A	Count station inoperative
2002	N/A	Count station inoperative
2003	21,371	-15.1
2004	21,458	-14.8
2005	18,724	-25.6
2006	17,936	-28.7

Table 2.3.5: US 50 Traffic Volumes Saturday of President's Day Weekend: 2006 Threshold Evaluation

Traffic counts collected by Caltrans between the months of November and December of 2006 indicate that between 4:00 PM and 12:00 Midnight, an average of 12,982 vehicles were recorded. This indicates a 17.7 percent decrease in traffic volumes from the 1981 levels of 15,781 vehicles.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The 2001 interim target for this threshold stated "TRPA shall work with Caltrans to install a traffic counter at the intersection of Park Avenue and Highway 50 by June 2002".

This action was completed and the interim target was achieved.

Threshold Target Dates

The threshold is currently in attainment.

2.3.6 AQ – 6 WOOD SMOKE

Status of Indicators

Unknown

The wood smoke indicator is based on reducing wood smoke from the 1981 levels. Because wood smoke levels were never established for the 1981 or subsequent timeframes and no reliable method of establishing them have been developed, it is difficult to evaluate this indicator.

Status of Additional Factors

The TRPA continues to develop a suitable indicator for wood smoke. In November of 2006, a scientist reporting they developed a protocol to isolate and measure wood smoke at cost in excess of $50,000 per month to operate. The TRPA is currently investigating this method.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The 2001 Threshold Evaluation stated that the "TRPA, in cooperation with state and local agencies, shall evaluate wood smoke levels and develop wood smoke indicators which (are) scientifically defensible and measurable." The TRPA examined aerosol data (including organic and light absorbing carbon) collected in South Shore and at Bliss State Park as a possible indirect indicator of wood smoke. Although there were some positive results, air quality experts determined this method was not suitable for use as the protocol.

Threshold Target Dates

TRPA is recommended deletion of this threshold until an acceptable protocol can be implemented. Therefore no target dates are proposed.

2.3.7 AQ – 7 VEHICLE MILES TRAVELED (VMT)

Status of Indicators

Non-Attainment

TRPA utilized the 1981 base year VMT estimate, and the corresponding 27 traffic count stations that produce annual traffic counts to analyze increases or decreases in VMT. As mentioned previously, the combined published traffic volumes on the 27 traffic count locations decreased approximately 2.7 percent from the 1981 traffic counts. Correspondingly, when applying the annual percentage increases-decreases of traffic volumes to the 1981 VMT estimate, estimated VMT has decreased by 4.5 percent from the 1981 estimate indicating a positive trend towards attainment.

Status of Additional Factors

Contrary to previous modeled VMT forecasts, actual traffic counts which were used to calibrate previous transportation models have shown a marked decrease. Current data indicate that significant shifts in housing, gaming economies, employment, and redevelopment strategies have assisted in significant reductions in traffic volumes and VMT with future trends in VMT being directly related to these demographic shifts. It is recommended that additional permanent and automated vehicle count stations be installed in the Basin and a new methodology be developed to model emissions associated with VMT by mode of travel.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The 2001 Threshold Evaluation stated that "By December 2006, VMT will not exceed 1.79 million VMT. TRPA has established programs which may reduce VMT by roughly 289,000 VMT (see 2001 Environmental Assessment – funding is needed)". The TRPA has successfully met this target. TRPA analyzed the annual percentage change resulting from 27 count stations maintained by Caltrans and NDOT and applied this percentage change to the previous year VMT estimate. Based on the results of this methodology, the estimated 2004 VMT is 1.58 million.

Threshold Target Dates

Reach compliance with the current VMT threshold by 2025.

2.3.8 AQ – 8 ATMOSPHERIC NUTRIENT LOADING

Status of Indicators

Unknown

The threshold standards require a reduction in dissolved inorganic nitrogen loading to Lake Tahoe from all sources by 20 percent of the 1973-81 annual average. Scientists have stated the exact 1973 -1981 annual average is unknown and scientifically valid protocols for the measurement of nitrogen dioxide have not been developed at this time. For this reason, the attainment of the threshold relative to nitrogen dioxide cannot be determined at this time.

Status of Additional Factors

Atmospheric nutrient loading is currently the subject of an intense study by the water quality program. The outcome of this study will be to adopt the total maximum daily load (TMDL) of nitrogen deposited by air to Lake Tahoe. This study will determine the appropriate measurement protocol and the amount of emission reduction necessary to retain the health of Lake Tahoe. Upon completion of this study, the air quality program may implement a new nitrogen indicator within the environmental health portion of the air quality program.

2006 Status Evaluation Relative to Threshold Attainment Schedules

Threshold Interim Target Status

The interim targets contained in the 2001 Threshold Evaluation state "TRPA, in cooperation with state and local agencies, shall evaluate dissolved inorganic nitrogen levels (DIN) and develop atmospheric deposition indicators which are scientifically defensible and measurable". TRPA in coordination with federal, state, and local agencies are currently working on this task as part of the Pathway 2007 and TMDL programs. TRPA expects the development of an acceptable indicator to be developed in the near future and will incorporate the results of the TMDL and protocols in the ecosystem health indicators of the air quality program.

2.4 EIP IMPLEMENTATION STATUS

2.4.1 COMPLETED EIP PROJECTS AND CONTRIBUTION TO THRESHOLDS

Approximately 91 capital improvement projects under the heading of air quality have been identified in the Environmental Improvement Program (EIP). TRPA's records indicate that almost 30 percent (26) of these EIP projects have either been completed or are partially completed as of this writing (see Table 2-4). The majority of the air quality projects involve the creation or improvement of transportation services or facilities such as improved transit and bike lanes. Because no in-depth emissions analysis was completed on many of these projects, it is difficult to accurately assess their benefits. As an example, it seems intuitive that if more people utilized alternative transportation there would be fewer emissions than if they drove in their vehicle. However, because improvements in the emission levels from passenger vehicles have significantly outpaced those of other modes of travel over the last ten years, it is possible that the emissions associated with some alternate modes of travel can actually be greater than if people traveled in their personal vehicles. Because transportation activities contribute the majority of the Basin's air pollution, the TRPA will continue to ensure that the air quality projects contained in the EIP provide the best possible air quality benefits to the Basin.

The EIP program is currently in the process of being updated. Therefore, recommendations for projects directed toward meeting attainment of the air quality thresholds will be made through that process.

Table 2-4: Completed Air Quality EIP Capital Improvement Projects

EIP Number	Title	Project Description	Status
507	Ski Run to Tahoe Meadows Bicycle Trail	City of South Lake Tahoe to construct 2,200 linear feet of new class one bicycle trail to connect Ski Run public beach with Tahoe Meadows linear park trail; includes wetlands restoration interpretive displays.	Completed
750	Class Two Pioneer Trail El Dorado County Line to Existing Bike Lane	A class two bicycle lane will be added to Pioneer Trail from the El Dorado County line to Glen Eagles Drive.	Completed
757	Class One/Two Incline Way Country Club Drive to Southwood Boulevard	A combination of a class one and class two bicycle trail will be constructed along Incline Way from Country Club Drive to Southwood Blvd.	Completed
765	Class three bike lane: State Route Highway 89 Cascade to Emerald Bay (North End)	A class three bicycle trail shall be developed to connect from the eventual end of the Class one trail at Cascade to the north end of Emerald Bay.	Completed
767	Class One bike trail: State Route Highway 89 15th Street to Current USDA Forest Service Class One Trail	A class one bicycle trail will be constructed to connect 15th Street with the southern end of the USFS bicycle trail to Camp Richardson. This project spans the City and County line.	Completed
773	Incline Village Commercial Area Pedestrian Facilities	In the commercial area of Incline Village, pedestrian facilities consistent with the community plan will be constructed. This will include providing pedestrian facilities between shopping centers and stores.	Completed
783	U.S. Highway 50 to Kahle Roadway and Sidewalk Improvements	Sidewalks along US 50 from the intersection with Kingsbury Grade to Kahle Roadway will be installed. Curb and gutter will be included.	Partially complete
788	State Route Highway 28 and State Route Highway 267 Intersection Improvements	The intersection of SR 28 and SR 267 will be improved with turn lanes to aid traffic flow.	Partially complete
796	Tahoe City Urban Improvement Project	The Tahoe City Urban Improvement Project will add sidewalks, access control, reconfigure parking and provide for better control and collection of run off. Scenic quality will also be improved.	Partially complete
813	Incline Village Transit Improvements	Headways were increased from hour to 1/2 hour.	Completed
816	Placer County Transit Improvements	Service in the Placer County area will be improved to make transit more convenient, more frequent, and reduce dependency on the private automobile.	Partially complete

EIP Number	Title	Project Description	Status
818	Placer County Transit Maintenance Facility Construction	Placer County will construct a maintenance facility which will allow for more efficient repair and operation of the TART transit fleet.	Completed
820	Park Avenue Transit Center Construction	In conjunction with the Park Avenue Project, a visitor center, rather than a transit center, coordinated to work with CTS will be built and operated.	Completed
823	South Shore Transit Maintenance Facility Expansion	The maintenance facility for the South Shore transit system will be expanded to better serve the needs of the transit fleet which is expected to expand. The facility will also accommodate repair areas for various engine types.	Completed
831	Emerald Bay Trolley Service Improvements	Fallen Leaf Lake and Emerald Bay are popular summer destinations for visitors. Providing transit services during the summer visitation period to these destinations is planned to reduce congestion and improve the visitor experience within these two areas.	Completed
833	Truckee to Tahoe City Transit Service Expansion	The transit service between Truckee and Tahoe City will be improved by decreasing 2 hour headway to a 1-hour headway (year round), with the goal of increasing transit ridership and accommodating potential transit riders who would now ride with the expanded service.	Completed
850	U.S. Highway 50: Pioneer Trail to Park Avenue Turn Lane Addition	As a part of the Park Avenue Redevelopment, a free right hand turn lane will be added from the intersection of Pioneer Trail and US 50 along US 50 to the intersection of Park Avenue and US 50.	Completed
851	U.S. Highway 50 and Park Avenue Intersection Improvements	As part of the Park Avenue Redevelopment plan, the intersection of Park Avenue and US 50 will be improved with right turn lanes and other enhancements that lessen congestion and promote safe roadway turn movements.	Completed
852	Reconstruction of Van Sickle Road and U.S. Highway 50 to Van Sickle Transit	As part of the Park Avenue project, Van Sickle Road will be reconstructed and a transit only lane will be made to allow transit to access the Park Avenue Transit Center.	Completed
853	U.S. Highway 50 and Ski Run Boulevard Intersection Improvements	As part of the Redevelopment process, the intersection at Ski Run and US 50 will be improved to allow for better traffic flow.	Completed
857	Coordinated Transit System	CTS organizes the various south shore transit providers under one dispatch entity which will make transit more responsive through the use of high technology and demand responsive service.	Completed

EIP Number	Title	Project Description	Status
1021	Rocky Point Class One Bicycle Trail	A small section of bicycle trail must be constructed to finish linking Tahoe City's bicycle trail with the Dollar Hill area.	Completed
10025	Acquisition of CTS Communications Components	Purchase additional equipment to support CTS Communications.	Completed
10035	Class One Ski Run Boulevard Bike trail from Ski Run Marina to Pioneer Trail	Construct a Class One trail on each side of Ski Run Blvd linking the existing linear park trail to the terminus bike lanes on Pioneer Trail at Ski Run Marina.	Completed
10041	Class One Bike trail Lake Forest Trail	Construct a class one trail from SR 28 to public lake access adjacent to Lake Forest Road.	Completed

Table 2.4: Completed Air Quality EIP Capital Improvement Projects 2006 Threshold Evaluation

2.5 THRESHOLD NEED FOR CHANGE

A major conclusion of this evaluation is that many of the air quality threshold standards, management standards and policies require re-evaluations for either recalibration or amendment. These changes also relate to updating the management system itself and coordination with other agencies. It is the recommendation of this report that TRPA should pursue the amendments to the environmental threshold carrying capacities developed and recommended as part of the Pathway 2007 process. The sections below summarize the proposed amendments. As noted amendments are scheduled for action with adoption of of the Regional Plan package in 2008, while others may will require further development and analysis by TRPA. The proposed changes include improving the current value statements with a more encompassing vision statement and more specific threshold goal statements for visibility thresholds and human and environmental health.

The following proposed Vision Statement and Threshold Goal Statements reflect the recommended basis for changing the existing threshold standards.

> **Air Quality Vision:** Air quality in the Lake Tahoe Basin is healthful for residents, visitors, ecosystems, and supports excellent visibility.

In addition to the vision statement, two separate desired conditions were developed. They include:

> **Threshold Goal Statement 1. Visibility*:*** Visibility in the Lake Tahoe Basin is at 2001 – 2003 levels or better.

Visibility has definitely improved over the past 20 years in the Tahoe Air Basin. Some of the regional and sub-regional targets, established 20 years ago, have been met and exceeded. Because of this success, it is necessary to establish new standards that will protect the visibility improvements achieved to date and prevent backsliding to less desirable conditions. This improvement reflects the achievements obtained by our past efforts and ensures this progress is maintained.

Threshold Goal Statement 2. Human and Ecosystem Health: Air quality in the Lake Tahoe Basin is healthy for humans and ecosystems.

The threshold goal statement for Human and Ecosystem Health includes all air quality aspects related to the environment in the Basin, rather than having individual desired conditions for each one. Promulgating a more holistic approach enables the TRPA to actively utilize adaptive management within this threshold category and bring about additional improvements as new information becomes available. Most of the previous threshold standards and indicators (AQ -1, 2, and 3) will likely be retained and will be included under this threshold goal.

Although ecosystem health was recognized as an extremely important factor, due to limited information, no standards are being proposed at this time. The TRPA is awaiting the results of several studies in the area of ecosystem health including, acidification of lakes and vegetation damage due to air pollution. This new information will be considered as part of the adaptive management process for any future improvements to the air quality threshold.

The standards for the air quality thresholds have not been sufficient to maintain significant resource values, and additional threshold standards are required to maintain significant values (cf. criterion 4d of Resolution 82-11). There is a need to streamline and develop an improved air quality program that utilizes an adaptive management process that enables rapid adjustment to new information resulting in improved programs. TRPA also sees a need to retain the individual standards necessary to protect human and ecosystem health and establish indicators that are based on exceedances of these standards. This allows a direct connection between the standard and the threshold goal, which is not possible with the current indicators.

The existing indicators and standards for human health reflect ambient air quality standards for specific pollutants as established by the U.S. EPA, California, Nevada, and TRPA. Over time, studies have shown that some of these standards were insufficient to protect human health, and were made more stringent. In addition, federal and state agencies adopted new standards for particulate matter which was identified as a significant health concern. For these reasons, it is necessary to make some adjustments to improve our current standards and indicators.

2.5.1 AQ-1 CARBON MONOXIDE

Threshold Recommended Changes

Minor changes to both the standards and indicators for carbon monoxide are recommended. The proposed standards and indicators are shown in Table 2-5 below.

Table 2-5: Carbon Monoxide

Threshold	Indicator	Standards
AQ-1 Carbon Monoxide	Number of times the standards are exceeded at any monitoring station in the Basin.	1. 6 parts per million (ppm) 8-hour average. Not to be equaled or exceed. 2. 20 ppm 1 – hour average. Not to be exceeded. The above standards are to be measured using the California Air Resources Board's methods and techniques for measuring Carbon Monoxide.

There are multiple TRPA, California, Nevada, and Federal standards for carbon monoxide in effect throughout the Basin. In order to provide the most progressive and equitable air quality for all citizens, the TRPA is proposing to adopt the most stringent standards for this pollutant Basin-wide. The proposed standards are already in effect for the California side of the Basin and are equally suited for the entire Basin for health-based reasons. Because carbon monoxide is considered a "Hotspot" pollutant, meaning its effects are very localized, it is important to monitor this pollutant at various locations in the Basin. For this reason, it is recommended that data from all CO monitoring stations within the Basin be used to report on the indicator. Currently, this indicator is only measured at one location and these data are not adequately to provide the necessary information to either evaluate or make recommendations for improvements.

Deletion of the current indicator and replacing it with the number of times the standards are exceeded at any monitoring station in the Basin is recommended. This will provide us with the information necessary to evaluate and make recommendations for improvements to the Basin's air quality program.

Rationale for Change

The recommended changes to this indicator are based on the finding that the threshold standard is not sufficient to maintain a significant value of the Region or additional threshold standards are required to maintain a significant value. The existing indicator and standards vary between the two states in the Basin. Thus, residents and visitors throughout the Basin may not be uniformly protected. Considering the air we breathe and the associated health effects do not recognize state and local boundaries of the Basin, it is important to adopt a single set of health-based standards Basin-wide in order to protect human health. The proposed standards are currently in effect for the California side of the Basin and it was important to the residents of the remaining portion of the Basin that they are provided with the same protection for their health. Moreover, the recommended improvements will provided a better approach to enable the adaptive management of criteria pollutants and facilitate additional changes as new information becomes available.

2.5.2 AQ-2 OZONE

Threshold Recommended Changes

Changes to both the standards and indicators for ozone are recommended. The proposed standards and indicators are shown in Table 2-6 below.

Table 2-6: Ozone

Threshold	Indicator	Standards
AQ-2 Ozone	Number of times the standards are exceeded at any monitoring station in the Basin.	1. 0.07 ppm 8-hour average. Not to be equaled or exceed. 2. 0.08 ppm 1–hour average. Not to be equaled or exceed. The above standards are to be measured using the California Air Resources Board's methods and techniques for measuring Ozone.

There are multiple TRPA, California, Nevada, and Federal standards for ozone in effect throughout the Basin. In order to provide the most progressive and equitable air quality for all citizens, the TRPA is proposing to adopt the most stringent standards for this pollutant Basin-wide. California recently adopted a more stringent 8-hour standard in order to protect its population from the damaging health effects of ozone. Adoption of this standard for the entire Basin is recommended in order to better protect the health of its residents and visitors. There are no changes proposed for the 1-hour standard.

Adding the number of exceedances of the new 8-hour standard to the existing indicator is recommended. This will enable us to better utilize the adaptive management process and evaluate and make recommendations for improvements to the Basin's air quality program.

Rationale for Change

Due to the health risk posed by ozone, TRPA, both states, and the federal government have adopted standards for this pollutant. Ozone gas is a secondary pollutant formed in the atmosphere by a photochemical process involving hydrocarbons, oxides of nitrogen, and sunlight. This pollutant can cause significant human health risks, and can adversely affect vegetation, especially at high altitudes. The primary source of ozone precursor emissions in the Basin are exhaust emissions associated with vehicle and other transportation sources.

The recommended changes to this indicator are based on the finding that a threshold standard is not sufficient to maintain a significant value of the Region or additional threshold standards are required to maintain a significant value. The existing 1-hour standards vary between the two states in the Basin. Moreover, California recently adopted an 8-hour standard to better protect its population from the damaging health effects of lower but persistent levels of ozone. Thus, residents and visitors throughout the Basin may not be uniformly protected by the current health-based standards. Because the air we breathe and the associated negative health effects do not recognize the state and local boundaries of the Basin, it is recommended that the most stringent health-based standards be

adopted Basin-wide in order to protect human health. The proposed standards are currently in effect for the California side of the Basin and it was important to the residents of the remaining portion of the Basin that they are provided with the same protection for their health.

2.5.3 AQ-3 PARTICULATE MATTER

Threshold Recommended Changes

Changes to both the standards and indicators for Particulate Matter are being recommended. The proposed standards and indicators are shown in Table 2-7 below.

Table 2-7: Particulate Matter

Threshold	Indicator	Standards
AQ-3 Particulate Matter	Number of times the standards are exceeded at any monitoring station in the Basin.	PM_{10} 1. 50 $\mu g/m^3$ 24-hour average.[1] 2. 20 $\mu g/m^3$ annual arithmetic mean. [1] Not to be exceed $PM_{2.5}$ 1. 65 $\mu g/m^3$ 24-hour average. [2,3] (EPA guidelines) 2. 12 $\mu g/m^3$ annual arithmetic mean. [1] Not to be exceed. [1]The above standards are to be measured using the California Air Resources Board's methods and techniques for measuring PM. [2]The above standards are to be measured using the U.S. EPA's methods and techniques for measuring PM. [3]The California Air Resources Board is in the process of developing more stringent $PM_{2.5}$ standards. Upon this adoption, TRPA will adopt and implement those standards Basin-wide.

Because of the health risks of this pollutant, adoption of the most stringent PM_{10} and $PM_{2.5}$ standards currently on the books is recommended as part of this threshold update. Due to the significant health risks associated with $PM_{2.5}$, the California Air Resources Board is in the process of developing more stringent standards. When adopted, these standards will automatically apply to the California side of the Basin and it is recommended that TRPA automatically adopt them Basin-wide.

It is also recommended to delete the current indicator and replace it with the number of times the standards are exceeded at any monitoring station in the Basin. This will enable us to better utilize the adaptive management process and make recommendations for improvements to the Basin's air quality program.

Rationale for Change

Particulate matter pollution consists of very small liquid and solid particles in the air. PM_{10} is among the most harmful of all air pollutants. When inhaled these particles evade the respiratory system's natural defenses and lodge deep in the lungs. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. These effects are particularly harmful to children, exercising adults, and the elderly. In addition, PM_{10} plays a significant role in the decline in visibility in the Basin. The primary sources of PM_{10} in the Basin include motor vehicles, sand, salt

and road dust, smoke from both natural and manmade fires, and fugitive dust from construction and barren areas of the landscape.

Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lungs. These particulates are less than 2.5 microns ($PM_{2.5}$) in diameter, and due to there extremely small size, can be inhaled deep into the lungs and into our bloodstream. Because some of these particles contain carcinogens, California and the federal government have adopted standards and increased their study of this pollutant. Because of the health risks of this pollutant, TRPA is recommending improvements to this threshold that include the adoption of the most stringent PM_{10} and $PM_{2.5}$ standards currently adopted by California and the Environmental Protection Agency Basin-wide.

The recommended changes to this indicator are based on the finding that the threshold standard is not sufficient to maintain a significant value of the Region or additional threshold standards are required to maintain a significant value. The existing standards vary between the two states in the Basin, resulting in possibility that residents and visitors do not have equitable protected from this pollutant. The proposed improvements provide better protection for both human and ecosystem health and allow TRPA to better evaluate and make recommendations for improvements to the Basin's air quality program. In addition, because the air we breathe does not recognize the various state and local boundaries of the Basin, TRPA believes it is important to adopt the most stringent standards Basin-wide in order to provide the maximum benefits to our residents and visitors.

2.5.4 AQ-4 VISIBILITY

Threshold Recommended Changes

Visibility has improved significantly in the Basin over the past 20 years. Some of the regional and sub-regional targets regarding visibility, established 20 years ago, have been met and exceeded. It is recommended that higher standards be established that protect the visibility improvements achieved to date. By establishing visibility standards equal to those that have been achieved in recent years, we will protect the visual beauty of the Basin that residents and visitors alike have come to cherish.

Changes to both the standards and indicators for visibility are recommended. The proposed standards for visibility are divided into two areas (Regional and Sub-regional visibility) and are in shown Table 2-8 below:

Table 2-8: Visibility

Threshold	Indicator	Standards
AQ-4 Visibility	Number of times the standards are exceeded at any monitoring station in the Basin.	**Regional Visibility**[1] 1. Achieve a light extinction coefficient of 21Mm^{-1} or less for 50% of the year. (Approximately equal to 116 miles) 2. Achieve a light extinction coefficient of 34Mm^{-1} or less for 90% of the year. (Approximately equal to 72 miles)[1] **Sub-Regional Visibility**[1] 1. Achieve a light extinction coefficient of 42Mm^{-1} or less for 50% of the year. (Approximately equal to 58 miles) 2. Achieve a light extinction coefficient of 72Mm^{-1} or less for 90% of the year. (Approximately equal to 34 miles) [1]The above standards are to be measured using the protocol established by the TRPA. Attainment calculations will be made on three year running periods.

Rationale for Change

The recommended changes to this indicator are based on the finding that the threshold standard is not sufficient to maintain a significant value of the Region or additional threshold standards are required to maintain a significant value. The existing standards are less than the current visibility conditions in the Basin and could allow progress made during the past twenty years to be reversed. For this reason, a need exists to update visibility standards to reflect and ensure that these improvements are maintained. By adopting these standards, we will retain the progress made during the past twenty years and prevent backsliding to less desirable conditions.

2.5.5 AQ-5 U.S. TRAFFIC VOLUME

Threshold Recommended Changes

This indicator was originally designed to measure the progress of CO attainment. However, because we have been unable to correlate CO levels with traffic volumes, staff is recommending deleting this standard and indicator as currently written and relying on the direct measurement of the CO standards alone.

Traffic volumes are currently measured on the Saturday of Presidents Day holiday between 4:00 PM and 12:00 Midnight at a site immediately west of the intersection of Park Avenue in the City of South Lake Tahoe. The CO monitoring station is located in close proximity to this count station in the Stateline area. Over the last evaluation period, the Basin has recorded increases in CO levels, while the vehicle counts have shown a corresponding 28 percent reduction in traffic volumes. For

this reason, this indicator has not proved to be effective in measuring this threshold and is proposed to be deleted.

Rationale for Change

The recommended changes to this indicator are based on the finding that substantial evidence to provide a basis for a threshold standard does not exist. Because we are unable to correlate CO levels with the traffic volumes along U.S. 50, it is recommended that this standard and associated indicator be deleted. Although this indicator was unable to be correlated with CO levels at the Stateline location, it is believed that traffic volumes are directly tied to CO and other emissions. For this reason, TRPA will work to establish a more Basin-wide approach for a traffic volume and Vehicle Miles Traveled (VMT) threshold in the future.

2.5.6 AQ-6 WOOD SMOKE

Threshold Recommended Changes

The threshold standard for wood smoke requires a 15 percent reduction from the 1981 levels. However, because no measuring protocol was ever developed, it is impossible to know what the 1981 levels were or to assess the current levels against them. For these reasons, it is recommended that this standard be replaced with recommended standards listed under visibility and particulate matter.

Rationale for Change

The recommended changes to this indicator are based on the finding that substantial evidence to provide a basis for a threshold standard does not exist. Because it is not possible to measure either the previous or current smoke or soil levels, it is recommended that these standards and associated indicators be deleted. The loss of these indicators can be mitigated with the improved visibility standards, PM standards, and new air deposition requirements that will be promulgated with the completion of the TMDL program.

2.5.7 AQ-7 VEHICLE MILES TRAVELED (VMT)

Threshold Recommended Changes

The purpose of the VMT threshold is to reduce the amount of nutrients deposited to the lake through vehicular activity. This included the nitrogen emission from the tailpipe as well as the nutrients associated with re-entrained road dust. However, because emissions associated with VMT vary greatly depending on the type or mode of transportation, lowering VMT can actually increase nutrients and other pollution to the Basin. For this reason, TRPA will be developing a new program after 2008 that incorporates VMT with emissions from each class of vehicle or mode of travel. By combining VMT with mode specific emission factors, this will provide much more valuable information and allow us to recommend improvements based on emission reduction potentials.

Rationale for Change

The existing threshold does not correlate well with the intended purpose of reducing NOx emissions or nitrogen deposition to Lake Tahoe. The recommended changes are based on the finding that substantial evidence to provide a basis for a threshold standard does not exist. As written, it is possible to actually increase nutrients and other harmful pollution to the Basin by decreasing VMT, although it seems intuitive that if there were less vehicle miles traveled there would be fewer emissions. However, because emission levels per mile from passenger vehicles have significantly outpaced those of other modes of travel over the last ten years, it

is possible that the emissions associated with alternate modes of travel can actually be greater than if people traveled in their personal vehicles.
As an example, if you made a round trip from the West Shore to the East Shore in a Cobalt 220 boat (24 miles @ 24mph), you would put out over 400 times the hydrocarbon and NOx emissions as if you drove a 2005 Subaru Outback the equivalent trip (70 miles). Similarly, if you transported 50 people to the Basin in a 50 seat Bombardier CRJ 200 jet, the emissions associated with one take-off and landing would be equivalent to the hydrocarbon and NOx emissions from driving over 169,000 miles in a 2005 Subaru Outback; or over 800 round trips from Sacramento.

For this reason, TRPA will be developing a new program that incorporates emissions from each class of vehicle or mode of travel into the VMT standard. Because the premise of this threshold is to encourage the least polluting source of travel within the Basin, the TRPA is considering developing an additional approach to reach the intended goal. Such a system may include an indicator that will measure emissions per person, per mile of travel. This type of indicator will provide much more valuable information on a project-by-project basis and will allow for improved recommendations that are based on emission reduction potentials.

2.5.8 AQ-8 ATMOSPHERIC NUTRIENT LOADING

Threshold Recommended Changes

An acceptable protocol for measuring this indicator has not been developed and therefore the status of this indicator cannot be determined. For these reasons, staff is recommending the standards and indicator be deleted until an acceptable protocol for measuring it can be developed. This protocol is currently being developed by the Lahontan Water Quality Control Board for use in their TMDL Program. Upon establishing these criteria, TRPA will propose new standards and indicators to help protect the ecosystem health.

Rationale for Change

The recommended changes to this indicator are based on the finding that substantial evidence to provide a basis for a threshold standard does not exist. Although it is known that atmospheric pollution causes a negative effect on Lake Tahoe and on ecosystem health, it is currently impossible to measure the direct DIN load on Lake Tahoe from atmospheric sources at this time. For this reason, the basis for this threshold as written does not exist. It is not possible to adequately measure or model the DIN load on Lake Tahoe from atmospheric sources at this time. For this reason, no basis for the air quality *Atmospheric Nutrient Loading Threshold* exists.

2.6 RECOMMENDATIONS

The following are additional recommendations for the air quality threshold. They have been divided into general recommendations that apply to most areas and individual recommendations for each threshold.

2.6.1 GENERAL RECOMMENDATIONS:

The recommendations for changes to air quality thresholds are described in section 2.5 and also included in the Draft Pathway 2007 Evaluation Report (Version 1.1, 2006) and Technical Supplement. Some of the recommended changes will be

addressed in the 2008 Regional Plan Update. The specific changes to be brought forth in the update will be evaluated in an Environmental Impact Statement to be completed before public hearings and requests for Governing Board action. The Compliance Measure updates listed in this document are intended to provide new information on monitoring, interim targets and to correct previous grammatical and factual errors. Potential changes to threshold standards and indicators will be addressed in the Threshold Update portion of the EIS for the Regional Plan Update.

Monitoring Program: The Basin's air quality monitoring program has suffered greatly in the last few years due to reductions, relocation, or removal of various monitoring stations and the lack of adequate resources to monitor this program. Although unfortunate, it is understandable given the complexities of the area and the large amount of coordination needed between the various regulatory and implementing agencies. For this reason, it is recommended that an extensive effort be placed upon developing and maintaining a cooperative monitoring network capable of measuring and reporting the necessary data to evaluate and recommend improvements to the Basin's air quality program. This effort will include close coordination with the Basin's stakeholders in developing the appropriate locations for each of the air quality constituents that need to be monitored for both ambient air quality parameters as well as for research. Once these locations are determined, a concentrated effort will need to be established to permanently secure these sites, establish the lead agency in charge of each site, and develop a protocol to record and disseminate the information to all appropriate stakeholders. Although this may sound routine, the coordination between two states, five counties and the various regulatory and scientific entities is very complex and will require almost full time attention by TRPA until a protocol can be developed and implemented.

Implementation Program: Secondly, although the Basin is unique and represents a very challenging arena to manage, the issues are by no means insurmountable. In the past, significant resources have been allocated to the extensive study of particular issues. Unfortunately, due to the complexities of the issues involved, the outcome of much of this study was inconclusive and therefore did not provide direct solutions to mitigate the associated air quality problems. Although extensive studies are certainly necessary to measure progress and for continued development of long range improvements, if improvements to the Basin's air quality are to be achieved in the short term, resources need to augmented or reallocated to the improvement of existing programs and the development and implementation of new air quality improvement programs based on our current knowledge. Although there is a possibility that further research could provide a more effective approach, there is an immediate need to correct the present problems and it is recommended that we use our primary resources to implement programs that have been shown effective in other areas, while awaiting the results of more in-depth research.

As an example, particulate matter has been linked to both human (respiratory) and ecosystem (visibility and water quality) health issues in the Basin. One of the primary causes of airborne particulate matter is the sand, salt and dust that is deposited on our roadways and subsequently re-entrained into the air or directly deposited through runoff to the lake. The overall solution to this challenge is clear: either reduce or eliminate the source of the particulate matter or remove the particulate matter once it is deposited on the roadways. Although no solution is without costs, and some are certainly more complex than others, a quick and cost

effective solution could be the implementation of a routine street sweeping program. This is one example of a program that has been used in other areas that could be implemented almost immediately in the Basin and show significant positive results.

Another significant challenge for TRPA's air quality program is lack of resources. Currently, only one full-time person is assigned for the entire program with an annual budget of less than $70,000. This is made up of a half-time program manager and a half-time technician. For this reason, every effort must be made to streamline current procedures to maximize results. As an example, the current wood stove program requires that at time of sale, all wood stoves within the home be compliant with TRPA's standards. This program currently requires approximately 15 percent of the current air quality manager's time to implement. One possible solution would be the adoption of regulations that would require proof of this retrofit through escrow documents. This is similar to the program already in place in Washoe County and would eliminate valuable staff time that could be dedicated to higher priority emission reduction projects.

Another area on which TRPA is proposing to concentrate is improvements to our transportation system. Emissions associated with the current transportation system continue to play a very significant role in air quality. Because there are few industrial processes or stationary pollution sources within the Basin, more than 90 percent of our carbon monoxide and ozone forming pollutants are associated with vehicular traffic. In addition, vehicle exhaust and re-entrained road dust play a significant role in airborne particulate levels, water pollution, and a decrease in the Basin's pristine visibility. For these reasons, it is crucial that we embark on a coordinated effort to dramatically increase the air quality benefits associated with our transportation system. To this end, it is recommended that TRPA work more closely with the Tahoe Metropolitan Planning Agency (TMPO) on all future transportation projects to prioritize, fund, and implement transportation projects according to their air quality benefit where possible. It is also recommended that the TMPO ensure that bike lanes and pedestrian facilities be incorporated into all major arterials around the lake when projects are proposed and ensure that significant air quality improvements are incorporated into every large scale transportation project.

Because of the overwhelming changes necessary in the air quality program, staff will be proposing incremental changes over time. The following is a compilation of specific recommendations for each indicator.

2.6.2 AQ-1 CARBON MONOXIDE

Status of 2001 Threshold Recommendations

This threshold was listed in attainment in the 2001 Threshold Evaluation and therefore no recommendations were listed.

Recommended Changes for 2006

As stated in the overall recommendations, the primary need for this indicator would be to establish and maintain permanent monitoring sites within the Basin. This will enable us to properly evaluate the indicator and provide us with valuable trend data that can help isolate problems and help evaluate and implement potential solutions. In addition, because this pollutant comes almost exclusively from automobiles in the Basin, it is imperative that transportation programs be developed that specifically improve the overall emissions contribution from

transportation activities in the Basin. Recommendations for the Carbon Monoxide program include:

1. Improve monitoring capability.

2. Improve in-house data gathering and analysis.

3. Design, prioritize, and implement transportation projects to maximize overall emission reductions.

Implementation of Supplemental Compliance Measures

There were 25 supplemental compliance measures listed for carbon monoxide in the 2001 Threshold Evaluation. Because of the current non-attainment status, it is recommended that the following supplemental measures be activated: 104, 105, 107, 108, 114, 115, 116, 117, 118, and 125.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as "measures in place" in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 94, 95, 96, and 97. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.3 AQ-2 OZONE

Status of 2001 Threshold Recommendations

There was one recommendation listed in the 2001 Threshold Evaluation for the ozone threshold (see Table 2-9). As of 2006, TRPA had installed 1 additional ozone monitoring station. However, due to resource constraints, this station is currently inoperative. For this reason, the overall effectiveness of the ozone measures is being categorized as ineffective.

Table 2-9: Status of 2001 Threshold Recommendations for Ozone

Recommendation	Comments	Status
New ozone monitoring stations need to be incorporated into the air quality program to help address out-of-basin transport issues. Non published in the 2001 Threshold Evaluation	TRPA installed one additional ozone monitoring station; however, due to vandalism and concerns of the usefulness of the location, this station is not in use at this time.	Partially complete.

Recommended Changes for 2006

At the time of this writing, data is still being collected and analyzed and therefore no reliable trend analysis is available. One of the primary reasons for the lack of data is that there are no resources allocated to provide a centralized location for the storage and analysis of this data and the air quality stations are continuously being relocated or removed. Both of these issues make it next to impossible to effectively manage the program. For these reasons, the primary need for this indicator is to establish and maintain permanent monitoring sites within the Basin. To this end, TRPA plans to work with the Basin partners over the next few years to develop permanent and stable monitoring stations along with a centralized reporting system for the data. This will enable TRPA to provide efficient and

accurate assessments of the conditions and develop appropriate mitigation measures for any challenges that arise.
In addition, because ozone precursor emissions come primarily from automobiles, it is again imperative that transportation programs be developed that specifically improve the overall emissions contribution from transportation activities in the Basin. The TRPA Compact recognized these impacts early on and stated that the goal of transportation planning shall be to reduce, to the extent feasible, air pollution caused by motor vehicles. In following this directive, the TRPA adopted an integrated Regional Transportation Plan – Air Quality Plan in 1992 with the purpose to attain and maintain the Environmental thresholds Carrying Capacities established by the TRPA. However, preliminary evaluations suggest that the current projects being considered or implemented could be improved with respect to emission reductions. To this end, it is recommended that transportation related projects provide an assessment of the overall emissions benefit for each of the proposed projects in the transportation plan and develop prioritization criteria for the funding and implementation of those projects based on the best possible emission reductions.

Recommendations for the Ozone program include:

1. Draft and approve minor rewording of the indicator to reflect updated standards.

2. Improve monitoring capability.

3. Improve in-house data gathering and analysis.

4. Design, prioritize, and implement transportation projects to maximize overall emission reductions.

5. Require bike lanes to be implemented concurrently with any construction along major arterials in the Basin.

6. Investigate the possibility of developing emission standards for char broilers in the Basin.

Implementation of Supplemental Compliance Measures

There were 23 supplemental compliance measures listed for ozone in the 2001 Threshold Evaluation. Because of the current non-attainment status, it is recommended that the following supplemental measures be activated: 104, 105, 107, 108, 114, 115, 116, 117, 118, and 125.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 82, 85, 86, 87, 88, 89, 90, 91, 92, 94, and 95. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.4 AQ-3 PARTICULATE MATTER

Status of 2001 Threshold Recommendations

There were three recommendations listed in the 2001 Threshold Evaluation for the particulate matter threshold (see Table 2-10).

Table 2-10: Status of 2001 Threshold Recommendations for Particulate Matter

Recommendation	Comments	Status
While in the past, efforts to reduce road salt and dust re-entrainment have fallen under the responsibility of the water quality program, more involvement by TRPA is necessary since airborne transport of materials contributes a significant amount of particulates to the lake. This requires increased measurements of airborne particulates in the Basin, primarily during winter storm events, in order to quantity the amount of salt and sand being deposited to the surface of the lake from the atmosphere, TRPA shall develop an action plan with associated costs (Dec 2004)	Although the assessment and quantification of the road contaminants delivered into the air and the lake is not fully complete, there is enough evidence to warrant implementation of a street sweeper program.	In progress
While it is know that fires emit several constituents including particulate matter, the actual contribution to atmospheric concentrations is unknown. Therefore, some form of event characterization is needed. TRPA also needs to coordinate with other agencies in the Basin (Dec 2004)	The USFS and Basin Fire Safe Council are currently developing improved modeling techniques	In progress
Data gathered by Air Resources Specialists, Inc. indicates increased transport of fine particulates into the Basin from the Sacramento Valley and San Francisco area. Increased analysis on the filters from the IMPROVE modules is necessary to better identify sources. (Dec 2004)	This recommendation is on going and being pursued by UC Davis. Although, it may be true that the Basin is experiencing pollution transport from upwind sources, it is suggested that we concentrate on controlling in-Basin sources.	Unknown

Recommended Changes for 2006

The primary sources of PM_{10} in the Basin include, sand, salt and road dust, smoke from both natural and manmade fires, and fugitive dust from both inside and outside the Basin. Recommendations for this indicator include concentrating on the primary sources of PM_{10} generated within the Basin. This consists of a focused program for street sweeping, snow storage on highways, and mitigation projects/programs for particulates generated from forest fuels reduction programs. It is recommended that a street sweeping program be implemented around the Basin including the development of a regularly scheduled sweeping program for each State, County and the City of South Lake Tahoe. Such a program may call for the use of high efficiency sweepers at least twice a week for major roads. This approach will not only improve particulate matter levels in the air, but will improve visibility of the air and clarity of the lake.

In addition to street sweeping, forest fuels reduction programs involving prescribed burning could be a major source of PM_{10} in the coming years. This is due to the tremendous fuel loads currently awaiting treatment in the Basin. The current preferred method by land managers for removing this fuel load is by burning. Because large scale burning will likely violate air quality standards, every effort

should be made by the controlling entities to treat these fuels without burning, and where this is not possible, utilize biomass facilities, and conduct burns only on the appropriate days and within limits. To aid in developing an appropriate way to predict good burn days, an improved monitoring network and the ability to predict how many burns and the amount of fuel to be burned by each entity needs to be developed. Such a program will require additional resources and monitoring stations to develop and implement this program. Because there is already an established network of fire professionals operating in the Basin, it is suggested that this program be managed by the Tahoe Fire Safe Council in cooperation with TRPA and other regulatory agencies. In addition, as we move through the current program to reduce the fuel loads in the Basin, it is recognized that broadcast burning may play a major role in forest health and ecosystem restoration. For this reason, it is recommended that TRPA develop the expertise in this field and work with such entities as the USFS, State Parks, and Conservation agencies to develop an appropriate broadcast burn policy for the future.

Recommendations for the PM program for the next 5 years include:

1. Adopt California's Annual Average and the federal 24-hr PM 2.5 standards.
2. Improve monitoring capability.
3. Improve in-house data gathering and analysis.
4. Develop a street sweeping program for the Basin.
5. Develop an improved snow storage policy to eliminate snow storage on the highway.
6. Work with the Fire Safe Council to implement new monitoring capabilities to help predict good burn days.

Implementation of Supplemental Compliance Measures

There were 25 supplemental compliance measures listed for particulate matter in the 2001 Threshold Evaluation. Because of the current non-attainment status, it is recommended that the following supplemental measures remain active: 104, 105, 107, and 108.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as "measures in place" in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 68, 69, 70, 73, 74, 75, 76, 77, 79, 82, 85, 87, 89, 90, 91, 92, 93, 94, 95 and 96. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.5 AQ-4 VISIBILITY

Status of 2001 Threshold Recommendations

There were two recommendations listed in the 2001 Threshold Evaluation for the visibility threshold (see Table 2-11). However, none of the recommendations have been completed. Due to programmatic recommendations to concentrate on the implementation of improvement programs rather than research, the following recommendations have been delayed.

Table 2-11: Status of 2001 Threshold Recommendations for Visibility

Recommendation	Comments	Status
Consider the adoption of seasonal visibility standards. (Dec 2004)	This recommendation is ongoing and will be further defined as the visibility program becomes more defined.	In progress
Research indicating the transport of visibility-reducing constituents into the Basin is fairly recent. Further research needs to be done to determine in-basin versus out-of-basin sources. (Dec 2004)	This recommendation is being conducted by UC Davis and the TMDL process. TRPA will incorporate the results of this work as part of the adaptive management process.	In progress

Recommended Changes for 2006

One of the challenges in the visibility program is to secure and retain the necessary resources to adequately monitor the program. Current estimates suggest the visibility monitoring program requires approximately $225,000 per year of consultant work in addition to TRPA staff time to adequately operate this threshold. The current standards require that the Basin meet various regional and sub-regional standards 50 and 90 percent of the year. However, the current monitoring practices were only able to capture between 26 and 60 samples per year. Unlike other programs that may only have slight variations from day to day, visibility levels in the Basin can dramatically change from one day to the next. For this reason, there is concern that due to the limited sampling days and the variability of the samples, an accurate assessment is difficult. However, visibility experts have assured TRPA that this sample period is viable and have suggested that TRPA improve the current visibility standards to those seen in the recent years (2001 – 2003). This recommendation was approved by the Forum and has been incorporated into the recommendations. Another area of concern with the visibility standards is the lack of sub-regional monitoring in the North Shore of the Basin. Sub-regional visibility was monitored only on the South Shore. It was thought that due to the more concentrated population in this area and the close proximity to sources (wood smoke and road dust) that this site would represent the worst case scenario with respect to visibility and if this site was in attainment, the rest of the Basin would likely be in attainment. However, the Forum expressed concern that the North Shore should not be burdened with unnecessary controls or programs if their area was in attainment and has suggested implementing a North Shore visibility monitoring.

Recommendations for the visibility program for the next 5 years include:

1. Develop more concise protocol language for visibility monitoring.
2. Improve in-house data gathering and analysis.
3. Reestablish visibility monitoring at the South Shore and at Bliss State Park.
4. Further evaluate the need for a North Shore monitoring station.
5. Improve the visibility standard to the levels experienced in the Basin for the 2001 to 2003 timeframe.

6. Improve our current wood stove program to include best available technology and require retrofit verification through escrow documents.

7. Develop a street sweeping program.

8. Develop an improved snow storage policy to eliminate snow storage on the highway.

9. Work with the Fire Safe Council to implement new monitoring capabilities to help predict good burn days.

10. Implement emission reduction programs for our transportation system.

Implementation of Supplemental Compliance Measures

There were 23 supplemental compliance measures listed for visibility in the 2001 Threshold Evaluation. Although we are currently in attainment for this threshold, staff is recommended that the following supplemental measures be activated: 104, 105, 107, and 108.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as "measures in place" in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 67, 68, 69, 70, 73, 74, 75, 76, 77, 79, 80, 81, 82, 85, 86, 87, 89, 90, 91, 92, 93, and 94. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.6 AQ-5 TRAFFIC VOLUMES

Status of 2001 Threshold Recommendations

There were two recommendations listed in the 2001 Threshold Evaluation for the traffic volume threshold (see Table 2-12). Both of these recommendations are currently in progress. It is recommended that a plan for automated remote sensing and reporting of vehicular counts be developed and implemented for all the entrances and major roads in the Basin. This will substantially add to the current information available to monitor and implement this threshold.

Table 2-12: Status of 2001 Threshold Recommendations for Traffic Volumes

Recommendation	Comments	Status
Upon better evaluation of carbon monoxide data, determine whether or not this standard should be revised or eliminated based on effectiveness and/or relevance of standard. This management standard was developed as a means of meeting the CO threshold, and currently the CO threshold is being met. (Dec 2004)	This indicator was designed to measure progress in meeting CO standards. Because CO can be directly measured, there is no need to utilize an indirect measurement for this pollutant.	In progress
Increase monitoring and data sharing with local entities as well as with California Department of Transportation and Nevada Department of Transportation; re-establish continuous data collection at necessary locations around/within the Basin. (June 2004)	Coordination between Caltrans and the NDOT has dramatically improved in the last 5 years. TRPA will continue this effort.	In progress

Recommended Changes for 2006

Because this indicator is extremely specific and is only monitored one day a year, it does not provide enough information to either inform or guide the air quality or transportation programs. However, traffic count data is very valuable for both transportation and air quality purposes and therefore TRPA is recommending improvements to this indicator that include a more Basin-wide representation and account for different emission factors for each type of vehicle. Currently, vehicle count stations are located at all entry and exit roads to the Basin and in most other significant roadways. Although most count stations are permanent, they are not equipped to remotely and automatically monitor traffic on a daily basis and therefore are only used when specific data is needed. Because monitoring technology and communications technology have increased dramatically in the recent years, these sites can be easily equipped with daily monitoring and reporting capabilities. This would enable us to accurately assess the vehicle traffic in the Basin and provide the much needed transportation assessments necessary to improve our air quality. For these reasons, TRPA is recommending improvements to this indicator as resources become available.

Recommendations for the Traffic Volume program for the next 5 years include:

1. Delete the current indicator and standard.
2. Develop an automated remote sensing and reporting vehicular count station plan for all the entrances and major roads in the Basin.
3. Reinstitute a new indicator to reflect the additional monitoring sites.
4. Develop a new vehicle count standard after sufficient data is collected.

Implementation of Supplemental Compliance Measures

There were 23 supplemental compliance measures listed for particulate matter in the 2001 Threshold Evaluation. Because TRPA is proposing improvements to this threshold, no supplemental compliance measures are being recommended at this time.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report: 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 82, 89, 90, 93 and 94. Because TRPA is proposing improvements to this threshold, no compliance measures are being recommended at this time.

2.6.7 AQ-6 WOOD SMOKE

Status of 2001 Threshold Recommendations

There was one recommendation listed in the 2001 Threshold Evaluation for the wood smoke threshold (see Table 2-13). This recommendation is currently in progress at this time.

Table 2-13: Status of 2001 Threshold Recommendations for Wood Smoke

Recommendation	Comments	Status
The wood heater retrofit program needs to be updated to allow for better enforcement (i.e. –make part of Escrow that seller/buyer shall retrofit upon sale of property) and to also determine the contribution of wood smoke emissions to atmospheric PM_{10}. (Dec 2004)	TRPA is proposing to delete the recommendation to determine the levels of wood smoke emission until the appropriate methods of measurement can be developed. In addition, TRPA is recommending incorporating improvements to the wood heater program which include the use of the best available technology and incorporation of proof of compliance within escrow documents.	**In-Progress**

Recommended Changes for 2006

Due to the inability to measure this indicator, it is recommended that it be substituted with the improved visibility and particulate matter indicators proposed for air quality. There is no environmental degradation due to this improvement because the current indicator cannot be measured and the effects of wood smoke will be monitored and maintained as part of the improvements to the visibility and particulate programs.

Implementation of Supplemental Compliance Measures

No supplemental compliance measures were listed for Wood Smoke in the 2001 Threshold Evaluation.

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as "measures in place" in the 2001 Threshold Evaluation Report: 73, 75, 80, and 93. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.8 AQ-7 VEHICLE MILES TRAVELED

Status of 2001 Threshold Recommendations

There was one recommendation listed in the 2001 Threshold Evaluation for the vehicle miles traveled threshold (see Table 2-14). This recommendation is currently in progress and will be used as part of improvements to the adaptive management process for air quality.

Table 2-14: Status of 2001 Threshold Recommendations for VMT

Recommendation	Comments	Status
Evaluate VMT and its effectiveness as a threshold standard for air quality. Determine whether another indicator would allow for better evaluation of air quality impacts (i.e., transit performance standard, Level of Service). Determine level of significance VMT plays in visibility impacts and increased NO_x concentrations. (Dec 2004)	This effort is currently in progress.	In progress

Recommended Changes for 2006

TRPA recognizes the importance of this indicator for use in transportation planning and the potential for usefulness in the air quality program if properly collected and analyzed. For this reason, TRPA will be developing a new program that incorporates VMT with emissions from each class of vehicle or mode of travel and evaluating a program to measure emissions per person per mile. By combining VMT with mode-specific emission factors, TRPA will gain the necessary information to recommend improvements based on emission reduction potentials. Recommendations for the Vehicle Miles Traveled program for the next 5 years include:

1. Rewrite this indicator to include language in which VMT is measured and reported by the class of vehicle and mode of travel and recorded by actual traffic and vehicle class counts.

2. Establish emission factors and parameters for each class of vehicle or mode of travel.

3. Evaluate the possibility of adding an emissions per person per mile of travel indicator.

Implementation of Supplemental Compliance Measures

The following supplemental compliance measures are proposed will provide benefit to the air quality program (104, 105, 106, 107, 108, 114, 115, 116, and 117).

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 76, 77, 82, 83, 84, 85, 89, 90, 91, 94 and 95. Because many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. For this reason, TRPA is proposing retaining all compliance measures until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process.

2.6.9 AQ-8 ATMOSPHERIC NUTRIENT LOADING

Status of 2001 Threshold Recommendations

There was one recommendation listed in the 2001 Threshold Evaluation for the atmospheric nutrient loading threshold (see Table 2-15). Although not complete at this time, research is currently ongoing.

Table 2-15: Status of 2001 Threshold Recommendations for Atmospheric Nutrient Loading

Recommendation	Comments	Status
This threshold was created at a time when the limiting nutrient for algal growth in Lake Tahoe was nitrogen. However, recent studies have shown a switch to phosphorous as the limiting nutrient. Although this is a water quality issue, atmospheric deposition may contribute 27% of the total phosphorous that enters the lake (Reuter et al., 2000). Deposition of particulate matter may also affect lake clarity. Therefore, TRPA recommends that research on the sources and deposition of nitrogen, phosphorous, and particulate matter be conducted since these data are important to obtain for the sake of water clarity. It is likely that this threshold will be modified for the 2007 Regional Plan. (Dec 2004)	Deposition research is ongoing by both the California Air Resources Board (LTADS) and the Lahontan TMDL process.	**In-progress**

Recommendations for 2006

Due to the large amount of research pending, only limited recommendations are proposed at this time. Recommendations for the Atmospheric Nutrient Loading program for the next 5 years include:

1. Delete both the standard and indicator from the Air Quality threshold at this time. These will be reincorporated at the conclusion of the TMDL process.
2. Continue to work with the Lahontan Water Quality Control Board and other scientists to develop the appropriate loading to Lake Tahoe and the associated techniques to measure these loadings.
3. Upon establishing the loading criteria, propose new standards and indicators for the protection of ecosystem health.

Implementation of Supplemental Compliance Measures

There were 23 supplemental compliance measures listed for the Atmospheric Nutrient Loading program in the 2001 Threshold Evaluation. Although TRPA is recommending the deletion of the standard and indicator, we believe the following supplemental compliance measures will provide benefit to the air quality program. (104, 105, 107, 108, 114, 115, 116, and 117).

Modifications or Deletion of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report: 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 79, 81, 82, 85, 86, 89, 90, 91, 92, 93, 94 and 95. Although TRPA is recommending the deletion of the standard and indicator, TRPA believes compliance measures (68, 69, 71, 72, 77, 82, 89, and 93) will provide benefit to the air quality program.

2.7 REFERENCES

TRPA. 1982. Study report for the establishment of environmental threshold carrying capacities. Tahoe Regional Planning Agency, Zephyr Cove, NV

TRPA. 2001. 2001 Environmental Threshold Evaluation. Tahoe Regional Planning Agency, Zephyr Cove, NV

Category: **air quality**
Parameter: **carbon monoxide (CO)**

1. STANDARD:
States and TRPA: 6 ppm (eight-hour avg.)
Federal: 9 ppm (eight-hr. avg.)
California: 20 ppm (one-hr. avg.)
Federal and Nevada: 35 ppm (one-hr. avg.)

2. INDICATOR (UNITS):
Second highest CO concentration at Stateline, CA station (ppm).

3. MONITORING SUMMARY: The official CO indicator monitoring site is located at Harvey's Casino in Stateline, Nevada. This site is managed by the Nevada Department of Environmental Protection and was used as the official measuring site for this indicator for the 2001 to 2006 time period.

CO data is also collected at several monitoring sites around the Basin by various regulatory agencies. At the time of this writing, data is still being collected and analyzed and therefore no a reliable trend analysis is possible for these additional locations.

~~There are 3 continuous CO monitoring stations in Lake Tahoe The California Air Resources Board (CARB) monitors CO concentrations continuously at a location on Sandy Way, adjacent to Lake Tahoe Boulevard in the City of South Lake Tahoe. CARB also monitored for CO at a site located near Stateline, CA (at Park Avenue and Lake Tahoe Boulevard). This second station began data collection in 1980 and in 1999 was relocated next to the Harvey's Casino, Stateline, NV. The Nevada Department of Environmental Protection (NDEP) monitored CO at a station located near the Horizon Casino at Stateline, NV until 1998 when the station was relocated to Cave Rock, NV. The Washoe County Health department also monitors CO in Incline Village, NV.~~

4. ATTAINMENT STATUS: Non-Attainment
Based on measurements at the Harvey's Casino monitoring site, the Basin is currently out of attainment for the TRPA and California 8-hr standard. Although the Basin was in violation at the beginning of the five-year analysis period, no recorded violations have been recorded since 2003 from the stations that have been analyzed. In addition, data indicates the Basin is currently in attainment for the remaining state and federal standards at all other monitored sites in the Basin. For these reasons, this evaluation report concludes that we have a positive trend.

~~Attainment: Two 1-hour or 8-hour periods in a given year with average concentrations over the applicable state, federal, or TRPA limit are considered a violation of the standard. Exceedances are expressed in number of periods exceeding the standard, number of days in which periods exceeded the standard, and concentrations which exceeded the standard. The first and second highest concentrations observed during the year are normally reported for each station. At the Sandy Way site, average CO concentrations did not exceed 2.4 ppm in any 8-hour period during the years 1996 to 2000. CO measurements at the Stateline, CA site were highest in 1996 with an 8-hour average value of 5.1 ppm. In 1997 and 1998, 8-hour average concentrations did not exceed 4.3 ppm. Carbon monoxide concentrations at the Stateline, NV sites (Horizon and Harvey's casinos) did not exceed 4.6 ppm. In Incline Village, CO concentrations have remained below 2.1 ppm since 1994.~~

5. TARGET DATE: The proposed target date for threshold attainment is 2010.

~~The Tahoe Region has met the targets established in 1991.~~

6. EVALUATION INTERVAL: Five ~~Two~~ years

7. INTERIM TARGETS:
The proposed 2006 interim targets for this indicator are as follows:

   a. By January 2009, develop and implement CO measurement and data collection protocols for TRPA.

   b. By October 2008, develop a monitoring location plan between the Environmental Protection Agency, Nevada Department of Environmental Protection, the California Air Resources

Board, Washoe County, Douglas County, El Dorado County, Placer County and the TRPA.

~~TRPA has met interim targets identified in the 1991 Evaluation, and is now meeting the threshold. No new interim targets have been set. Reasonable progress on control measures should continue to ensure maintenance of the threshold.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory)~~

   a. MEASURES IN PLACE: AIR QUALITY 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 94, 95, 96, and 97

   b. EFFECTIVENESS OF MEASURES IN PLACE:
   This threshold temporarily regressed into a non-attainment status for this five-year period. However, no CO exceedances have occurred since 2003. Because no CO violations have occurred over the last few years, TRPA is concluding that we have a positive trend and therefore the compliance measures appear to be working. Although the Basin is experiencing a positive trend, because approximately 98 percent of the CO emissions in the Basin are attributable to vehicle exhaust emissions, it is important to keep attention on emission reduction programs associated with transportation projects. To get the best possible benefit for these measures, it is recommending that the air quality program complete a thorough air quality emissions analysis for each of them and prioritize accordingly where possible.
   ~~In the Tahoe Region, over 98 percent of CO emissions are from mobile sources. CO exceedances occur most often during inversions and cold weather accompanied by traffic congestion. No exceedances have occurred since 1995 in the Tahoe Basin.~~

   c. SUPPLEMENTAL MEASURES:
   AIR QUALITY - 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 124, and 126

   d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
   Similar to the compliance measures, many of the supplemental measures did not complete an emission benefit analysis and therefore it is difficult to properly assess them. Although the TRPA has retained them as supplemental measures, to get the best possible benefit for these measures, it is recommending that the transportation department complete a thorough air quality emissions analysis for each of them and prioritize accordingly where possible.

~~In 1991, TRPA predicted that the Region would attain state and TRPA eight-hour standards between 1997 and 2002, and would attain the federal eight-hour standard before 1997. By 1995, TRPA was in compliance with all federal and TRPA/states standards and CO emissions have continued to decline.~~

9. ADEQUACY OF COMPLIANCE. MEASURES: The compliance measures are performing adequately at this time.

~~According to the Regional Transportation Plan - Air Quality Plan (TRPA, May 1992), the combination of in-place and supplemental measures will be adequate to maintain the applicable CO standards.~~

Category: air quality
Parameter: Ozone (03)

1. STANDARD:
   Standard: Federal: 0.12 ppm (one-hour av.)
   California: 0.09 ppm (one-hr. av.), not to be exceeded
   Nevada: 0.10 ppm (one-hour av.)
   TRPA: 0.08 ppm (one-hour av.)

2. INDICATOR (UNITS):
   Number of one-hour periods which equal or exceed the federal, Nevada, or TRPA standard at any of the permanent monitoring sites (unitless). Number of one-hour periods which exceed the California standard.

3. MONITORING SUMMARY: Over the last 10 years, the TRPA has monitored ozone levels in the Basin at no less than 6 separate sites. As of 2006, only two sites (CSLT airport and Incline Village) remain active. Currently the the Incline Village monitoring station is under renovation for improvments.

   ~~Ozone is monitored in South Lake Tahoe, CA at Sandy Way (CARB). The Nevada Department of Environmental Protection (NDEP) monitored ozone at the Horizon Casino-Hotel until 1999 when another site was installed at Harvey's Resort. Ozone monitoring was discontinued at this site in 1999. NDEP, with the assistance of CARB, monitors ozone at Cave Rock, NV. The Washoe County Health Department monitors ozone in Incline Village, NV.~~

4. ATTAINMENT STATUS: Non-Attainment.
   Between 2001 and 2004, the Basin recorded over 29 separate violations of TRPA's 1-hour Ozone standard at the various air quality monitoring stations. Although there have been no violations of any federal or state ozone standards in this reporting period, this indicator has been listed as non-attainment. Due to limited historical data, no trend analysis is currently available.

   ~~More than one day per year with one-hour concentrations greater than the Nevada or federal standards is considered to be a violation; one one-hour period which exceeds the California or TRPA standards is considered to be a violation. Exceedances of the most stringent 1-hour standard, TRPA's 0.08 ppm, have been recorded every year at one or more of the monitoring stations since the threshold was adopted. In 1996, the standard was exceeded by a concentration of 0.09 ppm in Incline Village, NV. In 1997, two violations occurred (0.095 ppm and 0.093 ppm) at the Sandy Way and Stateline, NV sites, respectively. In 1998, the standard was exceeded by a measurement of 0.081 at Sandy Way. In 1999, the standard was exceeded three times. A measurement of 0.095 was taken at the Sandy Way, CA site. Both the Zephyr Cove and Incline Village sites had readings of 0.09 and 0.087, respectively. In 2000, the TRPA ozone standard was exceeded once at the Zephyr Cove, NV site (0.090 ppm). In 1997 and 1999, ozone concentrations at Sandy Way exceeded the California standard of 0.09 ppm. No concentrations have exceeded the Nevada state standard of 0.10 ppm since 1988. The federal 1-hour standard has not been exceeded since 1982. The new federal 8-hour standard is calculated using the 3-year average of the fourth-highest daily maximum 8-hour average of continuous ambient air monitoring data over each year. This standard was not exceeded in any year.~~

5. TARGET DATE: 2015 ~~2006~~.

6. EVALUATION INTERVAL: Five ~~Two~~ years.

7. INTERIM TARGETS:
   a. By January 2009, develop and implement Ozone measurement and data collection protocols for TRPA.
   b. By October 2008, cooperatively develop a monitoring plan with the Nevada Department of Environmental Protection, the California Air Resources Board, Washoe County, Douglas County, El Dorado County, Placer County and the TRPA.
   c. By March 2010, produce the first Ozone evaluation for the 2009 calendar year.

   ~~No exceedances of TRPA's ozone standard will occur by 2006, or TRPA will use the data gathered in the study led by the California Air Resources Board to implement local and out-of-Basin control measures to reduce ozone.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory)~~

   a. MEASURES IN PLACE: AIR QUALITY –

62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 82, 85, 87, 88, 89, 90, 91, 92, 93, 94 and 95.

b. EFFECTIVENESS OF MEASURES IN PLACE:

Although there has been a decline in violations over the last two years and no violations have been recorded for any federal, or Nevada ozone standards, the threshold currently remains in non-attainment status for this five-year period. This is due to violations of TRPA's one-hour ozone standard. Because the Basin is in violation of these standards, the measures in place were not effective enough to attain and maintain this threshold. Although there has been a decline in violations since 2003, because approximately 90 percent of the ozone emissions in the Basin are attributable to vehicle exhaust emissions, it is important to keep attention on emission reduction programs associated with transportation projects.

Although the TRPA has retained these compliance measures, it is recommending that the transportation department complete a thorough emissions analysis to ensure the best possible programs are implemented on a timely manner.

~~Since the number of days exceeding the ozone standards has generally decreased since the threshold was adopted, it appears that the measures in place have been effective. However, since ozone is a secondary pollutant formed in the atmosphere, peak concentrations may be found miles downwind of source areas of the precursor emissions (reactive hydrocarbons and oxides of nitrogen). Thus, transport of ozone or its precursors into the Region from upwind areas may be a significant factor in observed ozone concentrations. More study is needed of the contribution of upwind emissions of ozone precursors to ozone concentrations observed in the Tahoe Region. Within the Region, there are large natural sources of reactive hydrocarbons in the summer; NOx emissions appear to have decreased significantly since 1982.~~

c. SUPPLEMENTAL MEASURES: AIR QUALITY - 01, 02, 03, 04, 06, 08, 09, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 29, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 125, and 126.

d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES.

Many of the supplemental measures did not complete a thorough emission benefit analysis. For this reason, it is difficult to properly assess them. Although the TRPA has retained these supplemental measures, it is recommending that the transportation department complete a thorough emissions analysis to ensure the best possible programs are implemented on a timely manner.

~~See discussion under (b), above. More study is needed to determine the contribution of upwind ozone precursor emissions to ozone concentrations observed in the Tahoe Region.~~

9. ADEQUACY OF COMPLIANCE MEASURES:

Although most of the compliance measures are performing adequately at this time, TRPA is recommending the use of adaptive management strategies to ensure the continued use of the latest and most effective technologies.

~~TRPA should sponsor additional research into the contribution of transport from upwind areas to ozone concentrations in the Region. The adequacy of compliance measures is not known, pending completion of additional studies.~~

Category: air quality
Parameter: particulate matter (PM10)

1. STANDARD:
   Federal:
   50 ug/m^3 (ann. avg., 3 yrs. running),
   150 ug/m^3 (24-hr mean, 3 yrs. running)

   California:
   30 ug/m^3 (ann. avg.),
   50 ug/m^3 (24-hr avg.)

2. INDICATOR (UNITS):

   Number of 24-hour periods exceeding the applicable federal or state standards at any permanent monitoring station (unitless); annual average PM10 concentrations at any permanent monitoring station (ug/m3).

3. MONITORING SUMMARY: Data was collected by the Air Resources Board at the Sandy Way site located in South Lake Tahoe for the between 2001 and 2003. No data was available for the 2004 or 2005 time periods. During this period, no exceedances of the national 24-hr standard were recorded and only six exceedances were estimated for the California's standard; all in 2003. At the time of this writing, no other additional PM data from other sites was available.

   ~~CARB monitors PM_{10} mass concentrations at the Sandy Way, South Lake Tahoe station. NDEP monitored concentrations at the Stateline, NV until 1998. The Washoe County Health department currently monitors PM_{10} in Incline Village, NV.~~

4. ATTAINMENT STATUS: Non-Attainment.
   This indicator was previously in attainment between 1996 and 2001. Since we have experienced non-attainment events during this five-year evaluation period, this indicator is listed as non-attainment. However, because data was unavailable for the entire evaluation period, it is not possible to develop a reliable trend.

   ~~Two 24-hour periods which exceed the applicable standard in a given year are considered a violation of the standard. The annual average standard is not to be exceeded in any year. PM_{10} measurements by CARB show that the federal standards and the federal and California annual geometric mean standard are in attainment, and that the California 24-hour average standard has been in attainment since 1999.~~

5. TARGET DATE: 2025

   ~~The Tahoe Region is in attainment of this indicator therefore a target date is not required.~~

6. EVALUATION INTERVAL: Five ~~Two~~ years.

7. INTERIM TARGETS: ~~N/A~~

   a. By May 2009, investigate the potential benefit of a street sweeping program for the Basin.
   b. By September 2009, develop a monitoring plan between the Nevada Department of Environmental Protection, the California Air Resources Board, Washoe County, Douglas County, El Dorado County, Placer County and the TRPA.
   c. By October 2009, develop and implement PM_{10} measurement and data collection protocols for TRPA.
   d. By May 2010, produce the first PM_{10} evaluation for the 2009 calendar year.

8. COMPLIANCE MEASURES: ~~(See Section II for inventory).~~
   a. MEASURES IN PLACE: AIR QUALITY-62, 63, 64, 65, 66, 68, 69, 70, 73, 74, 75, 76, 77, 79, 82, 85, 87, 89, 90, 91, 92, 93, 94, 95 and 96.
   b. EFFECTIVENESS OF MEASURES IN PLACE:
      This threshold has regressed into non-attainment status for this five-year period. For this reason, the measures in place were not effective enough to attain and maintain this threshold.

      Many of the compliance measures include transportation programs that have not completed a thorough emission benefit analysis. For this reason, it is difficult to properly assess them. Although the TRPA has retained these compliance measures, staff is recommending that the transportation department complete a thorough emissions analysis to ensure the best possible programs are implemented on a timely manner.

~~The largest contributors (by mass) to PM10 concentrations are wood smoke and dust. Thus, controls on wood smoke and dust are the most effective controls in place.~~
~~Controls have been reasonably effective, since the applicable standards are no longer being exceeded. Control measures can be improved, however.~~

c. SUPPLEMENTAL MEASURES:
AIR QUALITY - 98, 99, 100, 101, 102, 103, 104, 105, 106, 107 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119 and 120.

d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
Because most of the supplemental measures did not directly address either wood smoke or dust, additional work on these are recommended. ~~Additional controls on wood smoke and dust are the most effective supplemental measures.~~

9. ADEQUACY OF COMPLIANCE MEASURES:
TRPA evaluated the compliance measure listed in the 2001 Threshold Evaluation Appendix A. Although most of the compliance measures are performing adequately at this time, TRPA is recommending improvements to some of these measures to reflect new information learned through adaptive management strategies.

~~To maintain the PM10 thresholds, TRPA should continue to implement the compliance measures in place.~~

Category: air quality
Parameter: visibility

1. STANDARD:

The revised TRPA thresholds for air quality include the following visibility standards.

Regional Visibility
NUMERICAL STANDARD: Achieve an extinction coefficient of 25 Mm^{-1} at least 50 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 156 km, 97 miles); and achieve an extinction coefficient of 34 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the Bliss State Park monitoring site (visual range of 115 km, 71 miles).

Calculations will be made on three year running periods using the existing 1991-1993 monitoring data as the performance standards to be met or exceeded.

Reduce wood smoke emissions by 15 percent of the 1981 base values through technology, management practices, and educational programs.

Sub-regional Visibility
NUMERICAL STANDARD: Achieve an extinction coefficient of 50 Mm^{-1} at least 50 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 78 km, 48 miles); and achieve an extinction coefficient of 125 Mm^{-1} at least 90 percent of the time as calculated from aerosol species concentrations measured at the South Lake Tahoe monitoring site (visual range of 31 km, 19 miles).

2. INDICATOR (UNITS):
For regional visibility, visual range calculated from speciated aerosol and nephelometer data from the TRPA visibility-monitoring program. For sub-regional visibility, visual range calculated from speciated aerosol and nephelometer data collected at the Lake Tahoe Boulevard station (km). For state visibility standards, visual range calculated from nephelometer data collected at Bliss State Park and Lake Tahoe Boulevard for periods in which relative humidity is less than 70 percent (miles).

3. MONITORING SUMMARY: Regional visibility data was collected at the Bliss State Park monitoring station from 2000 to 2004. During this period, 503 days were sampled. Data analysis for subsequent periods is not available at this time.

Sub-regional visibility data was collected at the South Lake Tahoe monitoring station from 2000 to 2004. During this period, 186 days were sampled. Data analysis for subsequent periods is not available at this time.

~~TRPA operates integrated visibility monitoring stations at Lake Tahoe Boulevard and Bliss State Park. The monitoring stations include equipment to monitor meteorological, aerosol, and visual extinction data. For additional detail, see 2001 Evaluation Report.~~

4. ATTAINMENT STATUS: ~~Non-~~Attainment.
Regional Standards:
Based on the available information provided by Air Resource Specialists (ARS), regional visibility was found to be in-attainment with the 71 mile standard 96 percent of the sampled days and in-attainment with the 97-mile standard 65 percent of the sampled days. From this data, we were able to calculate the three-year rolling average for the years 2002, 2003, and 2004. All of these years were shown to be in attainment.

Sub-Regional Standards:
Based on this data provided by ARS, sub-regional visibility was found to be in-attainment with the 19 miles standard 100 percent of the sampled days and in-attainment with the 48-mile standard 73 percent of the sampled days. From this data, we were able to calculate the three-year rolling average for the years 2002, 2003, and 2004. All of these years were shown to be in attainment.

~~Data gathered by Air Resource Specialists, Inc. (ARS) including recent visibility measurements from TRPA's nephelometer indicate that the regional and sub-regional 50 percent visibility standards are being attained, and that the 90 percent sub-regional visibility ranges are being met. The 90 percent~~

~~regional visibility standards (D. L. Bliss State Park) are not being met.~~

5. TARGET DATE: The standards are currently in-attainment, therefore no target date is specified. ~~2006.~~

6. EVALUATION INTERVAL: Five ~~Two~~ years.

7. INTERIM TARGETS:

   a. By April 2009, request additional resources from agency for the reestablishment and improvements to the visibility program.
   b. By June 2009, draft language to incorporate current monitoring protocols.
   c. By April 2009, evaluate the need, required resources and funding, site location, and measurement protocols for a North Shore visibility monitoring station.
   d. By May 2009, investigate the potential benefit of a street sweeping program for the Basin.
   e. By May 2010, amend the TRPA Code of Ordinances for the wood stove program and propose requiring retrofit verification through escrow documents. This will be developed similar to other wood stove program in operation.

   ~~Data indicates that transported particulates may be contributing to the reductions in regional visibility. No exceedances of TRPA's visibility standards will occur by 2006, or TRPA will use the data gathered in the study led by the California Air Resources Board to implement local and out-of-Basin control measures to reduce visibility-reducing particulates.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory).~~
   a. MEASURES IN PLACE: AIR QUALITY- 62, 63, 64, 65, 66, 67, 68, 69, 70, 73, 74, 75, 76, 77, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 91, 93, and 94.

   b. EFFECTIVENESS OF MEASURES IN PLACE:
   It appears that local controls have been effective since significant improvements in ~~sub-regional~~ visibility have been observed over the last 10 years.

   ~~Since it appears that out-of-Basin sources may be contributing to reductions in regional visibility, the current measures in place may not address all sources. Out-of-basin transport is currently being addressed in the air quality research program being developed by several state and local agencies. The largest contributors (by mass) to visibility degradation are wood smoke and dust. Thus, controls on wood smoke and dust are the most effective controls in place.~~
   c. SUPPLEMENTAL MEASURES: AIR QUALITY - 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119 and 120.
   d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
   Similar to the compliance measures, these measures appear to be properly working.

   Additional ~~controls on wood smoke, VMT and dust~~ particulate controls should be examined to continue the positive trend in visibility. ~~are the most effective supplemental measures.~~

9. ADEQUACY OF COMPLIANCE MEASURES: Since the threshold has improved and is in-attainment, the compliance measures were deemed as adequate. However, to take advantage of new information learned through our adaptive management strategies and the latest available technologies, it is recommended that the compliance measures be reevaluated for the best possible improvements.

   ~~The highest priority should be supplemental measures that include transportation control measures, enhanced combustion heater controls, and enhanced BMP implementation program.~~

Category: air quality
Parameter: U.S. 50 traffic volume

1. STANDARD:

   TRPA, 7 percent reduction in traffic volume on the U.S. 50 corridor from 1981 values, winter, 4 p.m. to 12 a.m.

2. INDICATOR (UNITS):

   Although the threshold does not specify a location of US 50, or the specific winter period, TRPA traditionally looked at two different measurements to assess progress at reducing winter traffic volumes. These included: the traffic volumes recorded at Park Avenue and US 50 from 4:00 p.m. to 12:00 midnight for all days during the winter months of November through February, and on the Saturday of President's Day Weekend., coinciding with the period of the most frequent exceedences of the CO standards, historically. The latter measurement has been used as the indicator to determine compliance with the threshold

3. MONITORING SUMMARY: TRPA relies on Caltrans for the collection of the data from a station near Park Avenue, and has received information on this site since it was replaced in 2003.

   ~~In the past, permanent counting stations have existed on U.S. 50 at Park Avenue and Rufus Allen Boulevard. TRPA has recently learned that the permanent count station that previously existed at Park Avenue is no longer in operation. The last year of full monitoring at this location was for 1997.~~
   ~~TRPA staff is proposing to utilize the 1996-97 winter season's data to determine compliance with the threshold for that period. In order to estimate whether the threshold may be in attainment presently, a comparison of data will be used to try to estimate how traffic may have changed during that time period. TRPA is proposing to look at several locations immediately around the Park Avenue intersection and compare recent daily traffic with that from 1995. The only published data for these other locations is either Annual Average Daily Traffic (AADT), or Peak Month Average Daily Traffic (MADT). A relationship will be developed comparing 1996 traffic counts with 1999 traffic counts, and that relationship will be applied to the winter average from 1996-97 to estimate whether this threshold is presently being met. The same will be done to compare the Presidents' Weekend Saturday traffic volumes.~~

4. ATTAINMENT STATUS: Attainment: Traffic volumes at the monitoring location have shown the Basin to be in attainment since 2003. The average traffic volume of 17,936 was recorded in 2006 and represents a 28.7 percent reduction from the 1981 levels. This is well above the 7 percent reductions required by the current standards. In addition, the Basin has experienced a general improvement in almost every year since 2003 which indicates a positive trend.

   ~~Unknown. (Although TRPA evidence indicates this threshold is in attainment, the actual counter was not operational and the threshold status is therefore classified as unknown.) The data for 1996-97 winter does indicate that the threshold was being met during that time frame. The average traffic volume at the specified location, from 4:00 pm to 12:00 midnight, averaged from November through February was 14,587 for the 1996-97 winter. This value is approximately 7.6 percent lower than the 1980-1981 value of 15,781. Published traffic volumes from Caltrans for areas throughout South Lake Tahoe, and specifically around this intersection, show that the annual averages and peak month averages have not changed since 1996.~~
   ~~Traffic volumes recorded at the Park Avenue intersection for the Saturday of Presidents' Day Weekend for 1981, 1987, and 1989 indicated that traffic volumes increased from 25,173 in 1981 to 28,605 in 1987 (+13.6 percent), but decreased to 54,756 in 1989 (-1.7 percent). In 1996 traffic volumes for this time period decreased by 7.2 percent to a volume of 23,353, and decreased again in 1997 to a volume of 22,384 (-4.1 percent). As stated above, the annual averages for the area did not change from 1996 through 1999, and so it is presumed that the volumes for this specific time period and location would have stayed relatively constant, although we do not have the particular data to make the exact determination.~~

5. TARGET DATE: This standard is currently in-attainment and therefore no target data is specified.

   ~~Pursuant to Code subsection 32.3C, when TRPA lacks sufficient data to evaluate an indicator, it will establish a timetable. A new counter will be installed at the intersection of Park Ave. and Highway 50 by August 2002.~~

~~Data for the winter of 2002-2003 will be used to determine indicator status by June 2003.~~

6. EVALUATION INTERVAL: Five ~~One~~ years.

7. INTERIM TARGETS:

   a. By April 2010, develop a vehicle count station plan and have partial implementation of an automated remote sensing and reporting network for the appropriate entrances and major roads in the Basin.
   b. By August 2012, evaluate the data for possible addition of a new traffic count indicator.

   ~~TRPA shall work with Caltrans to install a traffic counter at the intersection of Park Avenue and Highway 50 by June 2002.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory)~~
   a. MEASURES IN PLACE: AIR QUALITY – 62, 64, 65, 66, 67, 68, 69, 70, 71, 72, 82, 89, 90, 93 and 94.
   b. EFFECTIVENESS OF MEASURES IN PLACE:
      Although the standards is in-attainment, analysis of the data suggests that this is primarily due to demographic shifts currently taking place in the Basin and not on the measures currently in place. However, although the measures in place may not be the primary reason for improvements in the traffic volumes, they do have a potential to assist in further reductions in the traffic volumes.

      ~~Available data indicates that measures in place have resulted in significant reductions in traffic volumes. and that this threshold is likely in attainment. though data are only available through 1997.~~
   c. SUPPLEMENTAL MEASURES: AIR QUALITY –
      Supplemental measures are only required when the threshold is not being achieved. The threshold is in-attainment; therefore no supplemental measures are necessary at this time.

      ~~98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119 and 120.~~
   d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
      Supplemental measures are only required when the threshold is not being achieved. Since the threshold is currently in-attainment, no supplemental measures are necessary at this time.

      ~~TRPA should continue to implement supplemental measures to maintain the threshold.~~

9. ADEQUACY OF COMPLIANCE MEASURES: Since the threshold is in-attainment, the compliance measures were deemed as adequate. However, to take advantage of new information learned through our adaptive management strategies and the latest available technologies, it is recommended that the compliance measures be reevaluated for the best possible improvements. These improvements could dramatically change the purpose and need of the current compliance measures.

   ~~Threshold may be in attainment. The cumulative impacts of compliance measures will result in traffic reductions.~~

Category: air quality
Parameter: wood smoke

1. STANDARD: TRPA: reduce annual emissions 15 percent from 1981 values

2. INDICATOR (UNITS): Aerosol samples analyzed for organic and light-absorbing carbon collected in South Lake Tahoe and at Bliss State Park serve as indirect indicators of wood smoke.

3. MONITORING SUMMARY: No reliable monitoring has been conducted.
~~The wood smoke signature element, excess fine potassium, is monitored by TRPA's IMPROVE aerosol samplers at Lake Tahoe Boulevard and Bliss State Park in conjunction with the TRPA visibility monitoring program. TRPA does not know whether suspended soil particles and wood smoke emissions have been reduced in sufficient amounts to attain the thresholds, above. A possible method for evaluating this threshold was previously identified using the concentration of a wood smoke signature element, excess fine potassium, in air samples taken by TRPA's IMPROVE aerosol monitors (ug/m3). However, due to scientific complications, this has not been monitored as an indicator unit. However, data from aerosol filters at South Lake Tahoe and Bliss State Park (see details under Visibility attainment status) indicates that the sub-regional wood smoke levels may have been reduced by 15%, but the regional levels have not. Improvements in sub-regional visibility also indicate a reduction in wood smoke.~~

4. ATTAINMENT STATUS: Unknown.
TRPA does not know whether suspended soil particles and wood smoke emissions have been reduced. ~~in sufficient amounts to attain the thresholds, above. Analysis of data in this area is ongoing. Current data indicates a significant reduction in sub-regional wood smoke may have occurred from 1991-1999.~~

5. TARGET DATE:
No baseline data has been collected for this standard; therefore it is not possible to set a target date.

~~Pursuant to Code subsection 32.3C, when TRPA lacks sufficient data to evaluate an indicator, it will establish a timetable. Since there are no methods to determine the 1981 levels of wood smoke and therefore no way to determine attainment of this indicator, TRPA will use the data gathered in the research led by the California Air Resources Board to develop an applicable wood smoke indicator which can be analyzed given current scientific methodology.~~

6. EVALUATION INTERVAL: ~~Two years~~.

7. INTERIM TARGETS:
   a. No measuring protocol has been developed to quantify the level of wood smoke in the Basin. For this reason, staff recommends this standard and indicator be reviewed for removal as part of the Regional Plan update after 2008.

~~TRPA, in cooperation with state and local agencies, shall evaluate wood smoke levels and develop wood smoke indicators which scientifically defensible and measurable.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory).~~
   a. MEASURES IN PLACE: AIR QUALITY
   Since many of the compliance measures did not include emission benefit analysis, it is difficult to recommend modifications or adjustments to them. However, since the following measures have the potential to provide benefits, TRPA is proposing to retain them until additional studies are provided. New compliance measures may be added in the future as part of the adaptive management process. These measures include 73, 75, 80, and 93.

   b. EFFECTIVENESS OF MEASURES IN PLACE: Unknown:
   No measuring protocol has been developed to quantify the level of wood smoke in the Basin. For this reason, staff is unable to specifically identify the effectiveness of the measures in place. Although no exact information is available, it is reasonable to believe that they provide air quality benefits and therefore should remain.

   ~~Although TRPA does not know the status of this threshold, data indicates that reductions in wood smoke have likely occurred over the last 10 years. Therefore, it appears that measures in place have been somewhat effective. However, the~~

~~wood heater retrofit program should be more strictly enforced. Organic carbon from wood smoke is the most prevalent fine particulate species (by mass) in the Tahoe Region.~~

c. SUPPLEMENTAL MEASURES: AIR QUALITY – None

d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
No supplemental measures were identified in the 2001 evaluation.

~~Currently no supplemental measures have been identified.~~

9. ADEQUACY OF COMPLIANCE MEASURES:
Due to the inability to measure the indicator, TRPA does not know whether compliance measures in place have resulted in progress toward, or attainment of, the applicable threshold. ~~Peak-hour wood heater emissions (on a per-heater basis) have been reduced since 1981 by the introduction of cleaner-burning heaters. Bulk annual emissions of wood smoke is a function of many factors, including average temperature, number of wood heaters, and occupancy rates in units with wood heaters.~~

Category: air quality
Parameter: VMT (vehicle miles traveled)

1. STANDARD: TRPA:
   Reduce VMT 10 percent from 1981 value.

2. INDICATOR (UNITS):
   VMT calculated by TRPA staff for peak summer day using TRANPLAN transportation model or equivalent model. In 1988, TRPA adopted interim performance targets for the VMT threshold standard, as follows:

   Indicator: VMT calculated for peak summer day using QRS (Quick Response System) transportation model or equivalent model.

   Interim Target: Indicator shall not exceed RFP (Reasonable Further Progress) line.

3. MONITORING SUMMARY: Rather than modeling compliance with the 1981 VMT Threshold, TRPA staff utilized the 1981 base year VMT estimate, and the corresponding 27 traffic count stations that produce actual annual traffic counts to analyze increases or decreases in VMT.

   ~~TRPA, Caltrans, and NDOT carry out a continuous program of traffic counting using both automatic permanent counters and spot counts. (See Table 2-5.) TRPA calculates vehicle miles of travel for any given year by modeling traffic volumes and trip lengths with the computerized TRANPLAN model. Thus, VMT is a calculated value that is not directly monitored. When the most recent VMT calculation was developed with a 1995 base year, forecasts were calculated for the years 2001, 2006, 2016. For more details, see 2001 Threshold Evaluation.~~

4. ATTAINMENT STATUS: Non-attainment.
   The combined published traffic volumes on the 27 traffic count locations decreased approximately 2.7 percent from the 1981 traffic counts. Correspondingly, when applying the annual percentage increases-decreases of traffic volumes to the 1981 VMT estimate, VMT has been estimated to have decreased by 4.5 percent from the 1981 values indicating a positive trend towards attainment.

   ~~TRPA calculated that, from 1981 to 1995, VMT in the Tahoe Region increased five percent. Further, VMT is estimated to have increased an additional 3.2 percent between 1995 and 1999, to approximately 8.5 percent above the 1981 values.~~

5. TARGET DATE: 2025

   ~~Since both residents and non-residents affect VMT, it is expected to increase regardless of the number of allocations permitted by TRPA. Therefore, attainment of this indicator is not expected to occur until 2020+. However, TRPA has established an interim target for this indicator (see below).~~

6. EVALUATION INTERVAL: Five Years
   ~~Two years, corresponding to updates of the Regional Transportation Plan.~~

7. INTERIM TARGETS:
   a. By December 2009, as part of the Regional Plan update, explore the inclusion of language in which VMT is measured and reported by the class of vehicle and mode of travel and recorded by actual traffic and vehicle class counts.
   b. By December 2009, as part of the Regional Plan update, establish emission factors and parameters for each class of vehicle or mode of travel.
   c. By February 2010, evaluate the possibility of adding an emissions per person per mile of travel indicator.

   ~~By December 2006, VMT will not exceed 1.79 million VMT. TRPA has established programs which may reduce VMT by roughly 289,000 VMT (see 2001 Environmental Assessment – funding is needed).~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory)~~
   a. MEASURES IN PLACE: AIR QUALITY - 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 76, 77, 82, 83, 84, 85, 89, 90, 91, 94 and 95.

      Because many of the compliance measures include transportation programs that have not completed a thorough emission benefit analysis, it is difficult to properly assess them. Although the TRPA has retained them

as compliance measures, we are recommending that the transportation department complete a thorough emissions analysis in order to properly assess these measures.

b. EFFECTIVENESS OF MEASURES IN PLACE:
Recent analysis suggests that the VMT decreases seen over the last few years are largely due to the continued demographic shifts currently taking place in the Basin, and not predominately to the compliance measures currently in place. However, since the measures in place may provide additional improvements in VMT, they will remain pending further analysis by the transportation department.

~~Although measures in place have kept the increase in VMT in the Tahoe Region to less than one percent annually using the computed rate of growth between 1995 and 1999, they have not been effective in meeting the applicable threshold. Implementation of supplemental measures listed below, coupled with large capital investments, and major shifts in the way people travel to, and within, the Region will be necessary to attain the threshold.~~

c. SUPPLEMENTAL MEASURES: AIR QUALITY
98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119 and 120.

d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:
Similar to the compliance measures, the recent analysis suggests that the VMT decreases seen over the last few years are largely due to the continued demographic shifts currently taking place in the Basin, and not predominately to the supplemental measures currently in place. However, since the supplemental measures in place may provide additional improvements in VMT, they will remain pending further analysis by the transportation department.

~~At this time, TRPA forecasts that VMT will continue to increase in the Region, despite the proposed program of mass transit and other transportation control measures. However, implementation of the supplemental measures will reduce the increases in VMT.~~

9. ADEQUACY OF COMPLIANCE MEASURES:
Although the compliance measures were effective at reducing VMT, it is unknown if they would be adequate for the long term.

~~To attain and maintain a threshold of a ten percent reduction in VMT from the 1981 value it will take many years, large capital investments, and major shifts in the way people travel to, and within, the Region. For additional discussion, see the Regional Transportation Plan – Air Quality Plan, TRPA, May 1992.~~

Category: air quality
Parameter: atmospheric nutrient loading

1. STANDARD: Reduction in direct DIN load on Lake Tahoe from atmospheric sources by approximately 20 percent of the 1973-1981 annual average.

2. INDICATOR (UNITS): Annual average concentration of particulate NO3 at the Lake Tahoe Boulevard air quality monitoring station (µg/m3).
Interim Target (1991): Not greater than 1.27 µg/m^3.

3. MONITORING SUMMARY: No reliable monitoring has been conducted.
~~TRPA monitors nitrate-nitrogen concentrations using the particulate samplers at South Lake Tahoe and D. L. Bliss State Park (described above in the discussion of visibility and visual range). The particulate samplers measure concentrations of the NO_3 ion every one out of six days. The California Air Resources Board monitors nitrogen dioxide and nitrogen monoxide at the Sandy Way, South Lake Tahoe site. The Nevada Division of Environmental Protection monitored nitrogen dioxide concentrations at the Stateline, NV air quality monitoring site through 1997.~~

4. ATTAINMENT STATUS: Unknown. ~~The Region is attaining the 1996 interim performance target for atmospheric deposition. However,~~ Due to the fact that no measuring protocol has been developed, it is not known whether dissolved inorganic nitrogen deposition from the atmosphere has been reduced by 20 percent of the 1973-1981 annual average. ~~The data indicate that nitrate concentrations at the Lake Tahoe Boulevard station may have been reduced by much more than 20 percent, however, and the exact 1973-1981 annual average is not known. The region is attaining the interim target of not greater than 1.27 µg/m^3, and may be meeting the threshold.~~
~~Using data gathered from 1975-2000 at various South Lake Tahoe sites, it appears that the annual arithmetic mean concentrations of nitrogen dioxide have decreased 15 percent. The threshold standards require a reduction in dissolved inorganic nitrogen loading to Lake Tahoe from all sources by 20 percent of the 1973-81 annual average. However, indicators specific to nitrogen dioxide have not been created. Therefore, attainment of the threshold relative to nitrogen dioxide can not be determined.~~

5. TARGET DATE: N/A

~~Pursuant to Code subsection 32.3C, when TRPA lacks sufficient data to evaluate an indicator, it will establish a timetable. Since there are no methods to determine the baseline levels of dissolved inorganic nitrogen and therefore no way to determine attainment of this indicator, TRPA will use the data gathered in the research led by the California Air Resources Board to develop an applicable atmospheric deposition indicator which can be analyzed given current scientific methodology.~~

6. EVALUATION INTERVAL: ~~Five years.~~

7. INTERIM TARGETS:
   a. Continue to work with the Lahontan Water Quality Control Board and other scientists to develop the appropriate loading to Lake Tahoe and the associated techniques to measure these loadings.
   b. Upon establishing the loading criteria, as part of the Regional Plan update, propose new standards and indicators for the protection of ecosystem health.

~~TRPA, in cooperation with state and local agencies, shall evaluate dissolved inorganic nitrogen levels (DIN) and develop atmospheric deposition indicators which scientifically defensible and measurable.~~

8. COMPLIANCE MEASURES: ~~(See Section II for inventory)~~
   a. MEASURES IN PLACE: AIR QUALITY –
   TRPA believes supplemental compliance measures 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 74, 75, 76, 77, 79, 81, 82, 85, 86, 89, 90, 91, 92, 93, 94 and 95 provide benefit to the air quality program.

b. EFFECTIVENESS OF MEASURES IN PLACE:

Although, TRPA does not know whether the compliance measures have resulted in progress toward, or attainment of, the applicable threshold, TRPA believes that they provide a benefit to air quality.

~~The compliance measures in place appear to have been effective at reducing concentrations of particulate NO3 at the Lake Tahoe Boulevard air quality monitoring station, in accordance with the interim performance target and threshold. Effect of compliance measures on NO2 is unknown.~~

c. SUPPLEMENTAL MEASURES: AIR QUALITY –

TRPA believes supplemental compliance measures 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119 and 120 may provide benefit to the air quality program.

d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES:

See “b” above.

~~TRPA should continue to monitor atmospheric deposition and study the role of atmospheric deposition in Lake Tahoe's water quality. TRPA is not currently recommending implementation of supplemental control measures to attain the atmospheric deposition threshold, since there are indications of threshold attainment, pending further study. Note that implementation of these supplemental measures is nevertheless recommended for attainment and maintenance of other thresholds and standards.~~

9. ADEQUACY OF COMPLIANCE MEASURES:

See “b” above.

~~Compliance measures in place appear to be adequate to attain and maintain the threshold.~~