Appendix D

Smoke Management

for the 2004 Fire Management Plan for Mojave National Preserve

Contents:

1.0 Purpose of Smoke Management

National Park Service policy Directors Order and Reference Manual 18: Wildland Fire Management (NPS 1999) directs that the protection of visibility and clean air must be given full consideration in fire management planning and operations. Furthermore, federal fire management activities which result in the discharge of air pollutants must comply with all applicable federal, state, interstate, and local air pollution control requirements. This document outlines smoke management practices for Mojave National Preserve in compliance with this policy.

The light fuels and discontinuity between fuels that characterize most of Mojave National Preserve result in fires that are generally short-lived and small in size. Such fires generate little smoke and smoke management is generally not an issue. However, there is the potential for sustained ignition under extreme burning conditions, as evidenced by the few relatively large fires that have been recorded in the Preserve (Table E1).

Table E1. Fires that exceeded 10 acres in Mojave National Preserve (or lands that became Mojave National Preserve) recorded between 1984 and 2003, out of 582 fires recorded.

Start Date	Fire Name	Size (acres)	Cause	Duration (hrs:mins)
8/12/1985	Bailey 3	30	human	not available
6/24/1986	Kessler 2	35	lightning	not available
8/21/1986	Piute	20	lightning	not available
4/26/1987	Lanfair	60	lightning	not available
7/26/1988	Wildhorse1	50	lightning	not available
6/20/1989	Beecher	43	human	not available
8/30/1992	Piute	680	lightning	not available
6/20/1993	Hackberry	360	lightning	not available
8/5/1993	Lanfair 4	15	lightning	not available
8/5/1993	Lanfair 3	20	lightning	not available
8/5/1993	Lanfair 2	25	lightning	not available
8/5/1993	Lan Fair	35	lightning	not available
8/6/1993	Hackberry3	70	lightning	not available
8/29/1993	Castle	230	lightning	not available
9/14/1993	Mohawk 2	30	human	not available
6/28/1994	Fort Piute	9497	lightning	not available
6/28/1994	New York	38	lightning	not available
6/29/1994	Grotto	90	lightning	not available
6/30/1994	Cedar	624	lightning	not available
7/30/1995	Bridget	15	lightning	20:45
7/30/1995	Colton	100	lightning	74:15
7/30/1995	Tuttle	300	lightning	75:00
7/27/1996	Piute	510	lightning	15:30
5/10/1997	Summit	40	lightning	3:15
7/19/1998	Greens Well	15	lightning	26:00
5/27/1999	Hackberry	40	lightning	24:00
7/12/2002	Wildhorse 2	650	lightning	74:45

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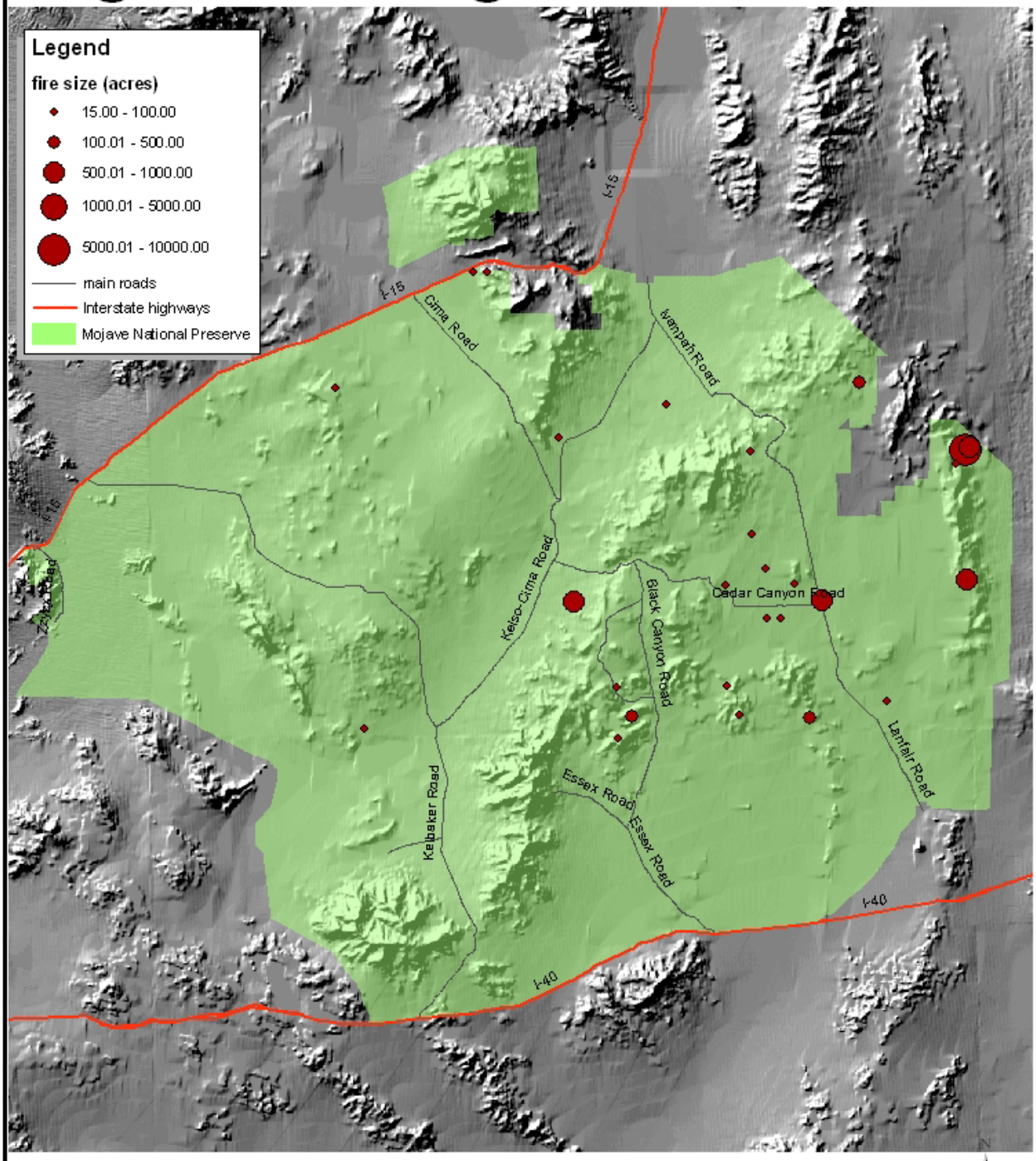
Figure E1: Large fire locations



Produced by S. Dingman, Biologist, Mojave National Preserve

August 2004

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Furthermore, the new Fire Management Plan provides for 342,900 acres of wilderness to be managed for wildland fire use where naturally-ignited wildland fires can be allowed to burn under pre-stated conditions. Naturally-ignited wildland fires in the remainder of the Preserve will be suppressed. All human-ignited fires will be suppressed throughout the Preserve. This accommodation of wildland fire use is a change from our previous fire management strategy where all fires in the Preserve were suppressed.

Wildland fire use areas are located primarily along the western edge of the Preserve, in an area of sparse and discontinuous fuels associated with Kelso Dunes, Devils Playground, Soda Dry Lake, with pockets of heavier fuels located in the Kelso Mountains, Old Dad Mountains, and Granite Mountains. The Piute Range on the east boundary, home to several of our largest fires of record, is also zoned for fire use. In the center of the Preserve, portions of the Providence Mountains, Mid-Hills, Woods Mountains, and Hackberry Mountains are also zoned for fire use. North of I-15, the center of the Clark Mountains is zoned for fire use in an area of high elevation montane woodland that is characterized by relatively heavy fuels in pockets interspersed with sheer cliffs and barren rock.

Smoke impacts from fires include: exacerbation of pre-existing health problems, contribution to levels of air pollution including ozone and particulate matter that exceed federal or state air quality standards, nuisance to residents and businesses, damage to property, and reduced visibility. This document identifies sensitive receptors and outlines a strategy to minimize and mitigate smoke impacts caused by wildland fire in Mojave National Preserve.

2.0 Air Quality Receptors and Weather Patterns

Air quality receptors for smoke generated by fires in Mojave National Preserve include concentrations of people due to the potential adverse health effects caused by inhaling smoke, and interstate highways and airports due to the potential for reduced visibility caused by smoke.

There are no urban areas in the immediate airshed of Mojave National Preserve. As measured from the center of the Preserve to the center of the urban area, the nearest urban areas are: Las Vegas, Nevada metropolitan area located 78 miles northeast; Barstow, California located 89 miles west; Twentynine Palms, California located 73 miles northeast; and the contiguous communities of Laughlin, Nevada and Bullhead City, Arizona located 54 miles to the southeast. There are significant orographic features separating the Preserve from any of these urban areas. The small size and short duration of most of the fires recorded in Mojave National Preserve make it very unlikely that a smoke column would rise high enough to be carried to these urban areas.

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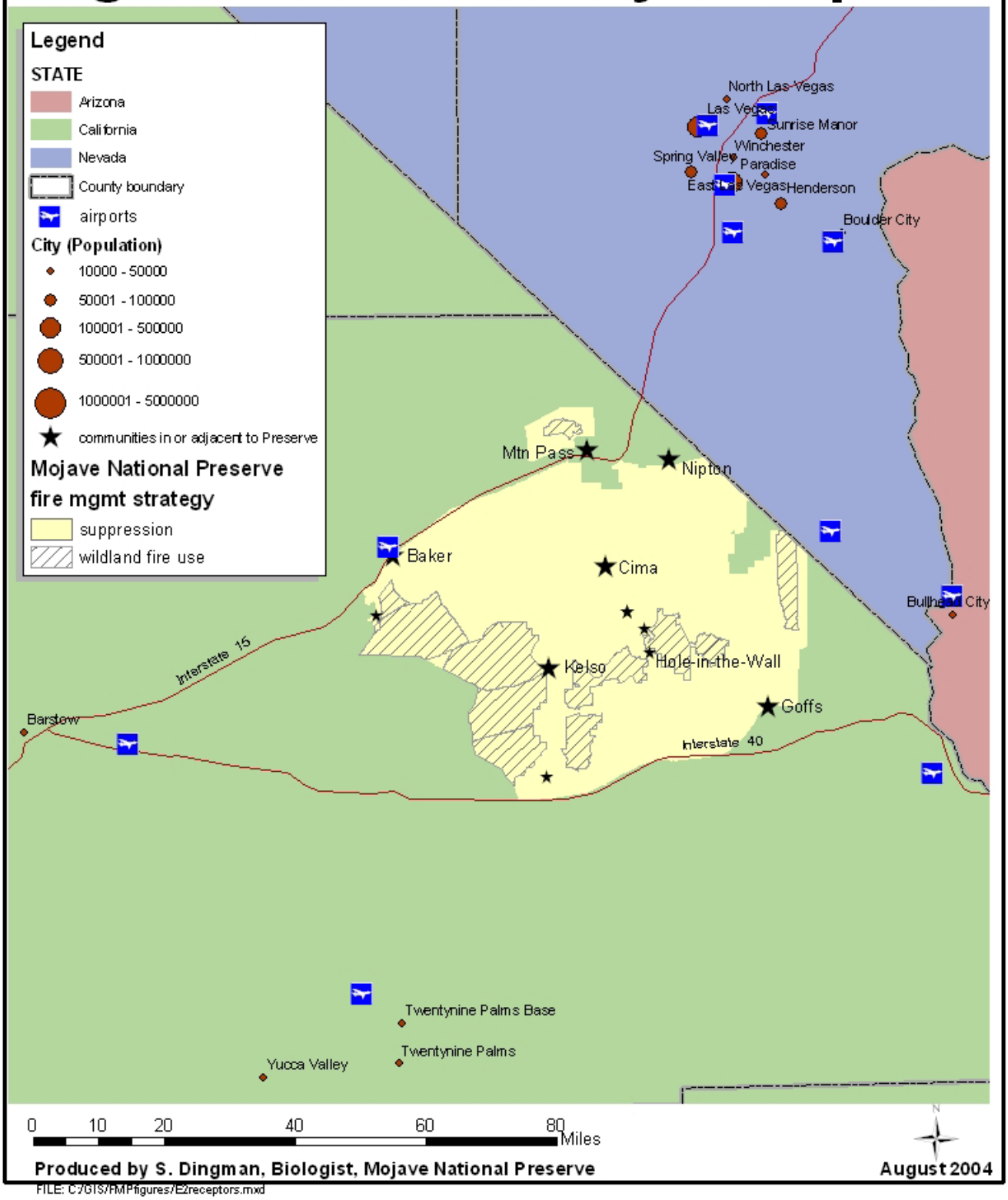
Figure E2: Air Quality Receptors



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The map in Figure E2 shows the locations of other small communities in or immediately adjacent to the Preserve. These communities have populations of a few dozen to a few hundred people. Other concentrations of people in the Preserve are shown as small stars and include two campgrounds, two university research stations, and vacation homes of Round Valley. Depending on the location of a fire and the prevailing winds, some of these communities could experience short-term smoke concentrations. There are no hospitals or nursing homes in these communities.

There are 11 airports in the vicinity of Mojave National Preserve (Table E2). There are no airports or authorized airstrips in the Preserve. The Baker Airport is the only airport that is immediately adjacent to the Preserve. There are other regional airports in the vicinity as shown on Figure E2 and Table E2. The nearest commercial airport is McCarran International in Las Vegas, Nevada. There are also two military airports in the vicinity, Twentynine Palms EAF Airport to the South and Nellis Air Force Base to the northeast. It is highly unlikely that any fires in the Preserve would generate enough smoke to disrupt aviation activities in any of these airports.

Table E2. Airports in the vicinity of Mojave National Preserve. Data obtained from AirNav.com.

Airport	Avg. Aircraft operations	Use Type
Baker Airport, CA	25/month	100% transient general aviation
Barstow-Dagget Airport, CA	100/day	49% military, 33% transient general aviation, 17% local general aviation
Twentynine Palms EAF Airport, CA	N/A	100% military (U.S. Navy)
Henderson Executive Airport, NV	270/day	47% local general aviation, 30% transent general aviation, 23% air taxi, <1% commercial
Kidwell Airport, Cal-Nev-Ari NV	67/week	86% local general aviation, 14% transient general aviation
Laughlin/Bullhead International Airport, AZ	158/day	50% transient general aviation, 43% local general aviation, 4% air taxi, 2% commercial, <1% military
Needles Airport, CA	29/day	76% transient general aviation, 24% local general aviation
Boulder City Municipal Airport, NV	90/day	45% transient general aviation, 45% local general aviation, 9% air taxi
McCarran International Airport, Las Vegas NV	1468/day	62% commercial, 19% transient general aviation, 11% air taxi, 4% local general aviation, 4% military
North Las Vegas Airport, NV	617/day	48% local general aviation, 31% transient general aviation, 21% air taxi, <1% military
Nellis Air Force Base, NV	89/day	100% military (U.S. Air Force)

The slopes facing the I-15 and I-40 travel corridors were intentionally zoned for full suppression. Any fire use area is behind the ridgeline above the highway, a measure designed to reduce the potential for smoke to impact traffic on the highways. Local roadways within the Preserve may also be affected by poor visibility caused by smoke, although such an occurrence is rare. Practices such as posted warning signs or, in the event of heavy smoke, the use of a pilot car or a temporary road closure are used to mitigate this hazard.

The entire desert bioregion is arid due to rain shadows of the Sierra Nevada, Transverse, and Peninsular ranges. From July to early September, the region experiences 10-25 days of afternoon thunderstorms from the North American monsoon originating in the Gulf of California and Mexico. Thunderstorm cells tend to concentrate over high terrain. Most lightning occurs during daylight hours from July through September as a result of summer monsoons. Relative humidity during the afternoon in the summer fire season, when fires are most likely to spread, is very low throughout the desert bioregion. The lowest humidity of the year (frequently < 10%) typically occurs in late June, just before the arrival of the North American monsoon (Brooks and Minnich in press).

Wind data has been collected at a manual weather station at the Hole-in-the-Wall Fire Center (location is labeled as "Hole-in-the-Wall" in Figure E2) since 1980, during the fire season from April to October. All large fires recorded have occurred during the fire season. A total of 3145 observations were compiled and analyzed to describe wind patterns (Table E3, Figures E3-E11).

Table E3: Surface wind observations recorded between 1980 and 2004 at the manual fire weather station at Hole-in-the-Wall; "obs" = observations and "speed" = average miles per hour. Maximum values per row in bold.

Month	data	NE	E	SE	S	SW	W	NW	N	calm
April	# obs	1	1	4	11	9	**13**	4	**13**	0
	% obs	1.8	1.8	7.1	19.6	16.1	**23.2**	7.1	**23.2**	0
	speed	15.0	3.0	11.5	12.2	11.0	11.7	**18.8**	10.0	0
May	# obs	8	6	32	87	42	42	25	**159**	3
	% obs	2.0	1.5	7.9	21.5	10.4	10.4	6.2	**39.4**	0.7
	speed	8.4	8.2	13.5	**14.0**	11.0	12.6	11.7	10.4	0.0
June	# obs	8	9	27	169	45	38	23	**247**	2
	% obs	1.4	1.6	4.8	29.8	7.9	6.7	4.0	**43.5**	0.4
	speed	10.9	**15.0**	12.1	11.7	9.8	12.1	10.7	9.3	0.0
July	# obs	3	7	47	175	53	13	15	**268**	4
	% obs	0.5	1.2	8.0	29.9	9.1	2.2	2.6	**45.8**	0.7
	speed	**13.7**	10.0	12.1	10.9	10.2	10.2	10.9	9.4	0.0
Aug	# obs	3	9	61	158	49	8	12	**247**	5
	% obs	0.5	1.6	11.1	28.6	8.9	1.4	2.2	**44.7**	0.9
	speed	7.3	**13.2**	10.2	10.4	11.1	10.3	9.6	9.6	0.0
Sept	# obs	6	13	76	155	39	24	17	**248**	2
	% obs	1.0	2.2	13.1	26.7	6.7	4.1	2.9	**42.8**	0.3
	speed	12.3	**12.8**	11.8	10.5	10.2	12.0	11.5	9.0	0.0
Oct	# obs	20	13	40	83	24	18	26	**143**	5
	% obs	5.4	3.5	10.8	22.3	6.5	4.8	7.0	**38.4**	1.3
	speed	15.3	10.1	11.0	10.5	11.3	13.9	**14.7**	9.0	0.0

The prevailing surface wind direction is generally north, although there is a significant southerly component to the wind in all seven months. Furthermore, analysis of the maximum average windspeeds indicate that strong winds can blow in virtually any direction and may vary by month: NW in April at an average windspeed of 18.8 mph, S in May at an average windspeed of 14.0 mph, E in June at an average windspeed of 15.0 mph, NE in July at an average windspeed of 13.7mph, E in August at an average windspeed of 13.2 mph, E in September at an average windspeed of 12.8, and NW in October at an average windspeed 14.7 mph.

While prevailing surface wind direction is the most obvious influence on smoke, fundamentally the distribution of smoke is more complex and is a function of the local and regional weather conditions at the time of a fire. A few of these influential weather conditions (NWCG 1994a, 1994b, 2001) are discussed here for general understanding, although the consultation process outlined in section 4 will be used to generate the data necessary to understand and predict smoke dispersal during an actual fire.

Dispersion, how smoke is distributed vertically and horizontally, depends upon the depth of the mixing layer and the strength of the transport wind. Atmospheric stability is the degree to which vertical motion in the atmosphere is enhanced or suppressed. An unstable atmosphere is associated with low pressure areas and enhances vertical motion, hence it increases mixing and the dispersion of smoke. A stable atmosphere is associated with high pressure areas and it suppresses vertical mixing, thereby limiting the dispersion of smoke. The lower atmosphere is generally more stable at night than during the day, allowing smoke to concentrate in low-lying areas at night. A temperature inversion will limit vertical dispersion of smoke originating from below the inversion. A low mixing height will limit dispersion, causing smoke to concentrate in low levels of the atmosphere. Conversely a high mixing height will improve dispersion.

Transport-level and surface winds govern the direction and downwind dilution of smoke. Winds may be completely different at different altitudes. The intensity of the fire influences the height of the smoke plume, which determines which wind regime carries the smoke. The stronger the winds are, the better the dispersion is as the smoke travels downwind. Locally high concentrations of smoke may occur near a fire due to lack of plume rise. Local winds are influenced by topography; upslope during the day and downslope at night in the case of mountainous terrain, such as characterizes the Mojave Desert. Smoke from smoldering or low intensity fires is most affected by topographically influenced wind. Nighttime drainage winds, when vertical dispersion is limited, will tend to bring a high concentration of smoke into valleys. Fires burning in valleys during the day may bring smoke up slope or up valley, though smoke may be more dispersed vertically as compared to down slope winds. Weak winds are associated with high pressure; stronger winds associated with low pressure. Mesoscale weather patterns, in conjunction with local terrain, may create significant high wind events, i.e. the Santa Ana.

A very dry airmass with clear skies, such as generally characterizes the Mojave Desert, will allow strong radiational cooling at night thus increasing the chance for development of a nighttime inversion. Very dry air along with good dispersion may result in good visibility. High humidity, such as occurs during the monsoon, may result in poorer visibility as smoke particles absorb moisture, expand, and reduce visibility.

Figure E3a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

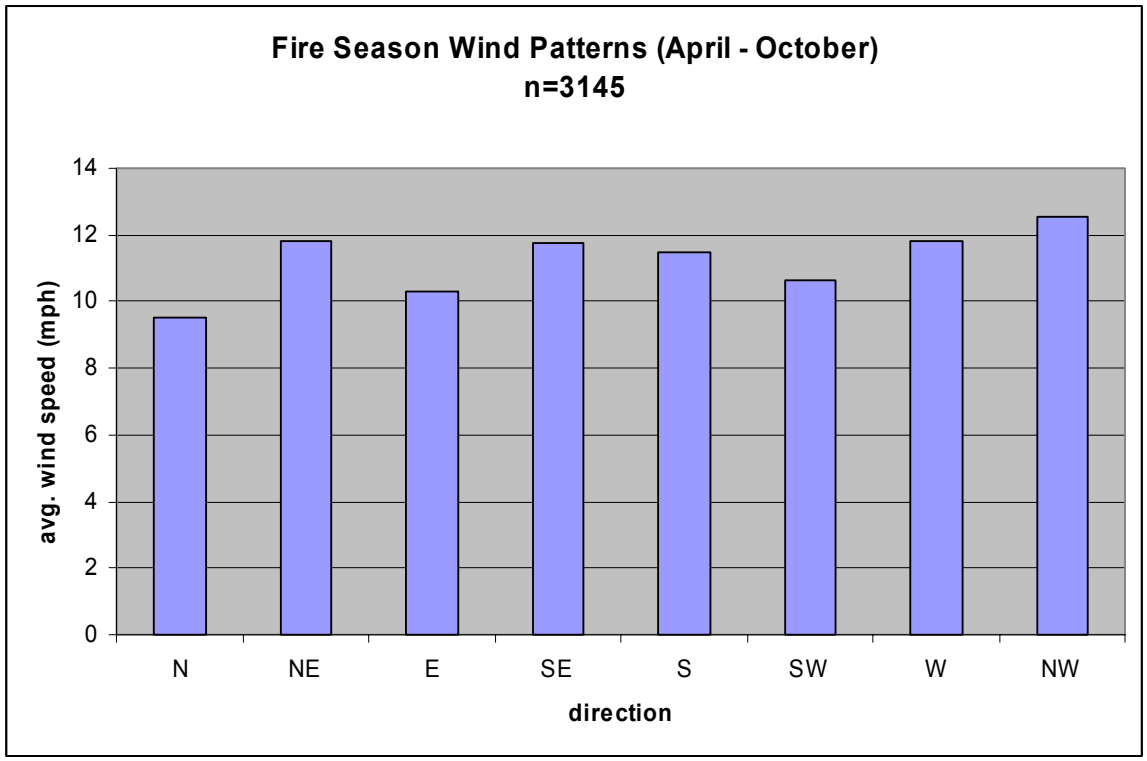


Figure E3b.Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

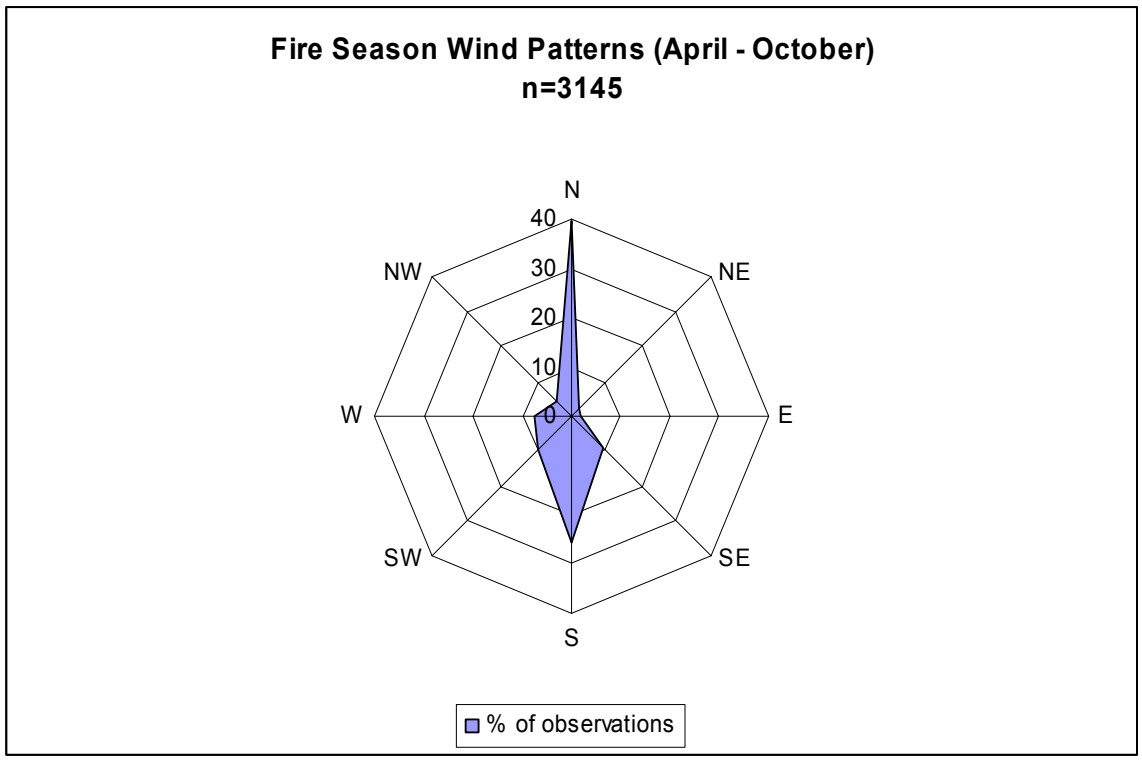


Figure E4a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

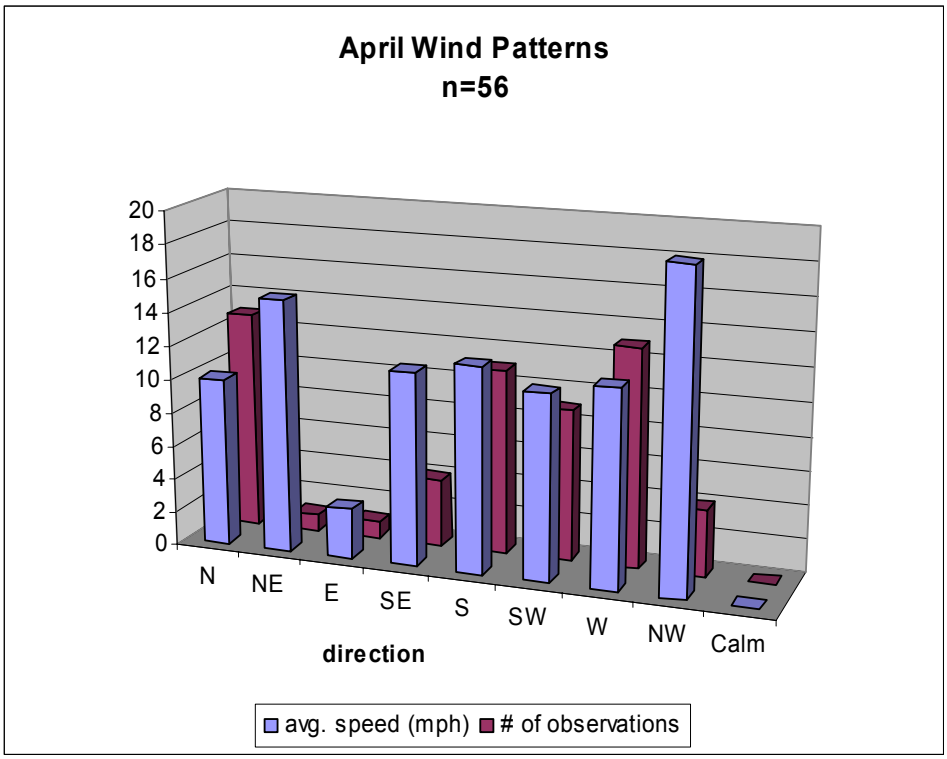


Figure E4b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

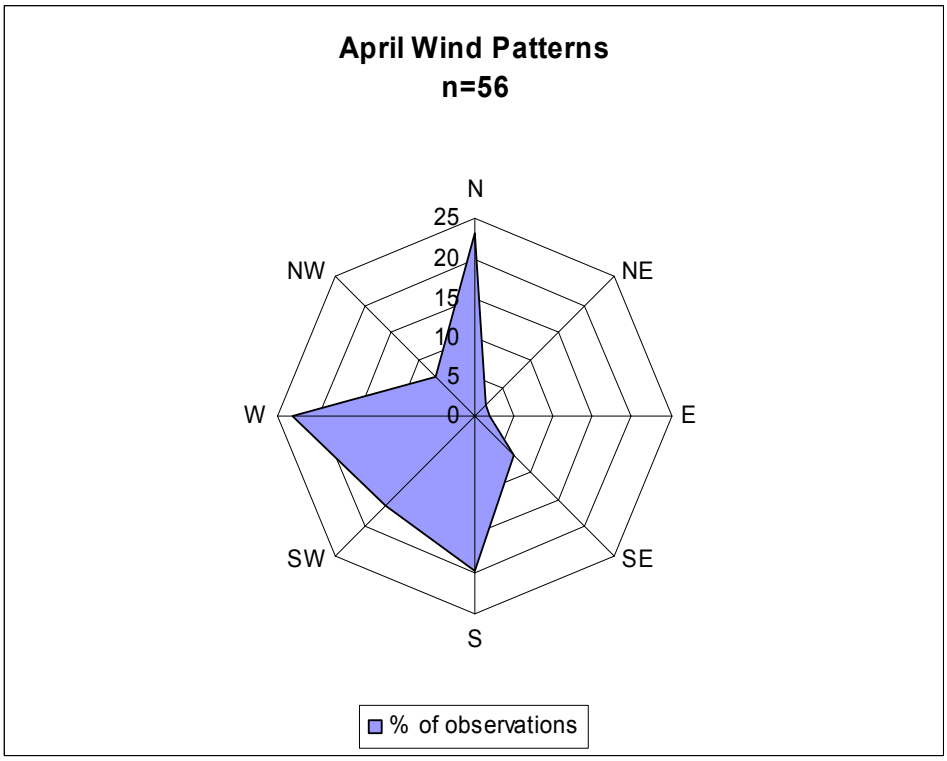


Figure E5a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

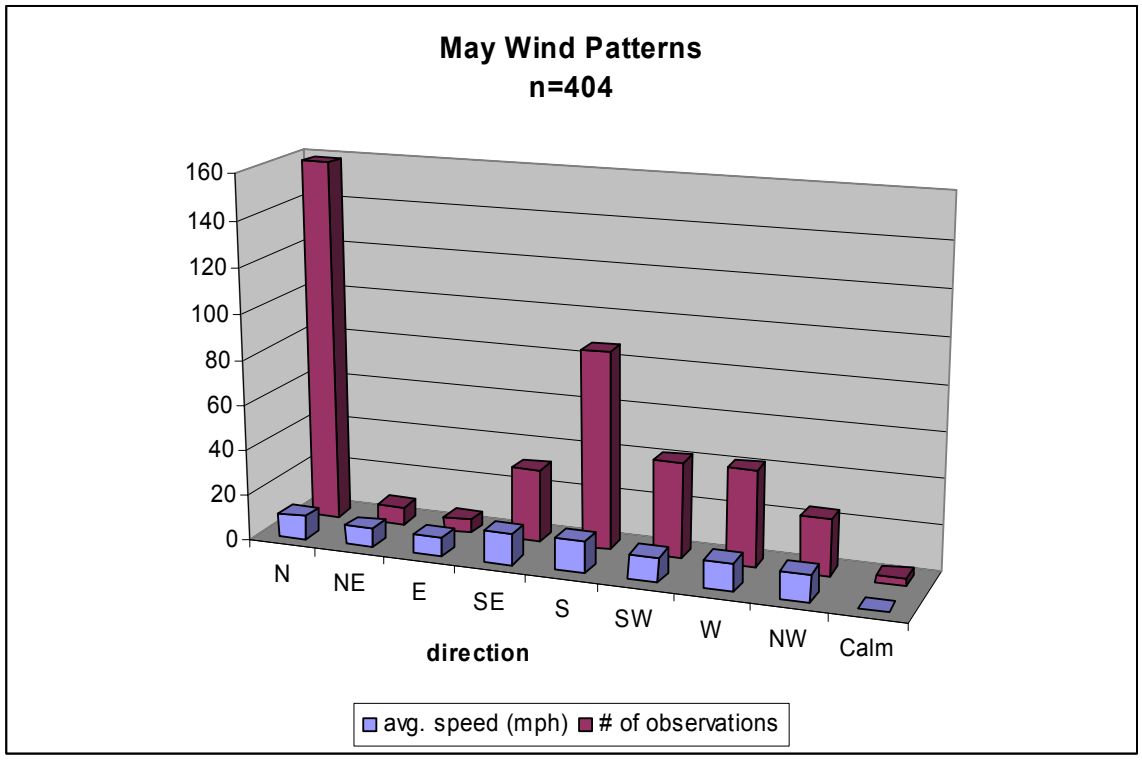


Figure E5b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

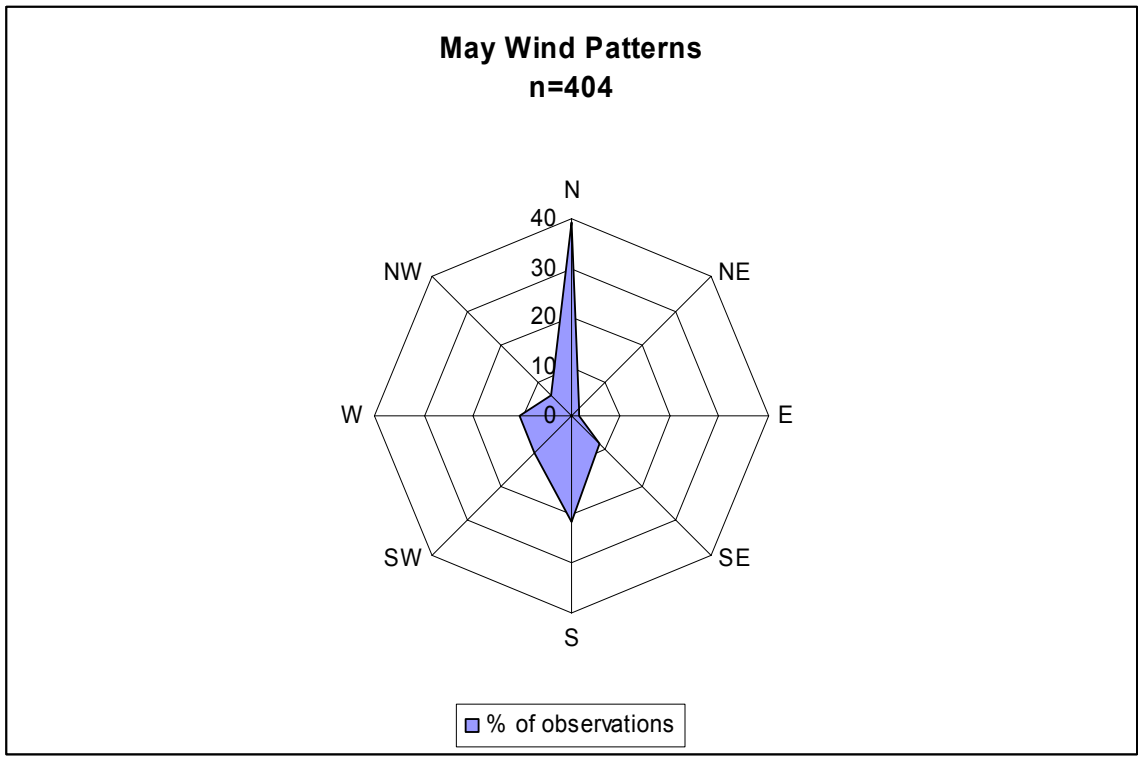


Figure E6a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

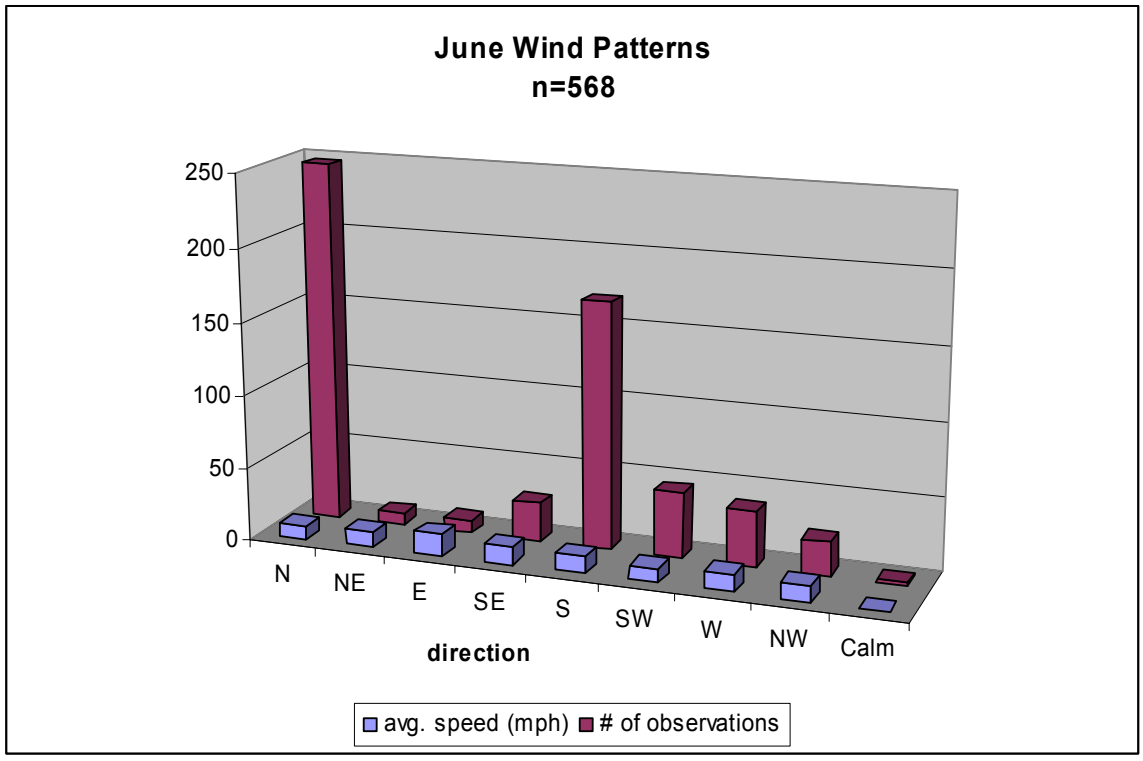
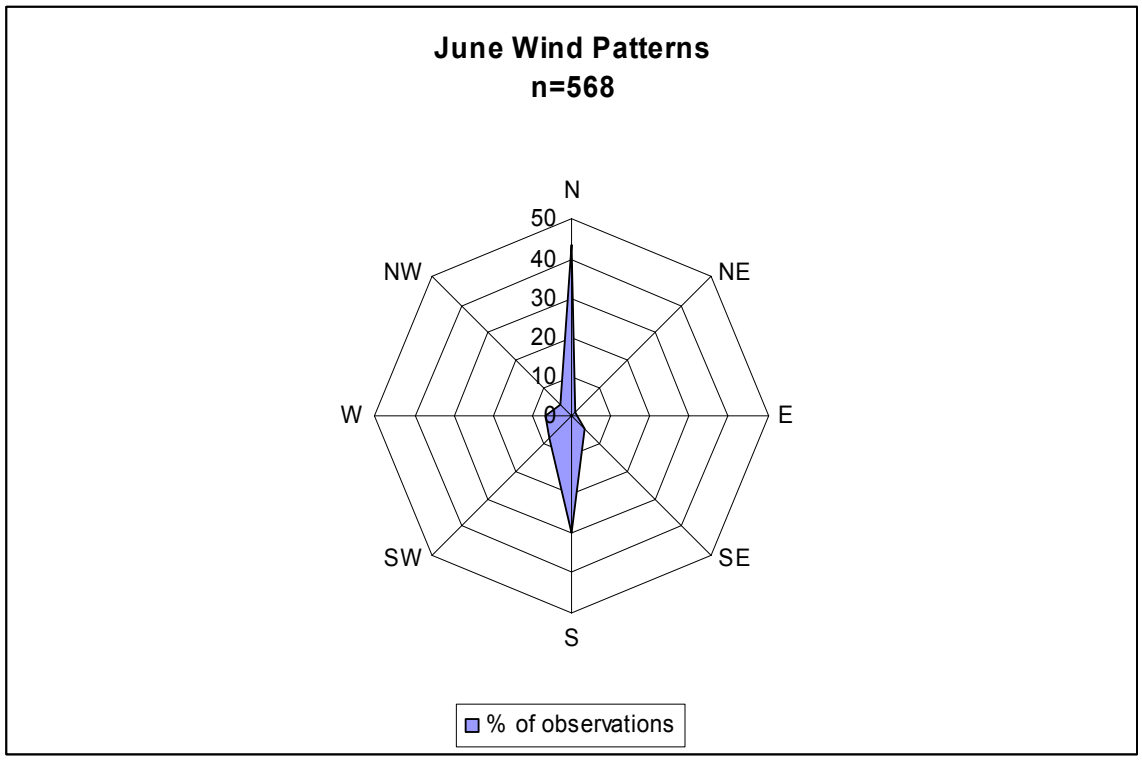


Figure E6b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.



FigureE7a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

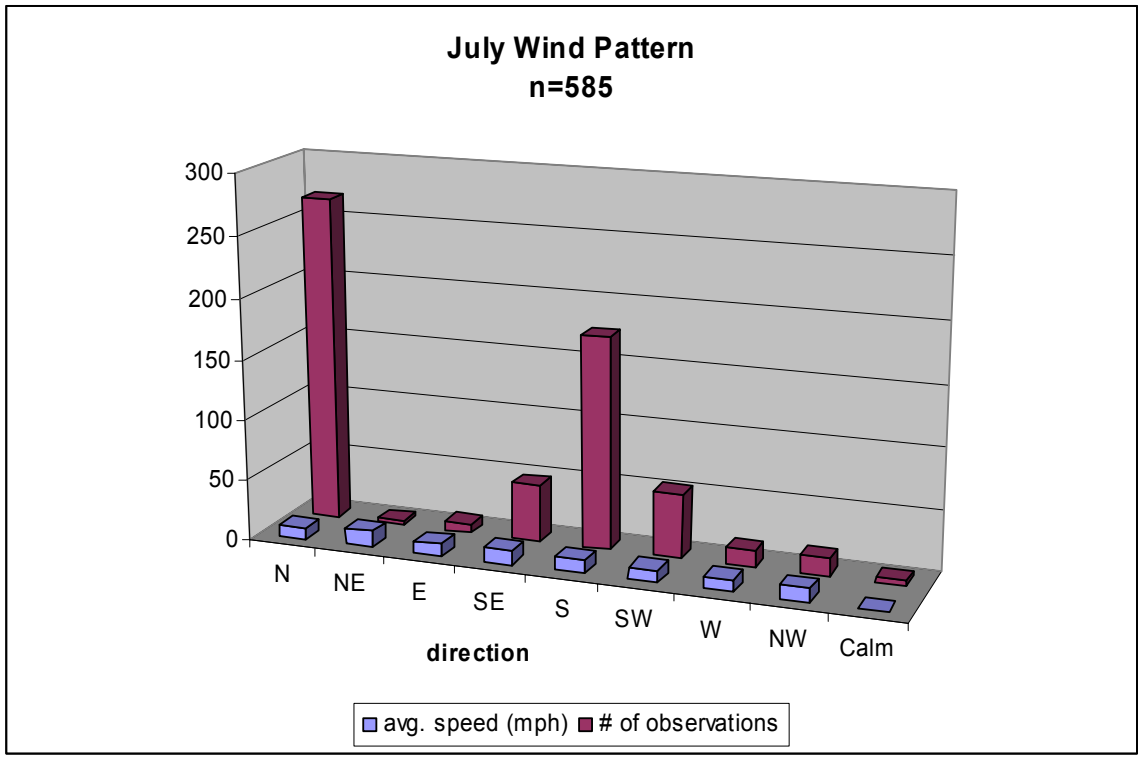


Figure E7b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

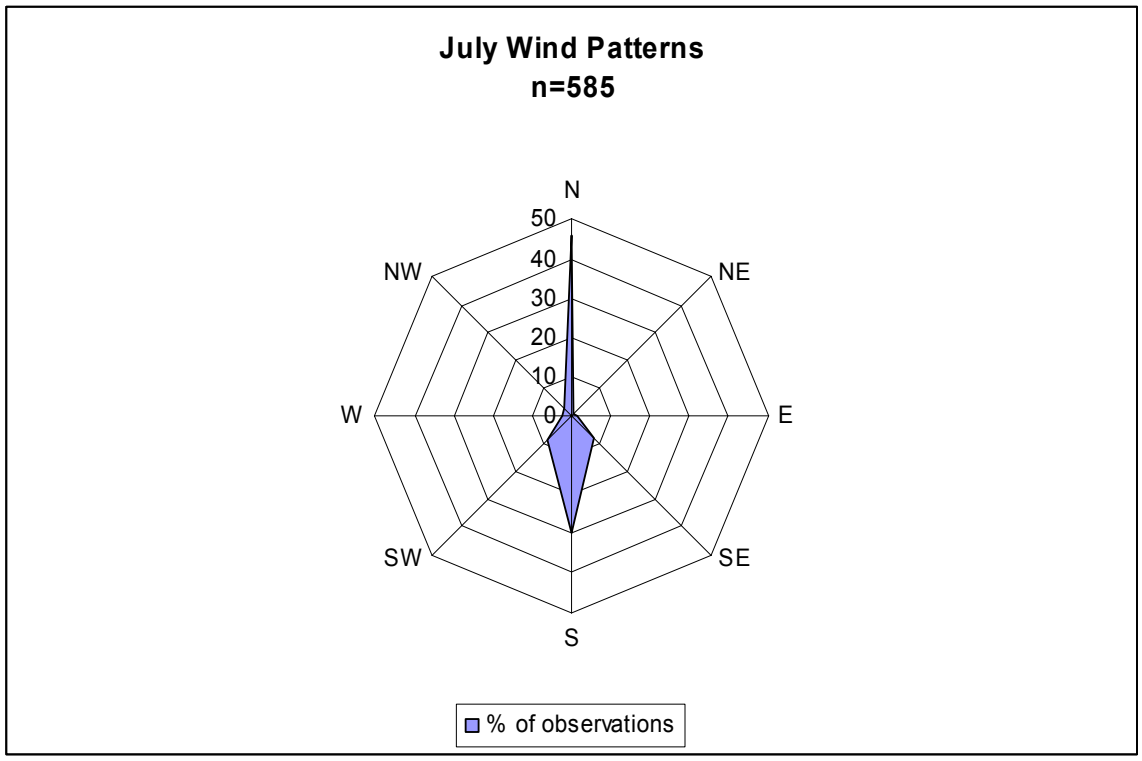


Figure E8a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

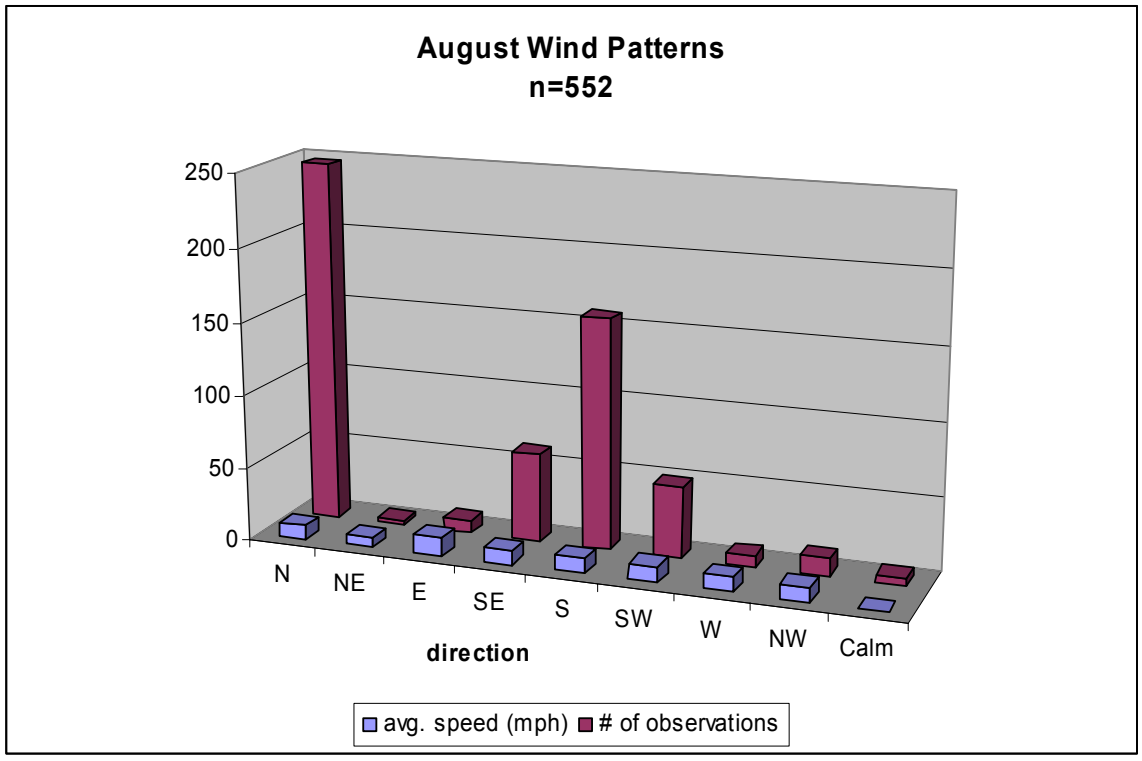


Figure E8b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

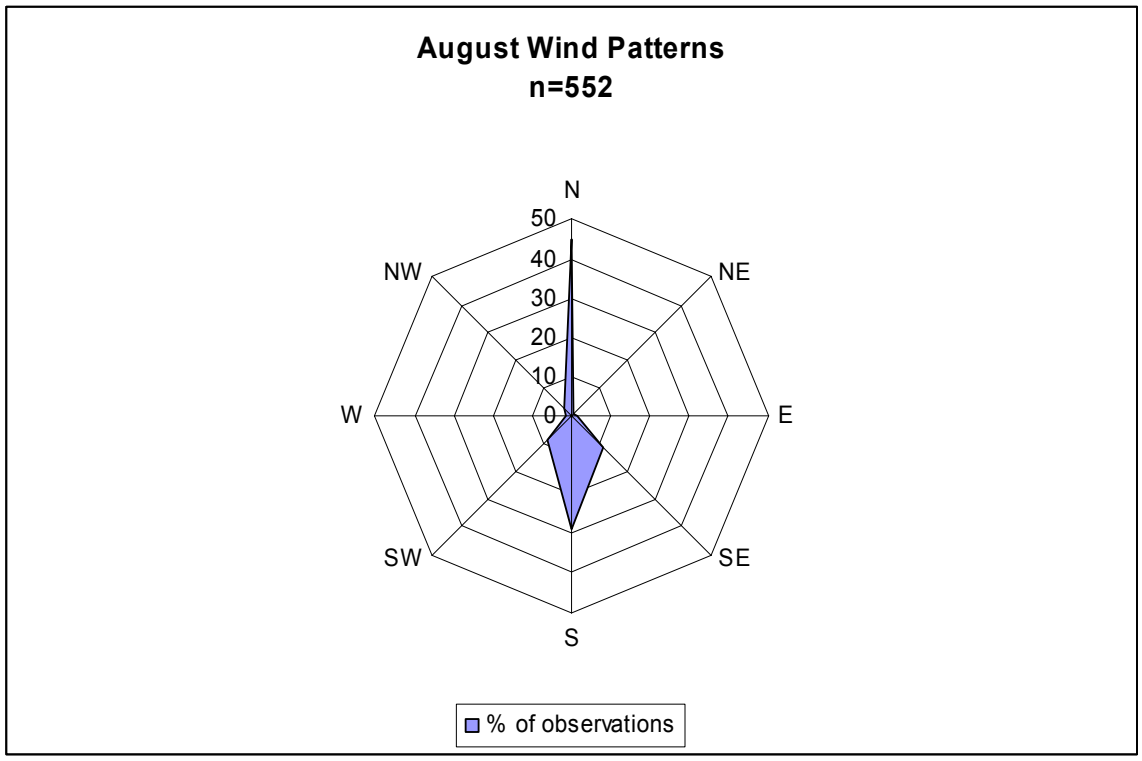
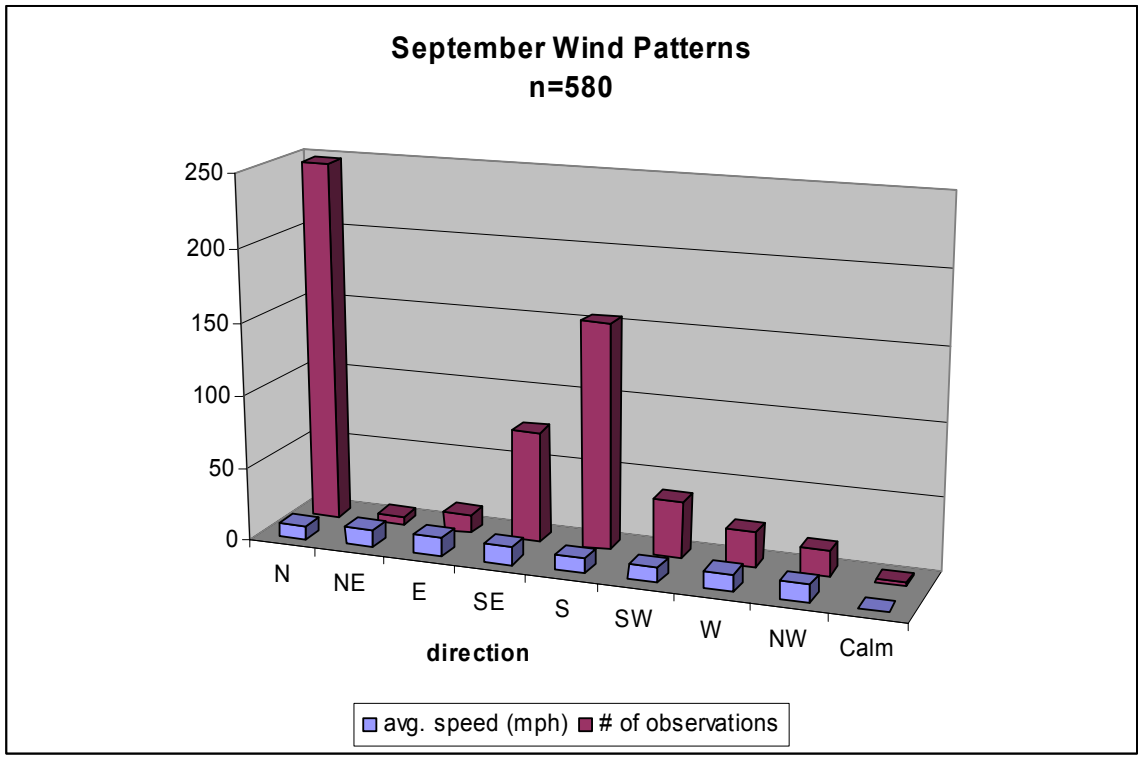


Figure E9a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.



FigureE9b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

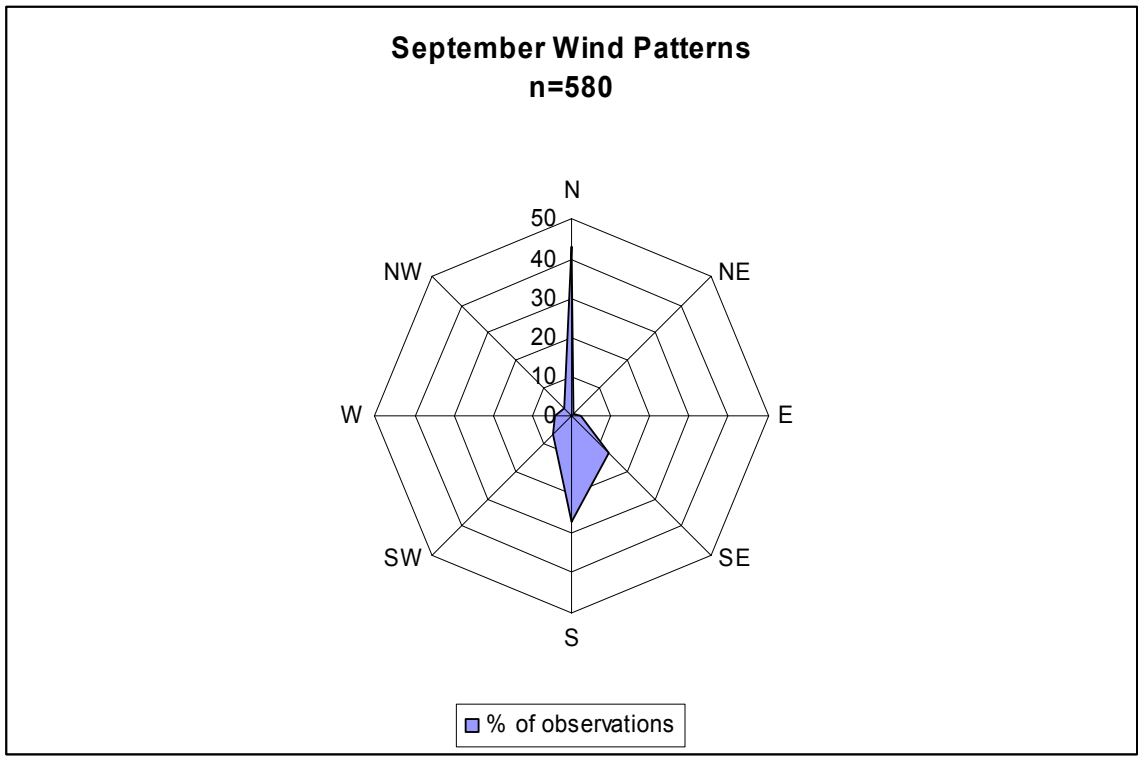


Figure E10a. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.

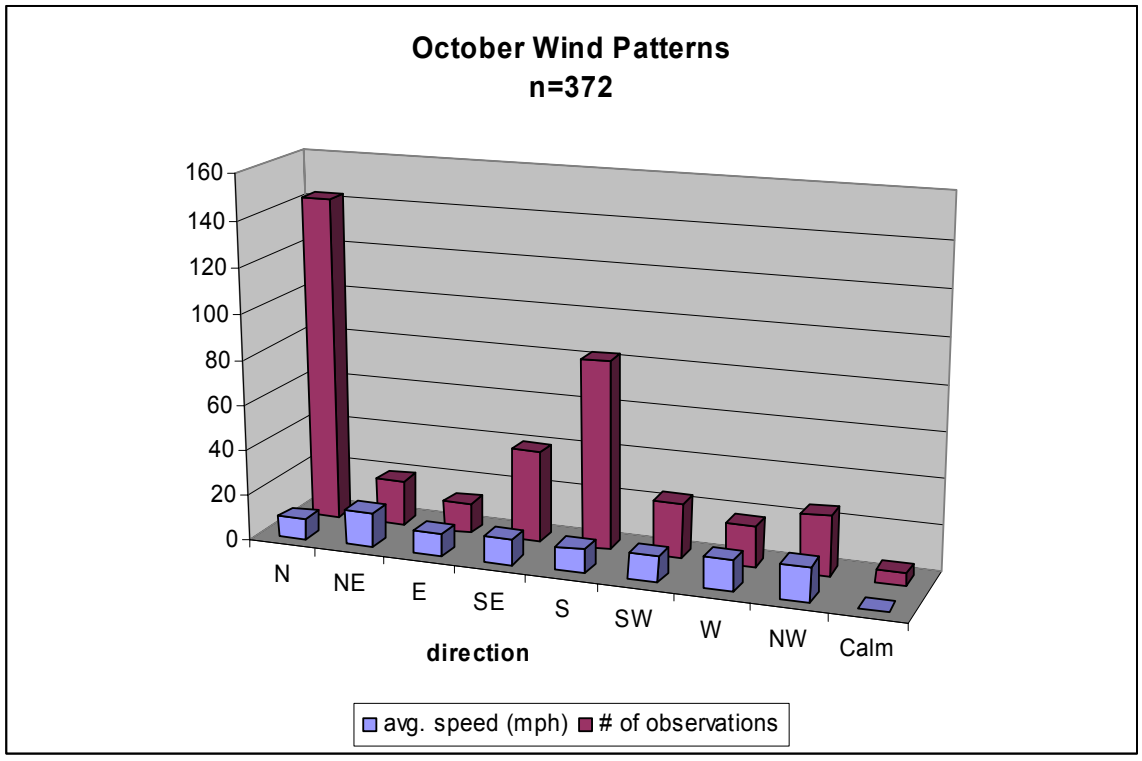
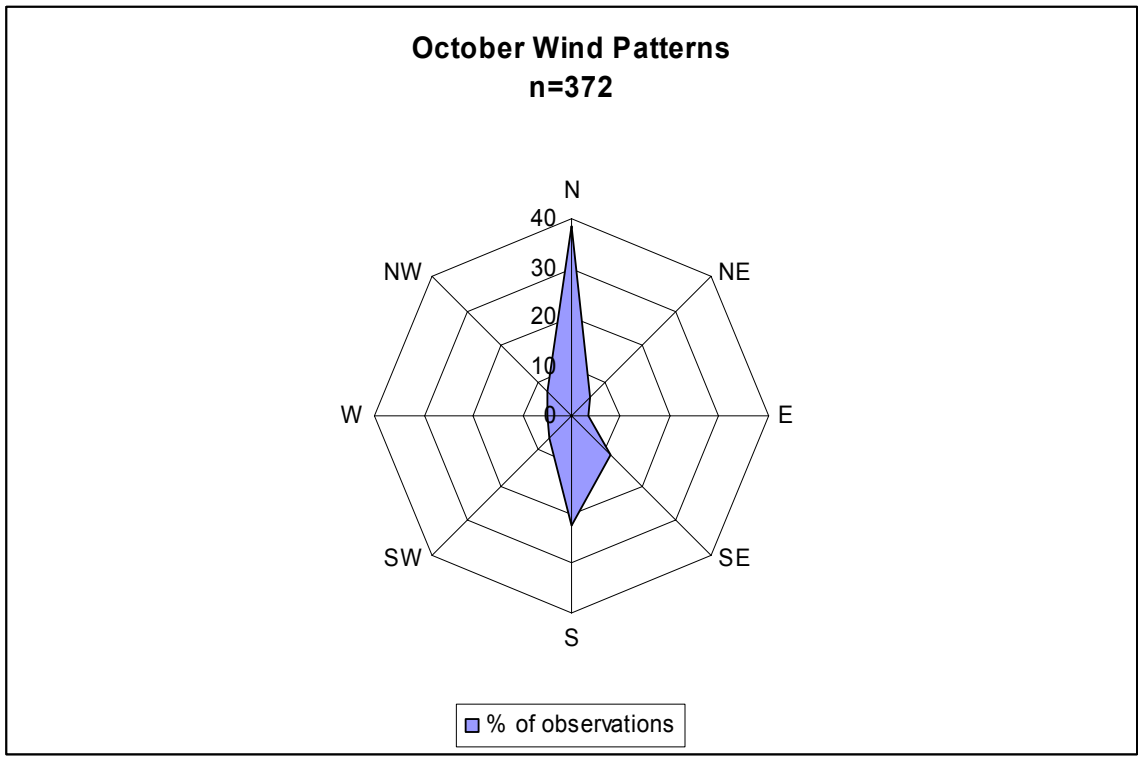


Figure E10b. Wind recorded 1980-2004 at the manual weather station at Hole-in-the-Wall.



3.0 Regulatory Environment

All federal agencies are required to adhere to the Clean Air Act (42 USC 7401-7671q, as amended in 1990). This Act established national ambient air quality standards for several "criteria pollutants" including carbon monoxide and particulates and established a classification system for airsheds. The Preserve is considered a Class II "floor" area that allows for moderate increases in some pollutants, but it can never be redesignated a Class III area that would permit a large volume of new pollution. As a Class II area, Mojave National Preserve does not monitor any air quality parameters.

Class I areas are designated areas for non-deterioration under the Clean Air Act. While Mojave National Preserve is not a Class I area, the Preserve still has the responsibility to consider the potential affects of its actions on surrounding Class I areas. Figure E3 shows the surrounding Class I areas managed by the National Park Service and the Forest Service. There are no Class I areas managed by Fish and Wildlife Service or Bureau of Indian Affairs in the vicinity of the Preserve. The three closest Class I areas, as measured from the nearest edge of Mojave National Preserve to the nearest edge of the Class I area, are: Joshua Tree National Park, 49 miles southwest; Grand Canyon National Park, 78 miles northeast; and San Gorgonio Wilderness (Forest Service), 74 miles southwest. As described in the previous section, it is unlikely that smoke generated by wildland fires in Mojave National Preserve will have an affect on any Class I areas due to the small size and short duration of most fires. The potential for a wildland fire use event to affect Class I areas will be considered with other critical receptors (ie. population centers, airports) when an incident-specific smoke management plan is developed as described in Section 4.

Enforcement of the Act in California has been delegated to the state, through the California Air Resource Board that has developed more stringent standards for the "criteria pollutants." Local air districts may also develop regulatory structure to enforce air quality standards. Mojave National Preserve is located within the Mojave Desert Air Quality Management District (Figure E3).

The Mojave Desert Air Quality Management District includes lands that are in non-attainment for PM10 and ozone, although most of the emission concerns and critical receptors are located in urban areas well to the west and south of Mojave National Preserve. Statewide, the air pollutants that have been most problematic and required the most regulatory attention are ozone and particulate matter because they have known adverse effects on human health. Ozone also adversely affects some species of vegetation, and particulate matter contributes to visibility degradation; thus, these same two pollutants are of concern for their effects on the Preserve's resources as well as on human health. In addition, deposition of nitrogen species (NO3- or NH4+) via precipitation, fog, or as dry deposition, may affect aquatic and terrestrial systems. Ambient air concentrations of ozone, particulate matter, and nitrogen deposition are also derived or affected by concentrations of nitrogen oxides and volatile organic compounds. Typically, primary particulate matter in the size range of 2.5 to 10 micrometer (μm) is derived from natural sources, but human activities also contribute road, construction, or agricultural dust. In California, particulate matter less than 2.5 μm typically consists largely of organic and elemental carbon and of NH4NO3. In urban areas, organic and elemental carbons are emitted by

automobiles and other mobile sources, as well as in wood smoke. Wildland fires are another source of particulate carbon. There are no smoke management policies, rules, or guidelines specific to this District so state-wide policies will serve as guidance for smoke management in Mojave National Preserve.

In 2004, staff of the California Air Resources Board, Federal and State land management agencies, the United States Environmental Protection Agency, and the air districts within the Southern Sierra Nevada mountain region worked together to develop a protocol entitled "Wildland Fire Use Coordination and Communication Protocol, July 2004" (California Air Resources Board 2004). Specifics of this protocol as they apply to Mojave National Preserve and the Mojave Desert Air Quality Management District are outlined in section IV of this document.

While the Preserve is wholly within California, the eastern boundary borders Clark County, Nevada. In August 2004, consultation was initiated with Clark County Department of Air Quality and Environmental Management and Nevada Department of Environmental Quality, Bureau of Air Quality Planning. Both parties expressed an interest in smoke management activities in Mojave National Preserve. The Fire Management Plan, including this smoke management document, will be submitted to them for review. Furthermore, both agencies will be included in the distribution list for incident-specific smoke management plans developed with the Mojave Desert Air Quality Management District for wildland fire use fires in Mojave National Preserve.

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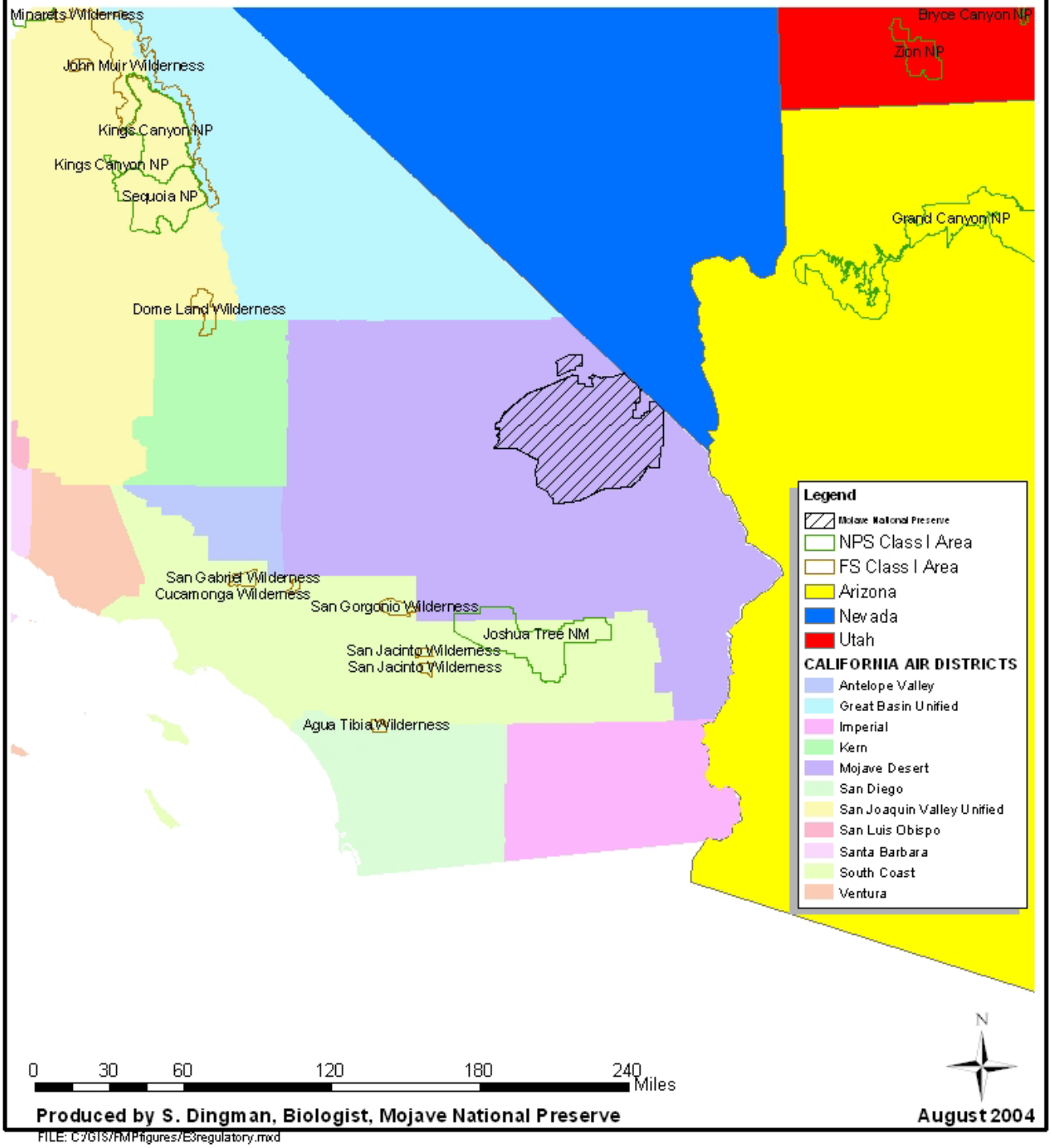
Figure E11: Regulatory Environment



Produced by S. Dingman, Biologist, Mojave National Preserve

August 2004

FILE: C:/GIS/MMPfigures/E3regulatory.mxd

4.0 Wildland Fire Use Coordination and Communication Protocol

This protocol is taken directly from "Wildland Fire Use Coordination and Communication Protocol, July 2004" (California Air Resources Board 2004) and adapted to Mojave National Preserve and its partners.

4.1 Objectives

The goal of this Wildland Fire Use Management Protocol (Protocol) is to establish the coordination framework that will be used to minimize smoke/emission impacts from naturally ignited wildland fires that are managed for resource benefits, commonly known as Wildland Fire Use fires (WFUs). Once Mojave National Preserve decides to manage the natural ignition as a WFU it is treated as a prescribed fire by the air quality management/air pollution control districts (Air Districts). This Protocol takes into consideration the resources, requirements, and goals of the LMAs and the Air Districts. Where possible, this Protocol seeks to follow established procedures, terminology, record keeping, and timelines.

The Protocol seeks to develop emission mitigation measures before smoke/emission impacts become a concern. The Air Districts will provide information regarding air quality based trigger points that should be used to implement smoke/emission mitigation measures. LMAs and Air Districts will plan mitigation efforts well in advance of their needed use. In order to ensure that emissions can be minimized safely and cost effectively prior to the occurrence of substantial smoke/emission impacts, actions need to be planned early in the WFU management process.

The processes included in this Protocol provide an agreed upon framework for the coordination process, which can be amended by the Air Districts and the LMAs based on local and regional needs.

4.2 Definitions:

Land Management Agency (LMA) is the agency responsible for fire management activities. In this case, the LMA is Mojave National Preserve.

Air District is the regulatory air quality management district. In this case, the air district is the Mojave Desert Air Quality Management District.

Emission Mitigation Measures are actions taken to minimize or stop the emissions associated with a WFU. These actions can be fire specific (i.e. fire redirection towards areas with lower fuel densities, holding actions, fire suppression, etc.) or non-fire specific (i.e. LMA electing to forego, or Air District not approving, other prescribed fire activity in favor of WFU activity).

Fire Emission Dispersal Advisory (FEDA)- This advisory from the Air District or the Air Resources Board (ARB) that provides fire emissions dispersal information and predicted air quality impacts.

Go/No Go Decision is the LMA initial Go/No Go decision, and subsequent revalidation of the decision, to manage a naturally ignited wildland fire for resource benefit. A "Go" decision means that the naturally ignited wildland fire can be managed as WFU. A "No Go" decision means the LMA must take appropriate actions to manage the ignition as

an unwanted wildland fire. Once a fire has been converted from a wanted to an unwanted status, it cannot be converted back.
Smoke/Emission Impacts - Smoke/emission impacts from fires include, but are not limited to: exacerbation of pre-existing health problems; effects on individual and community health, including burning eyes, runny noses, and aggravated respiratory tracts -- older adults, small children, and people with chronic heart and lung disease can be especially affected; contribution to levels of air pollution including ozone and particulate matter that exceed federal or state health-protective air quality standards, especially when air pollution levels from all sources are high; nuisances to residents and businesses; damage to property; disruption of people's lifestyles; and reduced visibility.
Smoke Management Plan (SMP) - A document for each fire over 10 acres in size prepared by land managers or fire managers that provides the information and procedures required in Title 17, § 80160 and applicable Air District rules.
Air District Approval – is authorization/approval of the SMP as provided by LMA for management of a naturally ignited wildland fire for resource benefit. Air District Disapproval – means the SMP is not approved as written and requires further mitigation and/or coordination efforts between the LMA and Air District
Trigger Points - (also called Management Action Points) Either geographical points on the ground or specific points in time where an escalation or alteration of management actions is warranted. These points are defined and the management actions to be taken are clearly described in an approved Wildland Fire Implementation Plan (WFIP). Timely implementation of the actions when the fire reaches the action point is generally critical to successful accomplishment of the objective. (Source: federal Wildland and Prescribed Fire Management Policy)
Wildland Fire Use (WFU) - The management of naturally-ignited wildland fires to accomplish specific pre-stated resource management objectives in pre-defined geographic areas outlined in Fire Management Plans. Operational management is described in the Wildland Fire Implementation Plan (WFIP). (Source: Federal Wildland and Prescribed Fire Management Policy)

4.3 Communication and Coordination Protocol

4.3.1 General and on-going planning and communication

4.3.1.1 Mojave National Preserve will seek input from the Mojave Desert Air Quality Management District when amending their Resource Management Plans and their Fire Management Plans. Responsible parties: Fire Management Officer for Fire Management Plan, Chief of Resource Management for Resource Management Plan.

4.3.1.2 Mojave National Preserve will include areas where WFUs may be used on the annual Air District Burn Registrations. Responsible party: Fire Management Officer.

4.3.1.3 Prior to each fire season, Mojave National Preserve and the Mojave Desert Air Quality Management District will review successes and shortfalls identified during the previous burn year and determine improvements that can be made to this Protocol. Responsible party: Fire Management Officer.

4.3.1.4 Mojave National Preserve and the Mojave Desert Air Quality Management District will work together to establish: criteria for managing WFUs in progress based on existing and projected air quality conditions; fire and emission reporting criteria and timelines; smoke mitigation measures to minimize smoke/ emission impacts from active WFUs; coordinated outreach opportunities and methods; other needed resources and tools.

4.3.2 *Confirmation of Ignition - fire discovery, initial assessment, and location information*.

4.3.2.1 Notifications and Coordination Efforts: Mojave National Preserve will communicate to ensure that natural ignitions to be managed as WFUs are selected appropriately, while considering the need to minimize air quality impacts. This is a cooperative, cumulative effort between all land management agencies in the region.

- Mojave National Preserve to evaluate the natural ignitions within their jurisdiction for potential use as WFU. Responsible Party: Incident Commander

- Mojave National Preserve to coordinate WFU selection with all other regional land management agencies to achieve regional land management goals while minimizing smoke/ emission impacts. Responsible Party: Fire Management Officer working in cooperation with the California Desert Interagency Fire Planning Unit

- For all naturally ignited fires <u>that exceed 1 acre, or where there are multiple starts from the same lightning event that cumulatively exceed 1 acre,</u> Mojave National Preserve will notify the appropriate Air District, within 24 hours of ignition confirmation. This notification <u>will be via fax and</u> will include the total number of confirmed ignitions, and, for fires to be managed as WFUs, the fire location and approximate size. Responsible Party: Incident Commander

4.3.3 Management Coordination Activities for Fires < 10 Acres <u>and that exceed 24 hours duration</u>

4.3.3.1 Notifications and Coordination Efforts, including everything in section 4.3.2.1., and:

- Upon receipt of the Ignition Discovery Form and coordination with neighboring Air Districts, the Mojave Desert Air Quality District will provide a FEDA based on current and projected air quality conditions. Responsible Party: Mojave Desert Air Quality Management District.

- Mojave National Preserve will request, and the Mojave Desert Air Quality Management District will provide, air quality forecasts to assist Mojave National Preserve in their decision making process. Responsible Party: Incident Commander and Mojave Desert Air Quality Management District.

- The Mojave Desert Air Quality Management District will coordinate with other Air Districts on a daily/weekly basis, or on an otherwise agreed upon timeline, to discuss regional WFU effects.

4.3.3.2 Smoke/emission mitigation efforts

- An unfavorable Fire Emissions Dispersal Advisory should encourage Mojave National Preserve to take appropriate management action to eliminate or minimize smoke/emission impacts. Responsible Party: Incident Commander.

- When planning for potential WFU growth, Mojave National Preserve will include considerations for future projected smoke/emission impacts. Critical receptors include Class I areas, transportation corridors, airports, and population centers, as identified in this document. Responsible Party: Incident Commander.

4.3.4 Management Coordination Activities for Fires > 10 acres and that exceed 24 hours duration

4.3.4.1 Notifications and Coordination Efforts, including everything in section 4.5.1, and:

- Mojave National Preserve will submit an SMP to the Mojave Desert Air Quality Management District for approval, within 72 hours of when the fire has exceeded 10 acres in size and 24 hours in duration. Responsible Party: Incident Commander.

- Mojave National Preserve will notify the Mojave Desert Air Quality Management District of the growth of the WFU beyond 100 acres within 24 hours of that event. Responsible Party: Incident Commander.

- As a component of the periodic fire assessment/revalidation effort, Mojave National Preserve and the Mojave Desert Air Quality Management District will revalidate the SMP. This revalidation will occur at least weekly, or on an otherwise agreed upon timeline, while the WFU is active. Responsible Party: Incident Commander and Mojave Desert Air Quality Management District.

- As needed, the Mojave Desert Air Quality Management District will notify States of Nevada and/or Arizona that a WFU is in progress. This notification will include anticipated smoke/emission impacts on the respective state. Responsible Party: Mojave Desert Air Quality Management District.

- Mojave National Preserve and the Mojave Desert Air Quality Management District will participate daily in 1:00 p.m. conference call, unless both agree that another format is acceptable. Dial-in: 1-877-874-5440 Pass code: 357238. Responsible Parties: Incident Commander and Mojave Desert Air Quality Management District

- The Mojave Desert Air Quality Management District will provide air quality forecasts to assist Mojave National Preserve in their on-going decision making process. The Mojave Desert Air Quality Management District will notify Mojave National Preserve with as much advanced warning as possible, when forecasted air quality is deteriorating. The goal of these forecasts is to provide timely notification to the incident commander so that they can begin emission mitigation measure implementation prior to receiving SMP disapproval from the Air District. Responsible Party: Mojave Desert Air Quality Management District.

4.3.4.2 Smoke/Emission Mitigation Efforts, including everything identified in section 3b, and:

- A Mojave Desert Air Quality Management District approved SMP is required for all WFUs greater than 10 acres in size that burn for more than 48 hours. Through the SMP, the Air Districts will provide input into trigger points after which

emission mitigation measures should be taken. These trigger points will be based on current and forecasted air quality, Air Quality Index assessment, documented complaints, and smoke/ emission impacts. Responsible Parties: Incident Commander and Mojave Desert Air Quality Management District.

- Mojave National Preserve is to describe what action can/will be taken to minimize or prevent smoke/emission impacts prior to their occurrence. (Examples: Preparation to redirect into an area with less fuel loading, check lines could be constructed to isolate pockets with high concentrations of accumulated fuels, etc.). Responsible Party: Incident Commander.

- Mojave National Preserve is to describe what actions will be taken when smoke/ emission impacts occur. (Example: Active fire redirection to previously identified areas, active fire suppression, etc.). Responsible Party: Incident Commander.

- Mojave National Preserve to implement emission mitigation measures when trigger points identified in the SMP are reached. Responsible Party: Incident Commander.

4.3.4.3 Enhanced Communication

- All effort should be made to resolve issues at the staff level. However, issues may arise that cannot be resolved by staff. When such an issue arises, Mojave National Preserve and the Mojave Desert Air Quality Management District staff will bring it to their respective management, who will help identify a solution. If requested, California Air Resource Board and U.S. EPA are available to participate in this discussion.

4.3.5 *Post WFU Reporting and Record Keeping*

Mojave National Preserve will prepare a post fire season WFU summary. This summary will include the number of blackened acres per fire, the start and end dates of each WFU, the number of smoke complaints received by Mojave National Preserve, and the total emissions from each WFU. Mojave National Preserve will submit this summary to the Mojave Desert Air Quality Management District. Responsible Party: Fire Management Officer.

4.3.6 *Public Outreach Efforts*

Mojave National Preserve and Mojave Desert Air Quality Management District will coordinate efforts to develop a consistent public message regarding WFUs. This message should be included in the WFU related public information that the Mojave National Preserve and the Mojave Desert Air Quality Management District produce. Mojave National Preserve and Mojave Desert Air Quality Management District will work together to identify communities, groups, and organizations that should receive special outreach attention. Responsible Parties: Fire Management Officer and Mojave Desert Air Quality Management District.

5.0 Consultations and Contact Information

For incident-specific Smoke Management Plan preparation and approval:

Alan De Salvio, Air Quality Engineer
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310
Phone: (760)245-1661 x6726
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Email: adesalvio@mdaqmd.ca.gov

For incident specific Smoke Management Plan distribution:

Russell S. Merle Jr., Senior Planner
Clark County Department of Air Quality
& Environmental Management (DAQEM)
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P.O. Box 555210
Las Vegas, Nevada 89155-5210
Phone: (702) 455-1662
Fax: (702) 383-9994
Email: merle@co.clark.nv.us for Russ Merle
koswan@co.clark.nv.us for John Koswan, Assistant Planning Mgr

Samuel Jackson, Smoke Management Coordinator
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Bureau of Air Quality Planning
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6.0 Preparers

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