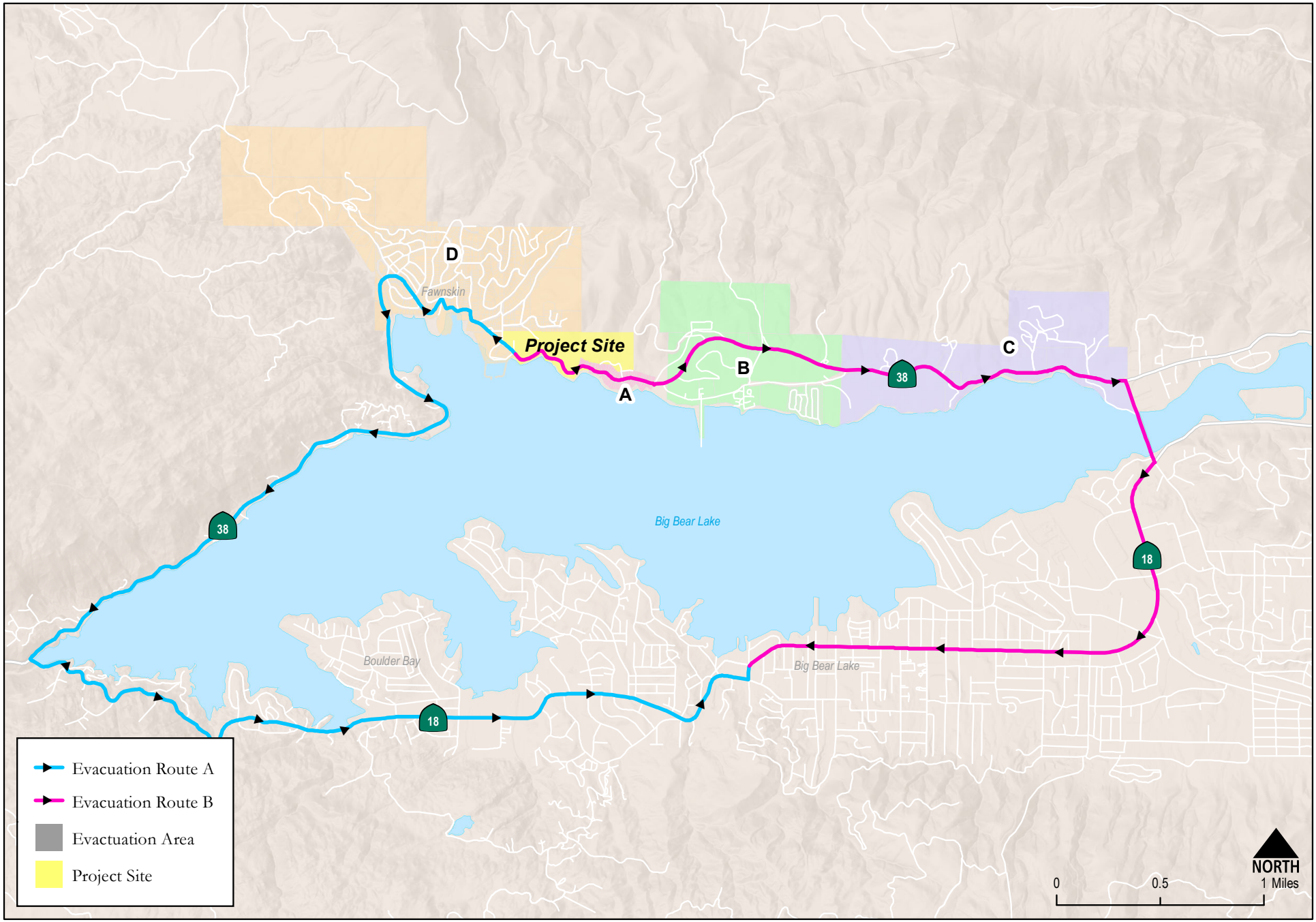

Moon Camp
Evacuation Analysis

C+R

Figure 3
Evacuation Routes and Evacuation Zones

Saturday Afternoon Evacuation; all residents are home

CRA presumes that the evacuation would transpire on a Saturday afternoon, a time when residents from the Project and nearby communities are home, meaning all residential vehicles would be required to evacuate. Additionally, it is assumed that the parking demand for nearby recreational land uses would be fully occupied, thus the vehicles associated with the recreational land uses would evacuate at the same time as the Project and other residential land uses.

In an actual evacuation scenario, the total number of vehicles needing to evacuate may actually be less. The Operation Area commander would prioritize evacuation of land uses located closest to the area with immediate risk, depending on the location of the fire.

Primary Evacuation Routes

CRA assumed that traffic evacuating from both the Project and nearby communities/land uses would use the closest evacuation routes to leave the area. Evacuation routes were selected based upon review of the Project's site, available evacuation routes, and the quickest way to leave areas located adjacent to the available vegetative fuels. Evacuations during large wildfire events would focus on removing threatened populations from the area, likely off the mountain. For this analysis, we assume a condition where the populations are directed to the developed areas of the City of Big Bear Lake, selecting the path requiring the least travel time. This location provides a significant buffer to the north/northeast with Big Bear Lake acting as a large fuel break. Based on Google's traffic data for a typical Saturday afternoon, the fastest evacuation route for traffic from the Project and areas A through C would be to head east on SR-38/North Shore Drive and then proceed towards the City of Big Bear Lake via Stanfield Cutoff and Big Bear Boulevard (pink evacuation route). Conversely, the quickest route for Area D would be to head southwest via North Shore Drive and Big Bear Boulevard (blue evacuation route). The Google travel time assessment is provided in **Attachment A**. This assumption selects a reasonable evacuation route for the assumed extreme weather scenario.

No contraflow lanes were assumed to provide access for first responders and law enforcement.[8] Two-way travel was assumed, with evacuating vehicles traveling outbound to the designated Safe Zone. It is assumed that first responders or law enforcement will direct traffic at all major intersections during the evacuation process. Should evacuation managers determine that contraflow is preferred or necessary, evacuation capacity would increase while evacuation times would decrease.

Safe Zone

Based on Dudek's review of the area's fire history[9], fires have not reached the City of Big Bear and the land uses along Big Bear Lake. In past fire events, the incident commander and the Red Cross have traditionally used local educational facilities as evacuation centers[10]. However, studies indicate that people generally resort to these evacuation centers only as a last option, mainly due to the absence of privacy and convenience[11]. Therefore, it is assumed that evacuees will likely head toward the more urbanized center of the City of Big Bear Lake, where multiple lodging options are available.

[8] Contraflow or lane reversal involves directing traffic to use lanes coming from the source of a hazard to move people away from the hazard. Such a strategy can be used to eliminate bottlenecks in communities with road geometries that prevent efficient evacuations or to facilitate traffic flow out of a major urban area. Among the considerations in planning emergency contraflow are whether sufficient traffic control officers are available, potential negative impact on responding fire apparatus, access management, merging, exiting, safety concerns, and labor requirements. Contraflow configurations must be carefully planned based on on-site factors and should not be implemented in an *ad-hoc* fashion. Dudek July 2014. "Wildland Fire Evacuation Procedures Analysis" for City of Santa Barbara, California, page 65.
[9] GIS review of CALFIRE California Fire Perimeters
https://hub-calfire-forestry.hub.arcgis.com/maps/e3802d2abf8741a187e73a9db49d68fe/about
[10] http://www.bigbearfire.org/homepage/press-releases/252-radford-fire-update
[11] https://tsrc.berkeley.edu/publications/review-california-wildfire-evacuations-2017-2019

Study Scenarios
A total of five evacuation scenarios were analyzed:

- **Scenario 1** – *Existing Land Uses*: This scenario estimates the evacuation time for the existing land uses within the study area (Area A through D).
- **Scenario 2** – *Proposed Project Only*: This scenario assumed full evacuation of the proposed Project.
- **Scenario 3** – *Existing Land Uses with the proposed Project*: This scenario is similar to Scenario 1 (Area A through D), with the addition of the proposed Project traffic.
- **Scenario 4** – *Existing Land Uses with Cumulative Projects*[12]: This scenario is similar to Scenario 1, with an ambient growth of 5% to represent potential cumulative growth in the area, the Marina Point project (120 dwelling units)[13] and TT 17670 (22 dwelling units).
- **Scenario 5** – *Existing Land Uses with Cumulative Projects with the proposed Project*: This scenario is similar to Scenario 4, with the addition of the proposed Project traffic.
- **Scenario 6** - Existing Land Uses with Cumulative Projects (Area D only): This scenario is similar to Scenario 4, but assuming that only Area D is under an evacuation order. Under this scenario, all of Area D would evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear (pink evacuation route).
- **Scenario 7** – Existing Land Uses with Cumulative Projects with Project (Area D only) – This scenario is similar to Scenario 6, with the addition of the proposed Project traffic.

Evacuating Vehicles

The number of evacuating vehicles was calculated using the following assumptions:

- Project and nearby Residential land uses: Residential units x average vehicle ownership (2 vehicles per household)
- Recreational land uses: full occupancy of parking lots
- RV resorts: full occupancy of parking lots and site.

Noted that the total number of evacuating vehicles assumed a very conservative estimate where all nearby residential land use are fully occupied, in actual evacuation, depending on the time of day or day of the year, actual occupancy maybe significantly less. For instance, only about 19%[14] of the mailing addresses in Area D correspond to residential units within that area. The other 81% are linked to addresses outside of Area D. Additionally, the nearby recreational areas are unlikely to be at maximum capacity.[15]This suggests that these properties (81%) might be secondary residences that aren't necessarily occupied when an evacuation order is issued.

Average vehicle ownership, residential units, and evacuating vehicles calculations are provided in Attachment A. **Table 1** displays the number of vehicles evacuating under each scenario.

Table 1 – Evacuating Vehicles

[13] Source: Moon Camp Focused Traffic Impact Assessment, Urban Crossroad, 2018.

[14] Mailing zipcode obtained from Parcelquest, a summary is included in Attachment A. Additionally, the County of San Bernardino Short Term Rental permitting system (https://str.sbcounty.gov/permitted-str-properties/) indicated that approximately 12% of the residential units in Area D are permitted short term rental.

[15] Satellite imagery from July 8, 2022, a time typically marked by high demand for recreational activities due to the area's hiking trails, shows only 10% of parking spaces being occupied.

Scenario	Number of Evacuating Vehicles					
	Nearby Land Uses (Area)				Project	Total
	A	B	C	D		
Scenario 1 – Existing Land Uses	112	380	394	1,425	0	2,311
Scenario 2 – Proposed Project Only	0	0	0	0	100	100
Scenario 3 – Existing Land Uses with Proposed Project	112	380	394	1,425	100	2,411
Scenario 4 – Existing Land Uses with Cumulative Projects	120	400	420	1,790	0	2,730
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	120	400	420	1,790	100	2,830
Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	0	0	0	1,790	0	1,790
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	0	0	0	1,790	200	1,990

Source: CR Associates (2023), US Census Bureau (2023), Google Maps (2023).

Mass Evacuation

A mass evacuation scenario was modeled in which all area residents would evacuate at the same time. This assumption presents a worst-case scenario as all traffic would be directed to the evacuation roadways at once. Mass evacuation events can overwhelm a roadway's capacity, which, when reaching a threshold traffic density, begins to decrease traffic flow.

In an actual "real-life" wildfire event, a phased evacuation would be implemented where orders are given to evacuate based on vulnerability, location, and/or other factors, which reduces or prevents traffic surges on major roadways and improves traffic flow. The phased evacuation strategy also prioritizes the evacuation of residents in proximity to the immediate danger, giving emergency managers the ability to monitor the fire situation and decide in real time based on changing conditions whether to order additional evacuations as needed, or not.

Extreme Wildfire Event

The evacuation analysis set forth below assumes a Santa Ana-wind driven fire from the north and/or east of the study area and travels in a westerly and southerly direction, similar to the 2017 Thomas Fire. This fire condition is the one most likely to require a large-scale evacuation, and the one that creates the most risk to property and humans. Historically, local fire such as the 2003 Old Fire[16], 2007 Butler Fire 2[17], and the 2023 Radford Fire[18] only resulted in limited evacuation of the affected area.

In California, wildfire-related large-scale evacuations are almost exclusively associated with wildfires that occur on extreme fire weather days, also known as "Red Flag Warning" days. These days occur when relative humidity drops to low levels and strong winds from the north/northeast are sustained. With climate change, periods in which such wildfires occur may increase. During Red Flag Warning days, vegetation is more likely to ignite and fire spread is more difficult to control. In the greater Los Angeles region, these extreme weather days typically occur during limited periods in the late summer,

[16] http://www.firescope.org/training/aars/2003/2003-old-fire-lessons-learned-report.pdf
[17] https://www.fire.ca.gov/incidents/2007/9/14/butler-ii-fire/
[18] https://www.fire.ca.gov/incidents/2022/9/5/radford-fire

fall and, occasionally, in the spring, but may occur at other times on a less frequent basis. Currently, it is not common to experience more than 10 to 15 Red Flag Warning days in a typical year. Wildfires that occur during these periods of extreme weather are driven by winds –referred to as "Santa Ana" winds – that come from the north or east and blow toward the south or west. Fires driven by these winds move very quickly, making them difficult to control. In response to such fires, emergency managers typically activate pre-planned evacuation triggers that require down-wind communities to sequentially be notified to evacuate and move to nearby urbanized areas prior to the fire's encroachment.

Wildfires that occur on non-extreme weather days typically behave in a much less aggressive manner and pose fewer dangers to life and property because they include less aggressive fire behavior and are easier to control. Terrain and fuel are typically the wildfire drivers during these conditions. During these non-extreme weather days, vegetation is much more difficult to ignite and does not spread fire as rapidly. In these situations, firefighters have a very high success rate of controlling fires and keeping them under 10 acres. CALFIRE estimates that 90% of all vegetation fires occur during normal, onshore weather conditions and that such fires account for only 10% of the land area burned. Conversely, the 10% of wildfires that occur during extreme fire weather account for 90% of the land area burned. This data highlights that the most dangerous fire conditions are those related to a fire that moves rapidly due to high winds and low humidity, whereas under normal conditions fires are likely to be controlled with no evacuation or possibly limited extent, focused evacuations.

While it is possible that a fire driven by onshore wind (i.e., from the west) could require evacuation of the Project, such an event would be unusual. Moreover, due to the roadway network and the geography of the Big Bear area, agencies has emphasize the needs for early and phase evacuation to prevent gridlock in an emergency.

Analysis Methodology

The analysis methodology utilized the following equation for determining evacuation time:

Evacuation Time = (Evacuation Population / Average Vehicle Occupancy) / Roadway Capacity

To analyze the evacuation events, CRA conducted simulations using *Vissim*, a microscopic, multimodal traffic flow modeling software used to simulate different traffic conditions. In *Vissim* simulations, roadway capacity is accounted for and each vehicle in the traffic system is individually tracked through the model and comprehensive measures of effectiveness, such as average vehicle speed and queueing, are collected on every vehicle during each 0.1-second of the simulation. This software enables drivers' behaviors during an evacuation to be replicated. A total of 20 simulations were conducted to yield a reasonable sample size to determine the performance of the study area roadways and impacts during evacuation scenarios. To be conservative, CRA assumed a worst-case scenario in which all vehicles belonging to households in the study area would be used in the evacuation, instead of the necessary number of vehicles needed to evacuate the impacted population. Detailed evacuation analysis information is provided in Attachment B.

Evacuation Analysis & Results

Based on the analysis methodology described above, **Table 2** reflects evacuation times for each scenario.

Table 2 – Evacuation Time Summary – All Scenarios

Scenario	Total Evacuation Vehicles	Evacuation Time (hours : minutes)				
		Nearby Land Uses				Project
		A	B	C	D	
Scenario 1 – Existing Land Uses	2,311	0:48	0:38	0:37	1:23	N/A
Scenario 2 – Proposed Project Only	100	N/A	N/A	N/A	N/A	0:25
Scenario 3 – Existing Land Uses with Proposed Project	2,411	0:53	0:40	0:37	1:23	0:52
Change in Evacuation Time - Existing Condition (Scenario 3 – Scenario 1)	-	0:05	0:02	0:00	0:00	0:52
Scenario 4 – Existing Land Uses with Cumulative Projects	2,730	0:50	0:41	0:38	1:39	N/A
Scenario 5 – Existing Land Uses with Cumulative Projects with the proposed Project	2,830	0:56	0:43	0:38	1:39	0:54
Change in Evacuation Time – Existing with Cumulative Projects (Scenario 5 – Scenario 3)	-	0:06	0:02	0:00	0:00	0:54
Scenario 6 - Existing Land Uses with Cumulative Projects (Area D only)	1,790	N/A	N/A	N/A	1:40	N/A
Scenario 7 - Existing Land Uses with Cumulative Projects with Project (Area D only)	1,990	N/A	N/A	N/A	1:42	0:26
Change in Evacuation Time – Existing with Cumulative Projects Area D only (Scenario 5 – Scenario 3)	-	N/A	N/A	N/A	0:02	0:26

Source: CR Associates (2023).

A summary of the evacuation time for each scenario is provided below:

- Scenario 1: It would take between 37 minutes and 1 hour and 23 minutes to evacuate the existing land uses.
- Scenario 2: It would take 25 minutes to evacuate the proposed Project only.
- Scenario 3: It would take between 37 minutes and 1 hour and 20 minutes to evacuate the existing land uses and the proposed Project. The Project increase Area A evacuation time by 5 minutes, Area B by 2 minutes, and it would take 52 minutes to evacuate the Project's site.
- Scenario 4: It would take between 38 minutes and 1 hour and 39 minutes to evacuate the nearby land uses under the cumulative scenario.
- Scenario 5: It would take between 39 minutes and 1 hours and 39 minutes to evacuate the nearby and Project land use under the cumulative with Project scenario. The Project would increase Area A evacuation time by 6 minutes, Area B by 2 minutes, and it would take 54 minutes to evacuate the Project's site.
- Scenario 6: It would take 1 hour and 40 minutes to evacuate Area D, assuming that all of Area D evacuate eastward via North Shore Drive, then southward via Stanfield Cutoff to arrive at the City of Big Bear.

- Scenario 7: It would take 1 hour and 42 minutes to Evacuate Area D, an increase of 2 minutes, and 26 minutes to evacuate the Project.

Currently there are no set standard for acceptable evacuation time due to the myriad of factors influencing evacuations, such as time of day, specific locations, areas at risk, wind conditions, and more. The "Best Practices for Analyzing and Mitigating Wildfire Impacts of Development Projects Under the California Environmental Quality Act"[19] guidance from the California Office of the Attorney General suggests that jurisdictions set benchmarks of significance based on past successful evacuations or on those from communities in similar situations. For instance, the Poinsettia Fire saw a successful evacuation with no fatalities[20], although specific data on the total evacuation duration wasn't included in the official report.

A recent study titled "Review of California Wildfire Evacuation from 2017 to 2019" provides more insights on the topic. This research involved interviews with 553 individuals (297 evacuees affected by various fires) including the Creek Fire, Rye Fire, Skirball Fire, and Thomas Fire. The study aimed to understand the decision-making processes of these individuals during the fires, such as whether to evacuate or stay, when to leave, the paths taken, chosen shelters, destinations, and modes of transportation. According to this research, the time it took for evacuations ranged from under 30 minutes to over 10 hours. From this dataset[21], the average evacuation time for the Creek Fire was found to be 3 hours and 40 minutes, involving 115,000 people[22]. For the Thomas Fire, the average time was 4 hours and 25 minutes, impacting 104,607 individuals. It's important to note that since the Thomas Fire resulted in 2 fatalities, the evacuation time for all the scenarios were compare against the data from the Creek Fire.

With the Project, the evacuation times are less than the average evacuation time for the Creek Fire, and the analyzed timeframe is based on a very conservative scenario, with actual evacuation times expected to occur over a shorter time frame. Other modeling assumptions and limitations are discussed below.

Analysis and Conclusion

Neither CEQA, nor the County has adopted numerical time standards for determining whether an evacuation timeframe is appropriate. Public safety, not time, is generally the guiding consideration for evaluating impacts related to emergency evacuation. The County considers a Project's impact on evacuation significant if the Project will significantly impair or physically interfere with implementation of an adopted emergency response or evacuation plan; or if the Project will expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

The County of San Bernardino has historically had an extremely high success rate for safely evacuating large numbers of people and doing so in a managed and strategic way using available technological innovations. Safely undertaking large-scale evacuations may take several hours or more and require moving people long distances to designated areas. Further, evacuations are fluid and timeframes may vary widely depending on numerous factors, including, among other things, the number of vehicles evacuating, the road capacity to accommodate those vehicles, residents' awareness and preparedness, evacuation messaging and direction, and on-site law enforcement control.

Notwithstanding evacuation challenges and variables, the success rate in the County of San Bernardino in safely managing both mass and targeted evacuations is extremely high for safe

[19] https://oag.ca.gov/system/files/attachments/press-docs/2022.10.10%20-%20Wildfire%20Guidance.pdf
[20] https://www.northcoastcurrent.com/oside-latest-news/2015/05/carlsbad-marks-one-year-since-poinsettia-fire/
[21] 2018 Carr Wildfire Evacuation Survey Data | Zenodo
[22] https://abc7.com/sylmar-brush-fire-creek-kagel-canyon/2740550/

evacuations. Technological advancements and improved evacuation strategies learned from prior wildfire evacuation events have resulted in a system that is many times more capable of managing evacuations. With the technology in use today in the County, evacuations are more strategic and surgical than in the past, evacuating smaller areas at highest risk and phasing evacuation traffic so that it flows more evenly and minimizes the surges that may slow an evacuation. Mass evacuation scenarios where large populations are all directed to leave simultaneously, resulting in traffic delays, are thereby avoided, and those populations most at risk populations are able to safely evacuate.

Based on the evacuation simulations above, under scenarios 1 through 5, evacuation traffic generated by the Project would not significantly increase the average evacuation travel time or result in unsafe evacuation timeframes. Although there is a potential increase in evacuation times of up to 6 minutes for existing communities, it is anticipated that the longest evacuation times would be associated with the Project vehicles. In a likely evacuation scenario, existing residents east of the Project site would be located downstream of Project traffic because they are closer to the evacuation routes and destinations and would be able to evacuate prior to Project traffic reaching the same location.

In Scenarios 6 and 7, the Project might contribute an additional 2 minutes to Area D's evacuation time. However, this added duration can be viewed as relatively minor. The actual evacuation time can fluctuate based on several factors: the specific nature of the evacuation, the scope of the area affected, and other human considerations. For instance, if not all housing units are occupied during the evacuation, if residents of the Project aren't at home, or if the evacuation covers a smaller region, the overall evacuation time could be shorter. Google travel time data exemplifies these variations: the commute between the Project site and Big Bear Lake can differ by up to 10 minutes, ranging from 12 to 22 minutes, at 2 PM on a Wednesday. Furthermore, if deemed essential by the incident commander, the introduction of a counter-flow lane in certain zones could significantly cut down evacuation time. The Project would also provide the responding emergency managers (County of San Bernardino Sheriff and Fire Department, California Highway Patrol, and other cooperating agencies and Departments) the alternative option of recommending that all or a portion of the site's population temporarily seek refuge at designated temporary refuge sites which may include open-air areas around Big Bear Lake or other protected buildings in the City of Big Bear Lake . This on-site sheltering option is a contingency plan, but an important option in the scenario when evacuation is considered infeasible or the less safe option. This would provide emergency managers with a safer alternative to risking a late evacuation.

This information will be provided to law enforcement and fire agencies for use in pre-planning scenarios to better inform in the field decisions made pursuant to adopted Emergency Response Plans. Emergency personnel who issue an evacuation order may take into account these time estimates in determining when and where to issue evacuation orders. In a real evacuation scenario, emergency managers may use alternative actions/options to further expedite evacuation. Such actions may include providing additional lead time in issuing evacuation orders, prioritizing area at higher risks, providing alternative signal control at downstream intersections, utilizing additional off-site routes or directing traffic to roadways with additional capacity, implementing contra-flow lanes, issuing "shelter-in-place" orders when determined to be safer than evacuation, or considering the possibility of a delayed evacuation where parts of the population could be directed to remain on-site until the fire burns through the fuels around the evacuation route. These options require "in the field" determinations of when evacuations are needed and how they are phased to maximize efficiency. Overall, safe evacuation of the Project and surrounding community is possible in all modeled scenarios.

Limitations

In coordination with fire professionals at Dudek, CRA has presented a conservative analysis simulating evacuation during an extreme wildfire event. However, as discussed above, wildfires are variable

events. The underlying planning principle for fire preparedness, given the dynamic nature of a fire, is to demonstrate the availability of multiple route alternatives and response strategies to permit emergency professionals to manage their response according to the specific circumstances. The Project area provides ample route and response alternatives that were not considered in this model. Emergency responders will coordinate the safest possible evacuation based on the dynamic circumstances of the actual event, including the appropriate phasing of the evacuation, and utilization of the most appropriate ingress and egress routes for area residents and emergency responders.

The breadth of route alternatives and response strategies available to emergency professionals to manage a potential fire in the County cannot and should not be evaluated using this evacuation analysis alone. A comprehensive view of Project fire safety is gained by understanding this memorandum, the Project's Evacuation Plan (Dudek 2023), along with the standard protocols and "in-the-field" decision making of emergency responders as detailed in the County[23] and nearby cities Emergency Response Plans documents.

This travel time analysis presents a reasonable vehicle travel time estimate based on professional judgment made by CRA, Dudek, and fire operations experts with experience participating in evacuations in Southern California. Changing any number of these assumptions can lengthen or shorten the average vehicle travel time.

For instance, a situation could arise in which professionals *may* choose to utilize additional roadways for evacuation not utilized in the analyses and *may also* choose to guide vehicle trips to more or different route permutations relative to what has been modeled in this analysis. A phased evacuation is also likely to be implemented, which improves the orderly flow of traffic in an evacuation scenario.

The net result of changing the variables selected could yield an average evacuation travel time shorter or longer than the results detailed in the analysis. Many factors can shorten or lengthen the vehicle time from the results shown herein. For example:

1. Changing the evacuation area affected by the evacuation order would affect the results. For Instance, emergency managers could order an early evacuation of land uses located in higher risks area, such as the Southern Oaks community. Thus, by the time an evacuation order is established for the proposed Project, there would be less vehicles on the road.

2. Increasing or decreasing the number of path permutations and percentage of the population utilizing each route that leads out of the immediate area could shorten or lengthen vehicle travel time relative to the results shown herein.

3. Emergency professionals electing to reserve certain travel lanes for emergency vehicle ingress for periods of time could affect the travel time relative to the results shown herein.

4. Assuming evacuees utilize fewer or more vehicles to evacuate from their homes relative to the vehicle utilization rate selected in the analysis would shorten or lengthen vehicle travel time relative to the results shown herein.

5. Changing the mix of vehicle trips allocated to each evacuation route could shorten or lengthen vehicle travel time relative to the results shown herein.

[23] County of Riverside Emergency Operation Plan: http://riversidecountyca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=2048&MediaPosition=3715.315&ID=10490&CssClass= County of Riverside Emergency Management Plan: chrome- https://rivcoready.org/sites/g/files/aldnop181/files/EMD%202022-2025%20Strategic%20Plan.pdf

6. Assuming different road condition adjustment factors could shorten or lengthen the vehicle travel time relative to the results shown herein.

7. Assuming fewer people are at home when the evacuation notice is given would reduce the number of vehicle trips and shorten vehicle travel time relative to the results shown herein. For instance, an evacuation during daytime hours could result in fewer outbound trips than assumed in this analysis

8. Assuming some portion of vehicle trips are made in advance of the evacuation notice would reduce the number of vehicle trips relative to the results shown herein.

9. Assuming emergency professionals elect to implement contraflow on certain roadways to open up additional lanes for emergency evacuation egress could reduce the travel time results shown herein.

This evacuation time analysis is necessarily limited in scope given the numerous variables inherent in a wildfire and evacuation event. However, as discussed above, it is not anticipated that the Project will significantly impact evacuation of the proposed or existing surrounding communities based on evacuation times and other qualitative considerations.

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Big Bear Fire Authority/City of Big Bear Lake/Big Bear City Community Services District Local Hazard Mitigation Plan, January 2020

Big Bear Community Wildfire Protection Plan (CWPP) – Addendum II "A System Approach", July 2018

County of San Bernardino Emergency Operations Plan (EOP) – January/February 2018

County of San Bernardino Multi-Jurisdictional Hazard Mitigation Plan – December 2022

County of San Bernardino Fire and Rescue Mutual Aid Operation Plan – 2014

Bear Valley Electric Service 2023-2025 Wildfire Mitigation Plan – May 2023

CalFire/Board of Forestry and Fire Protection - 2022/2023 Strategic Fire Plan for the San Bernardino Unit

Vehicle Ownership Calculation

DATA NOTES	
TABLE ID:	B25044
SURVEY/PROGRAM:	American Community Survey
VINTAGE:	2021
DATASET:	ACSDT5Y2021
PRODUCT:	ACS 5-Year Estimates Detailed Tables
UNIVERSE:	Occupied housing units
FTP URL:	None
API URL:	https://api.census.gov/data/2021/acs/acs5
USER SELECTIONS	
TOPICS	Owner/Renter (Tenure)
GEOS	Census Tract 113; San Bernardino County; California

Census Tract 113, San Bernardino County, California

Label	Estimate
Total:	631
Owner occupied:	490
No vehicle available	10
1 vehicle available	156
2 vehicles available	160
3 vehicles available	140
4 vehicles available	24
5 or more vehicles available	0
Renter occupied:	141
No vehicle available	7
1 vehicle available	69
2 vehicles available	47
3 vehicles available	0
4 vehicles available	0
5 or more vehicles available	18

VEHICLES AVAILABLE		Household
No vehicle available	0	17
1 vehicle available	1	225
2 vehicles available	2	207
3 vehicles available	3	140
4 vehicles available	4	24
5 or more vehicles available	5	18
	1245	631
Average Veh / HH		1.973058637
Rounded up to 2 vehicles per household for a conservative analysis		

Evacuation Vehicles Calculation

Zone	A	B	C	D	Project
Existing					
Single/Multi Family Residential	47	14	1	689	50
Average Vehicle Ownership	2	2	2	2	2
Total Veh (Residential) - Round up Nearest 10	100	30	10	1380	100
Other LU					
Hotel/Camping	12				
RV Resort (Light House Trailer and Resort)		90			
Big Bear Shores RV Resort		128			
Serrano Camp Ground		132			
Meadows Edge Picnic Area (100 parking spaces)			100		
Big Bear Visitor Center			135		
Big Bear Ranger			19		
East Public Launch (10 parking + 40 RV)			130		
Captain John Fawn Harbor (25 parking spaces)				25	
Loyal Order of the Moose (10 parking Spaces)				10	
Commercial near Fawn Lodge (10 parking spaces)				10	
Total Evacuating Passenger Veh	112	380	394	1425	100
Cumulative Projects					
Marina Point (120 Units @ 2 Veh per Unit)				240	
TT 17670 (22 units @ 2 veh per unit)				44	
Total Evacuating Passenger Veh	120	400	420	1790	100

Evacuation Routes Travel Time per Google Map

Existing

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	243.44	Area A Evac	6	3144.685	2901.245	0:48
B	2	902.605	Area B Evac	7	3226.475	2323.87	0:38
C	3	237.565	Area C Evac	8	2467.44	2229.875	0:37
D	4	226.175	Area D Evac	9	5238.445	5012.27	1:23

Existing + Project

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	243.44	Area A Evac	6	3465.88	3222.44	0:53
B	2	902.605	Area B Evac	7	3347.485	2444.88	0:40
C	3	237.565	Area C Evac	8	2468.315	2230.75	0:37
D	4	226.175	Area D Evac	9	5238.445	5012.27	1:23
Project	5	323.85	Project Evac	10	3452.505	3128.655	0:52

Project Only

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
Project	5	323.85	Project Evac	10	1849.555	1525.705	0:25

Cumulative

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	242.755	Area A Evac	6	3272.835	3030.08	0:50
B	2	902.605	Area B Evac	7	3364.665	2462.06	0:41
C	3	237.245	Area C Evac	8	2571.605	2334.36	0:38
D	4	225.69	Area D Evac	9	6218.32	5992.63	1:39

Cumulative + Project

Start Zone	Start Gate	Start Time	End Zone	End Gate	End Time	Elapse Seconds	Elapse Time
A	1	242.755	Area A Evac	6	3616.805	3374.05	0:56
B	2	902.605	Area B Evac	7	3497.825	2595.22	0:43
C	3	237.245	Area C Evac	8	2573.075	2335.83	0:38
D	4	225.69	Area D Evac	9	6218.32	5992.63	1:39
Project	5	323.85	Project Evac	10	3579.115	3255.265	0:54

Appendix D

Big Bear Valley Community Wildfire Evacuation Plan (CWPP)

Big Bear Valley Community Wildfire Protection Plan

Final Plan
"A Systems approach"
June, 2006

Prepared by
David A. Yegge M.P.A., B.B.A., A. S.
Fuels Technician
City of Big Bear Lake Fire Department

Submitted To
City of Big Bear Lake
Big Bear City Community Services District
San Bernardino County

Special Acknowledgement

to the

United States Forest Service,
San Bernardino National Forest,
Mountain Top Ranger District

and the

California Department of Forestry,
San Bernardino Ranger Unit

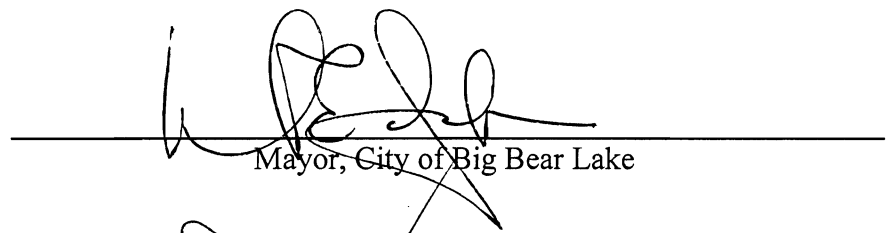
for Providing Supportive Maps, Statistics,
Reports, Information, and Data
Necessary to Accomplish the
Big Bear Valley Community Wildfire Protection Plan

PLAN ACKNOWLEDGEMENT

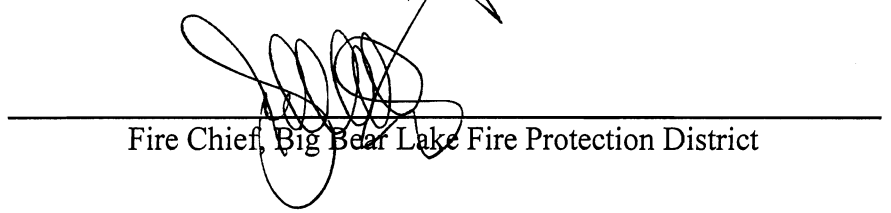
The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the Big Bear Valley.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

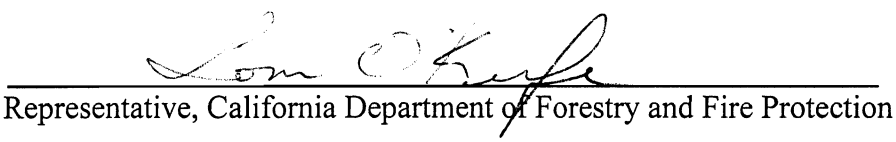
The following entities mutually agree with the contents of this Community Wildfire Protection Plan:



Mayor, City of Big Bear Lake



Fire Chief, Big Bear Lake Fire Protection District



Representative, California Department of Forestry and Fire Protection

NOTE:
At its meeting of July 10, 2006,
the City of Big Bear Lake City Council authorized the Mayor to acknowledge and sign the
Big Bear Valley Community Wildfire Protection Plan

PLAN ACKNOWLEDGEMENT

The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
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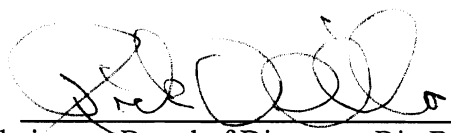
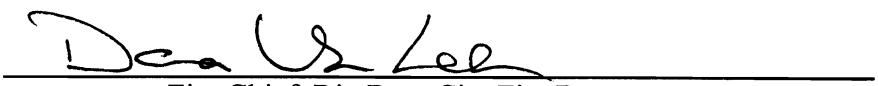
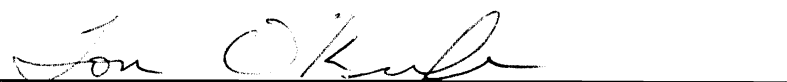


Chairman, Board of Directors, Big Bear City Community Services District



Fire Chief, Big Bear City Fire Department



Representative, California Department of Forestry and Fire Protection

NOTE:
At its meeting of August 7, 2006, the Board of Directors of the Big Bear City Community Services District authorized the President to acknowledge and sign the Big Bear Valley Community Wildfire Protection Plan

PLAN ADOPTION

The Community Wildfire Protection Plan:

- Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the Big Bear Valley have been consulted.
- This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the Big Bear Valley.
- This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Chairman, San Bernardino County Board of Supervisors

Fire Chief, San Bernardino County Fire Department

Representative, California Department of Forestry and Fire Protection

REPORT/RECOMMENDATION TO THE BOARD OF SUPERVISORS OF SAN BERNARDINO COUNTY, CALIFORNIA AND RECORD OF ACTION

February 6, 2007

FROM: **PAT DENNEN**, Fire Chief/Fire Warden
San Bernardino County Consolidated Fire District

SUBJECT: **COMMUNITY WILDFIRE PROTECTION PLAN CREATED BY FIRE SAFE COUNCIL OF BIG BEAR VALLEY**

RECOMMENDATION: Acting as the governing body of the County of San Bernardino and the San Bernardino County Consolidated Fire District, agree with the contents of the Community Wildfire Protection Plan created by the Fire Safe Council of Big Bear Valley.

BACKGROUND INFORMATION: A Community Wildfire Protection Plan (CWPP) enables a community to effectively plan how it will reduce the risk of wildfire. The Inland Empire Fire Safe Alliance (IEFSA) has been an effective coordinating force behind the Local Fire Safe Councils (FSC) and their Chapters that have taken on the task of completing CWPPs in all communities across the mountains. These are the same concerned citizens who were instrumental in successfully preparing our communities for the wildfires of 2003.

CWPPs are authorized and defined in Title 1 of the President's Healthy Forests Restoration Act (HFRA) of 2003. The HFRA emphasizes the need for Federal Agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and places priority on treatment areas that have been identified by the affected communities and included in a CWPP. County recognition of the CWPP contents provides communities an opportunity to influence where and how federal, state, and local agencies implement fuel reduction projects on federal land adjacent to their community, as well as how additional federal funds may be distributed for projects on non-federal lands. Other agencies that are signatory to the CWPPs include the United States Forest Service, the California Department of Forestry, and San Bernardino County Fire.

The CWPPs must at a minimum, address three areas of concern as identified in the Presidents HFRA. These areas are Collaboration, Prioritized Fuels Reduction and Treatment of Structural Ignitability. First, the CWPP must be collaboratively developed with local and state government representatives, in consultation with federal agencies, and other interested parties. Second, the CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure. Third, the CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan. County Fire has determined that the CWPP for Big Bear Valley has addressed all of the appropriate elements as provided in the National and State Guidelines.

cc: SBCCFD-Dennen; Brierty
CAO-Thies
CC-Krahelski
File-SBCCFD w/attachment and CD

Record of Action of the Board of Supervisors

APPROVED(CONSENT CALENDAR)
BOARD OF SUPERVISORS
COUNTY OF SAN BERNARDINO

MOTION	AYE	AYE	SECOND	MOVE	AYE
	1	2	3	4	5

DENA M. SMITH, CLERK OF THE BOARD

BY _____

DATED: February 6, 2007

Rev 07/97

ml (02/12/07)

ITEM 012

The efforts of the Big Bear Valley Fire Safe Council not only meet, but also well exceed the requirements of the HFRA for the purposes of their CWPP.

Approval of this recommendation would agree with the contents of the CWPP and support the efforts of the Big Bear Valley Fire Safe Council in their pursuit of grant funds to complete their objectives stated in the plan that would ultimately make their community safer.

REVIEW BY OTHERS: This item has been reviewed by the County Administrative Office (Wayne Thies, Administrative Analyst, 387-5409) on January 24, 2007; County Counsel (L. Thomas Krahelski, Deputy County Counsel, 387-5436) on January 25, 2007; and coordinated with the Third Supervisorial District.

FINANCIAL IMPACT: None. County agreement with the contents of the CWPP does not obligate the County to any future financial liability. Funding for future fuels reduction projects as stated in the CWPP will be provided by the Department of Agriculture and the USFS directly, or through the California Department of Forestry and Fire Protection to either the IEFSA or the local FSC.

SUPERVISORIAL DISTRICT(S): Third

PRESENTER: Peter Brierty, Assistant Chief/Fire Marshal, 386-8405

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Section 1.0 Executive Summary

The Big Bear Valley Community Wildfire Protection Plan (BBVCWPP) discusses both public and private concerns. Successful wildfire protection planning involves a review of all protection measures that contribute to a collective "systems approach" process. Eliminating the risk or threat is not always possible when living in a forest. What is possible is minimizing the threat by reducing structure ignitability, developing defensible space, and conducting fuels treatment that reduce the intensity and severity of a wildland fire.

The driving force in developing the BBVCWPP was the Healthy Forest Initiative, the Old & Grand Prix Fires, other historic fires (Bear, Panorama, and Willow), and the ongoing mortality rate of trees within the San Bernardino National Forest. Three broad categories that are discussed in this Plan are (1) the need for fuel breaks and treatments around and within the communities of the Big Bear Valley and in the forest itself; (2) the degree to which enforcement and voluntary participation contributes to the protection scheme; and (3) the willingness to develop and implement retrospective and prospective strategies to reduce the structural ignitability of properties within the Wildland Urban Interface (WUI).

Section 1.1 Plan Process

This Plan was developed after review and evaluation of the National Fire Plan, California Fire Plan template (August 2004 version), South Big Bear Fuels Reduction Project, San Bernardino County Operational Area Plan, and other available relevant documents.

Although this Plan is a public document for Homeland Security issues, certain maps that specifically provide information that may be sensitive in nature are not included. They include fire regime maps, condition class, fire history, utility maps, and critical infrastructure maps. At this time, the writers of this document have chosen not to identify and discuss items considered to be of a sensitive nature in accordance with Homeland Security guidelines.

Section 1.2 Introduction

The Big Bear Valley is nestled in the San Bernardino National Forest. The Valley is one of the only premiere four season mountain resort communities in Southern California. This Valley supports year round activities for snow skiing, fishing, boating, hiking, hunting, off-roading, mountain biking, and just relaxing & enjoying the forest environment. It is home to small boutique shops, eateries, small entertainment businesses, light manufacturing, and commercial industries that support tourism. In 2004, approximately 6 million people visited the Big Bear Valley.

Unknown to most visitors is the fact that the City of Big Bear Lake and the unincorporated Big Bear City Community Services District are listed in the Federal Registry as communities at high risk to wildland fires. Making fire even more of a threat is the ongoing and continual tree death rate within the WUI. A combination of issues has contributed to the alarming

increase in the death rate of various trees within the San Bernardino National Forest. The purpose of this document is to address these issues and propose measures that can reduce the threat of fire to our communities, simultaneously restoring the health of our forest.

Southern California has had drought-like conditions. This is a recurrent event and similar droughts have occurred in the past 100 years, and yet the tree mortality has never occurred to this extent. In some areas of Lake Arrowhead, nearly 90% of all conifer trees have died. In the San Bernardino National Forest, it is estimated that nearly 13 million trees have died. It has actually been said, "we have loved our forests to death."

Secondly, the watershed from years of drought conditions and depletion of the upper ground water aquifers has reduced the available water used by both vegetation and domestic sources.

During the last century after human occupation, fires in the Big Bear Valley have been small in nature. After the turn of the twentieth century and from the earliest date of Forest Service records, the Big Bear Valley has been absent any large or catastrophic fire.

Development in the Valley has caused the elimination of some existing trees, shrubs, and other plants, but it has done little to curtail the catastrophic fire hazard potential in the Valley. It can even be said that development has added fuel to the fire. In fact, it could be argued recent fire modeling of the Big Bear Valley indicates to a high degree that burnable fuel loading, topography, and cyclical climatic conditions cause Big Bear Valley to be susceptible to a large and/or catastrophic fire.

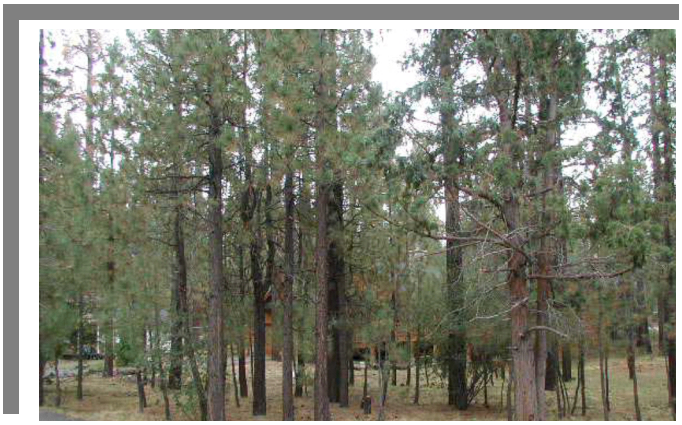
In spite of this very high fire hazard potential rating over the past decades, our fire suppression efforts have been successful at minimizing property damage as well as large vegetation fires in and around the Big Bear Valley. Yet the susceptibility to a large fire has not diminished. For the most part, little can be done to change the topographical and climatic conditions of the Big Bear Valley leaving one of the only changeable features, that being fuel loading.

Prior to Valley development, the Forest Service notes that area fires were more frequent and less intense. This was during an era where fires started by Native Americans and/or lightning caused fires removed the natural accumulation of burnable fuels such as pine needles, twigs, brush, saplings, branches, snags, and down dead trees and were left to burn out naturally leaving a mosaic pattern of fuel density across the landscape of the National Forest.

Over the years, logging of trees helped to reduce the fuel density found in the forest. This practice has been eliminated as a current use of the forest as it transitioned to a tourism and urbanized relief setting, except for the reduction of trees for firewood or small thinning projects. Even the harvesting of Christmas trees by permit is forbidden. This is an indication of the times where environmental sensitivity and preservation of most trees was seen as a normal course of action on both private and public lands but did little to curb fuel loading in our communities and in the forest.

The heightened awareness from a series of catastrophic fires, the rise of beetle infestation, disease, and drought led to experts rethinking past policies and to prescribe treatments to create and sustain forest health as well as provide fuel breaks that would reduce the threat to communities which are at risk.

The hands off approach to harvesting/thinning trees combined with quick suppression efforts and cyclical climatology has combined to exacerbate the declining health of the forest.



This has only increased the probability that a catastrophic fire would occur consuming large areas currently populated by all sizes and types of trees and vegetation. Harvesting/thinning selected trees and brush in forest areas that are densely overpopulated to help reduce the wildfire threat and to create a more bio-diverse ecosystem is necessary. It must be recognized that fuel loading is at its all time high on both private and public lands. The understory of manzanita, ironwood, and scrub oak height range up to 3 to 18 feet with a dense co-mingled canopy that makes it difficult to walk through. Increasingly, the number of dead pine and fir trees is noticeable in the forest in contrast to having one of the wettest years on record.

The tree mortality rate is relatively indiscriminate of age and size. Some of the largest and oldest trees in the San Bernardino National Forest exist within the Big Bear Valley. One of the largest lodge pole pine trees in the United States is located in the forest just south of Big Bear Lake. Large Jeffery pine and white fir series are 250 to 350 years old. Measures to protect and preserve these trees may be necessary, i.e., removing other trees and brush in and around these trees and potentially spraying the trees on an ongoing basis to protect them from beetle infestation.

During the Old Fire in 2003, this conflagration reached a triggering point that forced the evacuation of the communities of the Big Bear Valley for a period of three days. The social and economic effect that resulted has made it difficult for some in the business community to survive. More importantly, there is a feeling of complacency that has set in. People s perception is that the evacuation was unwarranted. Citizens have been heard to say *The next time, I am not going to evacuate.* These attitudes and the high fuel loading combine to set the stage for a potential disaster that could occur the next time a large fire occurs. Public education measures must be taken to inform the community on construction standards, defensible space practices, forest health issues, the need for forest thinning, fuel loading, hazard analysis, protection of old growth trees, the importance of protecting the watershed, and to actively educate the community on the reintroduction of prescriptive and controlled fires into the Big Bear ecosystem on both public and private lands.

It is, therefore, essential to effect a community fire protection plan that addresses the following issues.

Section 1.3 Overall Goals

General Goals

- Ensure the long-term economic stability of the communities by reducing the fire threat risk from very high to moderate/low.
- Identify lands private, public, forested, urbanized or otherwise that, if treated, would reduce the potential fire impact to communities and structures in and around the Big Bear Valley. This is commonly referred to as the Wildland Urban Interface (WUI) zone.
- Implement fuel reduction measures to assure continuing and ongoing safety of the Big Bear Valley watershed and recharge aquifers.
- Identify high valued areas that, if absent from trees, would have a detrimental effect on the appearance and ambiance of the communities of the Big Bear Valley. Propose and implement measures to assure the long-term survivability of these trees.
- Identify and support new markets that collectively, with public and private partnerships, assure that the forest vegetation and trees that are removed go to sources that have a beneficial use, i.e., lumber, biomass chips for landscaping, erosion control, and/or energy.
- Enhance biodiversity and forest health.

Buildings

- Review, evaluate, and modify fire wise building codes and fire protection laws for private landowners/builders to reduce home ignitions.
- Review, evaluate, and make recommendation for a fuel reduction and vegetation management/landscape ordinance.
- Design and develop a list of building standards that existing homeowners can voluntarily install to reduce the vulnerability of their homes.

Public Education

- Provide education to property owners about the need for fire wise construction standards, laws, and codes.
- Through public education and enforcement efforts, maintain ongoing practices of assuring the removal of overgrown vegetation and fuel loading on private lands. Emphasize defensible space clearing on private lands within the Big Bear Valley.
- Monitor, report, and educate citizenry on changes in the biodiversity evidenced within the Big Bear Valley Wildland Urban Interface (WUI).
- Seek as needed assistance from the Natural Resource Conservation Service on monitoring and implementing ways to educate citizenry on methods and techniques to help reduce soil erosion.
- Educate the public on public land fuel treatments, which will reduce local fire risk and improve forest health conditions.

Healthy Forest goals

- Develop and prioritize fuel treatment programs on National Forest lands using Forest Service practices within the Big Bear Valley WUI. For fuel treatment prescriptions on private lands, individuals are required to follow Title 14, State Forest Practice Act.
- Implement treatments within the Big Bear Valley WUI to revitalize forest health. Treatments should promote a mixed age class stand with healthy stocking levels that supports multiple forest resource values such as forest products, esthetics, water, wildlife, recreation, etc.
- Support the reintroduction of prescriptive and controlled fires into the ecosystem of the Big Bear Valley WUI on both public and private lands.
- Incorporate as much as possible a "do more with less" concept by privatizing "off budget" management and treatment prescriptions of the forest.

Section 1.4 Priorities Projects Summary

See Matrix 6.6, Page 43 for CWPP Project Summary.

Section 1.5 Acknowledgements

The Big Bear Valley Community Wildfire Protection Plan recognizes the indefatigable efforts of several individuals of the Big Bear Valley that without their participation and persistent encouragement this Plan would not have been completed.

David Jones, Big Bear Valley Fire Safe Council
Denise Proffer, Big Bear Valley Fire Safe Council
Greg Boll, Big Bear Valley Fire Safe Council
Doug Walton, Big Bear Valley Fire Safe Council
Kathy Sawyer, Big Bear Valley Fire Safe Council
Laura Dyberg, Mountain Rim Fire Safe Council
Local Fire Agencies:
John D. Morley, Fire Chief, City of Big Bear Lake Fire Department
Dana Van Leuven, Fire Chief, Big Bear City Fire Department
Jeff Willis, Assistant Fire Chief, Big Bear City Fire Department
George Corley, Division Chief, San Bernardino County Fire Department
Randy Clauson, Division Chief, United States Forest Service
Beth Nabors, Battalion Chief, United States Forest Service
David A. Yegge Forestry Fuel Technician, City of Big Bear Lake

Section 2.0 Mission Statement

The Big Bear Valley Community Wildfire Protection Plan provides a system-wide approach that reduces the fire hazard potential, enhances bio-diversity, promotes economic stability, is

SAFETY ORIENTATED, ENVIRONMENTALLY SENSITIVE, AND FOCUSES ON CREATING A BENEFICIAL USE OF THE BIOMASS FOR THE GREATEST GOOD.

Section 2.1 Methodology, Process, and Plan Development

The Big Bear Valley Community Wildfire Protection Plan group consists of private citizens involved through the Big Bear Valley Fire Safe Council and representatives from public fire protection agencies that are interested in developing a plan that enhances the protection of the communities, citizenry, infrastructure, historical, and cultural sites as well as assuring a bio-diverse healthy forest through conducting continual and ongoing fuel treatment projects on public and private lands to allow a more healthy sustainable density for generations to come.

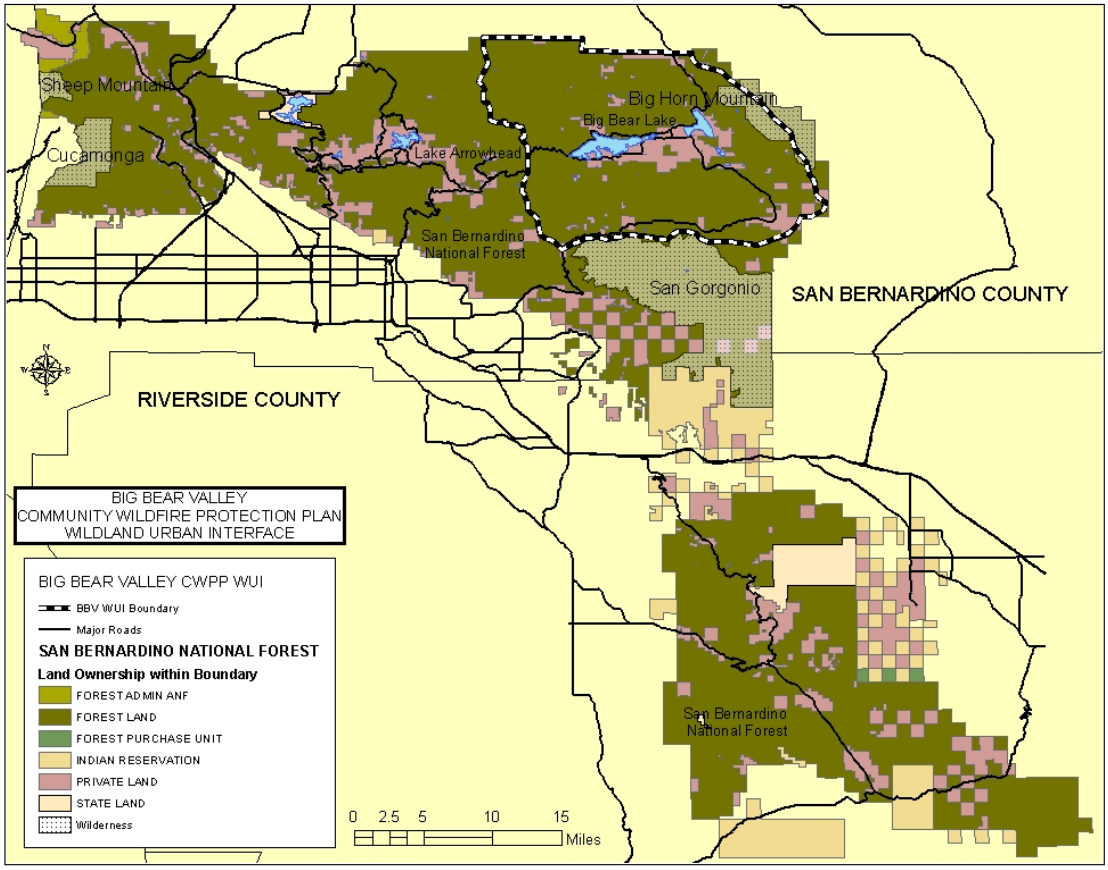
To accomplish this, a local focus group met on an as needed basis for one and a half years to track the Plan's progress. On August 25, 2005, the community was invited to attend a special meeting to discuss and provide input on the boundaries of the Big Bear Valley WUI and to establish community priorities for projects within the WUI.

Section 2.2 Big Bear Valley Wildland Urban Interface and Zone of Influence Boundaries

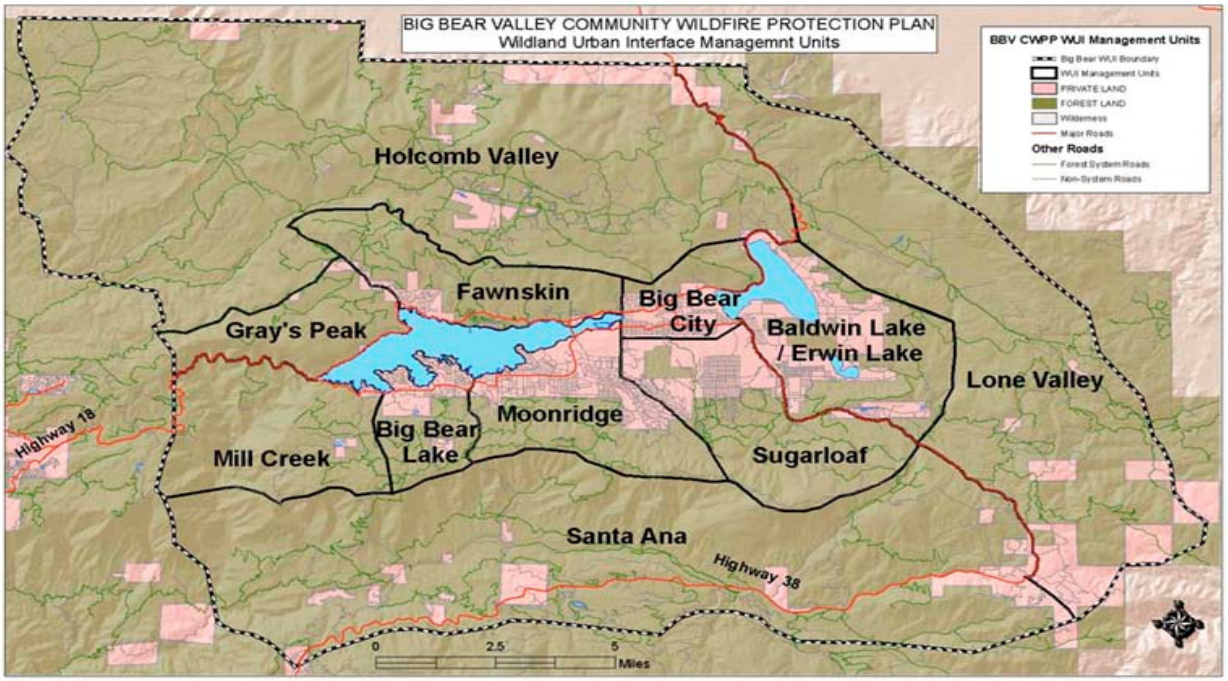
Consistent with the National Fire Plan, the Big Bear Valley WUI boundary is identified in Map 2.2.1. It was determined by evaluating past fire history, natural terrain, most probable threat area, strategic evacuation routes, watershed, drainages, fire regime class, and condition class that if a large fire were to evolve within the zone of influence, significant and detrimental impacts to the Plan's purpose would be affected.

The proposed overall size of the Big Bear Valley WUI is 170,447 acres. Within this area, differences exist on vegetation type, fire regimes, and condition classes that for practicality purposes make it viable for managerial rationale to identify eleven management areas that total the Big Bear Valley WUI boundaries. These management units will be identified by name in the project planning area, acreage, fire regime, condition class as well as the suggested priorities identified in each managerial unit.

MAP 2.2.1 BIG BEAR VALLEY WILDLAND URBAN INTERFACE BOUNDARY



Map 2.2.2 Big Bear Valley Wildland Urban Interface Management unit Boundary



Section 3.0 Community Legal Structures Jurisdictional Boundaries

The Big Bear Valley WUI consists of a mix of political subdivisions within its boundaries. It consists of unincorporated County areas known as Fawnskin and Baldwin Lake. This area encompasses ten square miles of private lands. The principle fire agency providing municipal fire protection is the San Bernardino County Fire Department. As this is an unincorporated area, the primary legal responsibility for vegetation fires and management is the California Department of Forestry and Fire Protection, which is protected by the U.S. Forest Service under an acreage exchange agreement.

In addition, the eastern portion of the Valley has unincorporated lands governed by the Big Bear City Community Services District (CSD). One authority of the Community Services District is to provide municipal fire protection for communities such as Big Bear City, Sugarloaf, Erwin Lake, eastern Moonridge, and Lake Williams. The CSD fire agency is called the Big Bear City Fire Department. The primary legal responsibility for vegetation fires and management is the California Department of Forestry and Fire Protection, which is protected by the U.S. Forest Service under an acreage exchange agreement.
The City of Big Bear Lake is an incorporated city government that includes a subsidiary fire district known as the Big Bear Lake Fire Protection District. As such, the Big Bear Lake Fire

Protection District has primary responsibility for both vegetation and structures within the City's boundaries as well as leased structures that exist outside the City's boundaries on Forest Service land.

The Forest Service provides primary protection for vegetation within the National Forest boundaries. On private properties outside the incorporated boundaries of the City of Big Bear Lake, they provide services within their scope of responsibilities, that of extinguishments of vegetation fires and structure fire exposure protection.

All fire agencies participate in Valley-wide automatic and mutual aid agreements that provide mutual assistance to each other. Seemingly, this mixed type of service appears seamless at the response level. It works quite well and appears to have minimal overlap.

The communities of Big Bear Valley have a high percentage of dwelling units that are vacant or second homes for most people. Table 3.1 indicates that a total square mile area of the communities that contain 95% of structures at risk is 26 square miles. The total assessed value for all communities in the Big Bear Valley is approximately $4 billion. The Forest Service leases land to individuals. There are over 470 special use dwellings on Forest Service leased land within the Big Bear Valley WUI. The assessed value for these structures range between $376 million to $752 million. Additionally, the total number of structured campground/RV spaces within the Big Bear Valley WUI is approximately 700 with an assessed value of $1.5 million. Campgrounds have an average of 40,000 visitors each year.

SECTION 3.1 POPULATION

The current estimated population for the Valley as identified in Table 3.1 is 19,822. This was derived from the 2000 census statistics and current planning & economic documents. This is an increase from the year 2000 of 2,652 or a 15.4% increase in five years or an annual percentage rate of 3.1%. Considering the current population, a projected permanent population for 2015 is 25,768.

According to the U.S. Forest Service, the San Bernardino National Forest is home to approximately 100,000 permanent residents of which 20% are located in the Big Bear Valley. Yet, as with any tourist community, daily visitor populations (DVP) are just as important to include when determining the total population of a community.

The daily visitor population (DVP) as identified in Table 3.1 is equal to 16,384. This equates to approximately 5,943,660 visitors annually. According to the San Bernardino National Forest Business Plan, the estimated DVP in the San Bernardino National Forest is equal to 100,000 people. The Big Bear Valley comprises 16% of the total average daily visitor population that visit the San Bernardino National Forest. Many of these are second homeowners and/or visitors. Certainly, seasonal fluctuations occur. Two ski resorts are located in the Big Bear Valley. For the 2004-05 ski season, a recent published report indicated an estimated three million skiers chose to ski at Big Bear Valley resorts. The

summer season enjoys the next largest influx of visitors with the fall season comprising the third largest season. According to this economic report, the slowest season is after the ski slopes close until June of each year. Generally, there are daily fluctuations that occur as well with the weekends and holidays seeing a higher influx than other days of the week. The Big Bear Valley is located within two to three hours of twenty million people.

The significance of the DVP is an important element to consider when evaluating the significance of the Big Bear Valley. In comparing the DVP in the Big Bear Valley to other well known tourist sites, the Big Bear Valley DVP is equal to the combined total annual visitors to Mount Rushmore National Memorial, Zion National Park, and Bryce National Park. The three parks combined have a population of six million annual visitors. At 16% of the DVP of the San Bernardino National Forest, the Big Bear Valley has the single largest percentage of any community in the San Bernardino National Forest.

Other communities that see a portion of the San Bernardino National Forest DVP are Idyllwild, Blue Jay, Crestline, Crest Forest, Lake Arrowhead, Wrightwood, Lytle Creek, Running Springs, Green Valley, Arrowbear, Forest Falls, Gardner Valley, Angeles Oaks, and other smaller communities. These communities comprise the remaining percentage of the estimated daily visitor population.

The total daily population of the Big Bear Valley including daily visitors and permanent residents as identified by Table 3.1 is approximately 36,106.

TABLE 3.1 BIG BEAR VALLEY WUI VALUES AT RISK

Communities of Big Bear Valley WUI	Population Daily Transient Population/Perma-nent	Square Miles	Housing Units	Commercial Industrial Square Feet	Assessed Value
City of Big Bear Lake & Fire Protection District	10,250 11,250/6028	8 9	9,210 9,210	1.8 M 1.8 M	$2 B $2 B
Big Bear City Community Services District	4,500/12,584	21.13	10,400	849,475	$1,611B
Unincorporated area of BBVWUI protected by County Fire Department	250/1210		1,000	45,000	$411 M
Forest Service Buildings			NA	30,000	$4.5 M
Special Use Housing	260/0		470	376,000	$376 M to $752 M
Campground/RV Spaces	2,800****		700		
Non-assessed Buildings & Equipment **	Reserved for Future	Reserved for Future	Reserved for Future	Reserved for Future	Reserved for Future
Bear Valley Electric					$26 M
BBVWUI Total ***	*16,284/19,822				$4.091 B

* The current estimated daily transient population was derived from the Big Bear Economic Performance Report and the United States Forest Service Environmental Assessment Report. An estimated 5,943,660 people visit the Big Bear Valley annually.

** The non-assessed value buildings include churches, schools, government facilities, and portions of the ski resorts. The projected replacement value of electrical infrastructure exceeds $55 million in fixed facilities and equipment.

*** The estimated total does not include community infrastructure that may or may not be affected by a wildland fire, i.e., roads, water system, electrical transmission lines, telephone cables, boat docks, ski lifts, dams, etc. **In 2003, the estimated value of improvements for the Big Bear Valley was in excess of $9 billion.**

**** The population number was arrived at by using 700 camping/RV spaces times 4 occupants per space. Spaces are open seasonally. Amount is previously included in the DVP for the City.

Section 3.2 Demographics

The U.S. Census indicated that in 2000, the Big Bear Valley ethnicity consists of 81.5% Anglo Saxon, 13.3% Hispanic, and 2.5% African American/Asian/Indian. The age distribution indicated that 73.8% of the residents of the Big Bear Valley were less than 55 years of age. Strikingly, 53% of the households earned less than $44,999.

As anticipated in an area with high tourism, the employment rate of growth is cyclical. Yet, the overall job growth was strong during the period evaluated with the largest job growth occurring in the retail sector. The inflation adjusted increase in payroll from 1990 to 2000 grew an estimated $17 million, which is a 27.5% increase from 1990. Big Bear employers paid employees an average of $17,646 for full or part-time positions. The number of businesses expanded from 1990 to 2000 by 76 companies.

The Big Bear areas' total taxable sales reached a record $144 million in 2000. The year 2000 was the last year evaluated by this report.

Table 3.1 indicated that the projected assessed value within the Big Bear Valley is $4.091 billion. This does not include an estimated value to the water distribution system, wastewater treatment system or underground / aboveground utilities. Nor does it include structures that are not taxed, i.e., schools, churches, certain governmental buildings, and some buildings on federal leased land. The San Bernardino County Multi-Hazard Functional Plan identifies twenty buildings on their roll of critical governmental facilities of potential loss but failed to identify schools, churches, ski resorts or Forest Service buildings.

Section 3.3. Land Use Trends

The primary land use within the Big Bear Valley Wildland Urban Interface is single-family homes. There are approximately 16,872 acres of private land in the Big Bear Valley that is within the San Bernardino National Forest. Since there are a limited number of acres, there are ultimately a limited number of parcels. Most of the level lots or most desirable lots have been developed. The trend is for development on the less desirable, higher angled-sloped properties. These properties tend to be closer to the boundaries of the National Forest or open undeveloped areas.

Section 3.3.1 Density

The density of structures per acre varies greatly within the communities of the Big Bear Valley. Some older lots are several acres in size. In other tracts in Sugarloaf, Erwin Lake, and lower Moonridge, lot widths are twenty-five to thirty feet and lot sizes are approximately 2,500 square feet,

which can accommodate up to 17 dwellings per acre. Historically, these lots were designed for tent camping use, which evolved over time with structures. Other areas within the Valley have 4,500 to 5,000 square foot lots, allowing up to 10 structures per acre. The trend on these lots is to create multi-story dwellings to increase living space.

The City of Big Bear Lake allows a minimum setback of three feet for lots less than thirty feet wide while the CSD and the County requires a minimum of five feet on similar lots. Under the right conditions, a fire can and will transmit from one dwelling to another subjecting these highly dense areas to a potential conflagration. It has not been uncommon for firefighters in the areas of Sugarloaf and lower Moonridge to arrive on the scene and have multiple homes threatened or involved in fire.

A more important responsibility of a fire department is balancing the available water in the water main to the required fire flow of the structures. Lot sizes in the 2,500 square foot range of Sugarloaf, Erwin Lake, and lower Moonridge, consideration should include increasing the calculated fire flow for exposures and density. In accordance with the 2005 Insurance Services Office "Guide for Determining the Needed Fire Flow", dwellings constructed of Type V non-rated construction with a ten foot setback or less require a minimum flow of 1,500 gpm. Moreover, the existence of shake shingle roofs on previously constructed buildings compounds the probability of ignition and significantly contributes to the spread of fire. Thus, the Insurance Services Office adds 500 gpm fire flow to the base fire flow required for a dwelling. This brings the needed fire flow to 2,000 gpm. This is 100% greater than the current standards typically required by most fire agencies within the BBVWUI. Fire officials should collectively review the minimum setback requirements and minimum fire flow standards for communities of the BBVWUI and consider additional flow for proximity to vegetation density, type of construction, existing shake shingle roofs, vehicle access, exposures, etc.

Section 3.4
Utilities

Section 3.4.1 Electrical Power

The existing utility services transverses the canyon and ridges north of Lucerne Valley and the Santa Ana River basin. The electrical service lines feeding the Big Bear Valley cannot support the demand during the peak usage period. Consequently, the need to provide supplemental electricity was and is needed; a natural gas fed generator with 8.4 megawatts of production capacity was installed and is available during peak periods to meet consumer needs. Additional natural gas/diesel powered generating plants are being proposed that would generate smaller megawatts of power.

Table 3.1 identifies Bear Valley Electric (BVE) as one of the major values at risk. The projected replacement value of electrical infrastructure exceeds $55 million in fixed facilities

and equipment. BVE contains over 200 miles of overhead power lines that has an estimated replacement value of $26 million.

The California Public Utilities Commission mandates utilities to conduct tree and vegetation clearance in and around aboveground electrical power lines. Bear Valley Electric spends approximately $150,000 annually for tree trimming. Since 2003, BVE has spent over $700,000 removing dead and dying trees as a result of the bark beetle infestation. The estimated tonnage of biomass generated from tree removal is unknown. The electric company maintains a list of participants that wish to have wood chip material delivered as landscape material and/or dust & erosion control as an alternative to disposal at the local landfill. Although the potential utilization of woody biomass as alternative energy use is certainly possible, especially with an estimated 13 million dead trees in the San Bernardino National Forest, a detailed environmental impact and feasibility study has not been conducted that would give stakeholders, governmental leaders, and the communities of Big Bear Valley necessary information to pursue this issue.

Section 3.4.2 Natural Gas/Propane

Service is provided throughout the Valley. Certain areas do not have natural gas service, and therefore, propane tanks are heavily used in outlying areas, organized campgrounds, and leased Forest Service properties. It should be noted that one of the most important safety features that can be installed on propane tanks is that of non-combustible strap hold-downs. According to local fire officials, this is the one item that is missing from the majority of the propane tanks located in the Big Bear Valley.

Section 3.4.3 Waste Water Treatment District

The Valley has sewer services to most of the dwellings, commercial, and industrial buildings. Sewage is processed at a plant on the east end of the Valley, and the effluent is gravity fed to Lucerne Valley with a parallel line that transverses alongside of Highway 18. Camps, Forest Service leased cabins, and the majority of the northern Baldwin Lake area are not connected to the waste treatment facility.

Section 3.5 Hydrology

The City of Big Bear Lake Department of Water and Power and the Big Bear City Community Services District has conducted several studies concerning the hydrology in Big Bear Valley and has identified distinct water shed subunits. Table 3.5 identifies each subunit and the perennial yield of drawing capacity that can be extracted from the watershed. This is based on historical and actual records maintained by both departments.

Currently, the recharge ability of the watersheds seem resilient in that after five years of drought, the draw down on the water table has mostly risen back to normal levels with above normal precipitation after the 2004/2005 rainfall season. Although water conservation

measures and limited new construction can impose short-term solutions to a long term problem, the narrow residual estimated perennial yield of the defined aquifer versus estimated annual use only magnifies the potential impact that a large fire could create.

Conducting a study to determine the potential that a large fire could have on the watershed may be warranted. Watersheds are vital to the long-term economic stability of the Big Bear Valley as 100% of the water comes from local underground aquifers.

TABLE 3.5 PERENNIAL YIELD BY SUBUNITS

Subunit Name	Acre Feet
Millcreek	330 (arsenic & fluoride)
Village	290
Rathbone	1,100-1,200
Division	500-550 manganese issues
Erwin	600
Grout Creek	283 (unavailable to south shore)
North Shore Fawnskin	44
CSD Erwin	600
CSD West Baldwin Lake	500-1,000
CSD Van Dusen	800-900
CSD East Baldwin Lake	>100
Total	5,147–5,997 acre feet

The Department of Water and Power and the Big Bear City CSD maintain maps, which identify the boundaries of each watershed subunit. The watersheds start at the top of the ridgeline and transverse in and around Big Bear Valley. There is little known about the potential increase or decrease in the perennial yield of each watershed should the Forest Service conduct fuel treatment practices in these watersheds. A far more important issue that needs addressing is determining what effects a fire could have on the perennial yield of the subunit watershed, if one were to occur.

A fire could be detrimental to the Big Bear Valley watershed as a whole, yet dependent on the fire size, location in relationship to specific watershed(s), and/or intensity of the fire, it may have limited watershed impact. Unequivocally, a major fire significantly larger than 100 acres would not only have immediate impact on the watershed but lingering diminished watershed retention.

Augmenting the current watersheds' perennial yield through creating a recharge basin or by some other form may provide the "safety net" necessary if and when a large fire occurs that affects the watershed.

Other possible impacts to the watershed as a result of a small fire may occur that affects only a specific watershed subunit. For instance, a small fire (less than 100 acres) on a seemingly

level terrain tends to have little overall impact compared to a small fire in riparian streambeds where vegetation holds back and slows down the speed of running water and allows more infusion into the aquifer.

The crown jewel of Big Bear Valley is Big Bear Lake. Most generally, streambeds terminate in the lake. A decrease in water quality can also be an issue as a result of a small fire or fuels treatment. Measures should be taken to keep the clarity of the water relatively high.

Section 3.6 Schools

Within the Big Bear Valley, the Bear Valley Unified School District provides education through three elementary schools, one middle school, a high school, and one continuation school. The total number of children attending our schools is approximately 3,000. In addition, there are a number of private schools that add approximately 400 more students.

Section 3.7 Hospital

The Bear Valley Community Healthcare District provides emergency room service and patient care with forty beds.

Section 3.8 Emergency Operation Services

The Valley's emergency services operation system functions quite well. The Big Bear Valley Mountain Mutual Aid Association was developed to coordinate and facilitate resources to minimize the impacts of a disaster or emergencies on people, property, and the environment. It involves citizens, businesses, and governmental agencies. It works under the auspices of the San Bernardino County Office of Emergency Services and operates as a non-profit organization.

The organization has been pressed into service on several occasions due to floods, earthquakes, and fires. The process implements the National Incident Management System (NIMS) organizational structure. Other agencies within the Valley have department operating centers that are also utilized, i.e., Sheriff's Department, fire departments, the City of Big Bear Lake, and the United States Forest Service. Most of these rooms are of insufficient size to meet the demands of an Emergency Operations Center. During the 2003 Old Fire, the Emergency Operations Center was housed in a make shift apparatus bay of a fire station because no dedicated building of sufficient size was available. Funding remains the single biggest roadblock to providing a Valley-wide Emergency Operations Center.

Mountain Area Safety Taskforce (MAST) organizations are active in both the San Bernardino and Riverside Counties. Both the San Bernardino and Riverside County MAST organizations are comprised of governmental agencies, private companies, and volunteer organizations concerned with public safety in the mountain areas of their respective jurisdictions. The two County MAST organizations have joined forces to coordinate their

response to the San Bernardino/San Jacinto Mountain Area vegetation mortality emergency at the regional level. While each County level MAST organization has its own County specific concerns, their joint efforts are rooted in a common intention to reduce the current region-wide risk of a major fire and to minimize impacts on mountain communities should one occur. A five-point action plan has been initiated by the two County MAST organizations as follows:

- Assure public safety - critical elements to this action include developing evacuation plans, clearing potential hazard trees from routes in and out of the mountains, and providing emergency planning and hazard mitigation information to the public.
- Obtain funds - work with local, state, and federal legislators to obtain funds to combat the problem.
- Reduce fuel and create fuel breaks - this means planning and organizing the removal of dead standing trees, the reduction of fuel on the ground, and the creation of defensible space around developed areas and homes.
- Develop commercial use or disposal options for waste wood products.
- Identify and develop plans for ensuring long-term forest sustainability.

MAST common priorities for the Big Bear Valley Wildland Urban Interface:

- Evacuation Routes – 111 miles
- Communication Sites – 55 acres
- Big Bear Valley Wildland Urban Interface – 170,447 acres
- Public use and administration facility protection

Section 3.9 Fire Protection Response/Readiness

Table 3.9 evaluates the number of factors that determine the level of readiness and response to a fire within the Big Bear Valley Wildland Urban Interface. The Big Bear Lake and the Big Bear City Fire Departments jointly provide one on-duty chief officer twenty four/seven.

Table 3.9 Fire Protection Response/Readiness

Department	Equipment Number/Type	Manufactured Year	Minimum Staffing
Big Bear Lake Fire Department	1-Type 1 Medic Engine	2004	4-24-7
	2-Type 1 Engines	1989/1984	Cross staff
	1-Type 3 Brush Engine	2003	1 Paid Call, hard staffed on weekends
	1-Type 2 Water Tender	2003	7 Paid Call Firefighters
	2-Command	2001/2003	
	1-Truck Company	2001	
	1-Lt. Rescue	1994	
	1-Utility Vehicle	1997	
San Bernardino County Fire	1-Type 1 Medic Engine	1991	2-24-7
	1-Type 3 Brush Eng.	1994	Six Months
	1-Type 2 Water Tender	1984	3-24-7 Six Months
	1-Command Vehicle		
	1-Lt. Rescue/1-Snow Cat	2002/1994	
United States Forest Service	3-Type 3 Brush Engines	1993, 2001, 2003	5-8-7 year round
	4-Type 6 Engines	2000, 2001, 2-2004	1-8-7 year round
	2 Command Vehicles Type 1 hand crew Type 2 hand crew	2-2003, 2-2001, 2001 rental	1-8-7 year round 20-8-5 Six Months On standby year round
Big Bear City Fire Department	3-Type 1 Engines	2-1990/2004	2-24-7
	1-Type 3 Brush Engine	1997	Cross Staffing Units
	1-Type 2 Water Tender 1- light Rescue	1978*	Situation up-staffing on winter weekends and holidays 2-24-7 Cross Staffing
	3-Medic Ambulances		6-24-7 (One Paid Call)
	3-Command Vehicles	2002/2004	
	1- Snow Cat		Cross Staffing

***NFPA Standard 1901 recommends the replacement of fire apparatus built prior to 1979.**
**** Additional resources are available through the mutual aid system**
***** Resources identified are located within the BBVWUI.**

Section 3.9.1 Specialized Equipment

Currently, the Type 1 engine for San Bernardino County contains a portable gel inductor unit. Some Type 1 engines, Type 3 engines, and water tenders have drafting capability and portable pumping units for potential streambeds, small lakes, pools, etc. but not all. Foam eductors are built into both the City of Big Bear Lake and Big Bear City CSD's Type 3 engines and water tenders.

Section 3.10 Water Distribution System Readiness

To evaluate the water distribution system, a review of the water grid map system was conducted. This grid map system contains sizes of mains, location of hydrants, and pressure reducing valves similar with other water grid map systems. Table 3.10 indicates the fire flow that is available at 20 pounds per square inch (psi). Hydrants in proximity to the National Forest were analyzed to assure that the projected flows would be capable of providing the minimum required fire flow for residential occupancies as required by Appendix III-A of the California Fire Code and/or local standards. The minimum standard fire flow at 20 psi residual pressure for communities in accordance with Appendix III-A is 1,000 gpm. The City of Big Bear Lake and the Big Bear City CSD amended their portion of the code to add a requirement that dwellings in excess of 3,600 square feet would be required to meet the fire flow of Uniform Fire Code, Appendix Table III-A-A-1., which establishes a minimum standard of 1,500 gpm for residential.

The review evaluated public versus private systems, long dead end systems, pipe diameter, and elevation to determine hydrants that would most likely not be able to provide the required fire flow. Ultimately, this means each agency needs to review their water system capabilities within their communities and determine the appropriate action to be undertaken. Water purveyors must be prepared to adopt a capital improvement schedule to help remedy the deficiency of small pipe sizes, loop dead-end lines, improve hydrant spacing, and increase water storage capacity. Table 3.10 indicates that in some areas of the communities, the percentage of the required fire flow is as low as 17%. Many evaluated locations only provide 40 - 70% of the currently recommended flow of 1,500 gpm. The water grid map number W-02 provides only 40 - 50% of the required fire flow (see Table 3.10) In general, the hydrants that are deficient have smaller mains, some two to four inches in size. These are located in the older areas of the communities of the Big Bear Valley.

In review of historical documents, the 2003 Urban-Wildland Interface Code states, *"that an approved water supply for the use of fire protection services to protect buildings and structures from exterior fire sources or to suppress structures fires . . . shall be provided."* The base residential fire flow suggested by the Insurance Services Office is 1,000 gpm for non-vegetated areas, which is the same as Appendix III-A of the California Fire Code. Finally, San Bernardino County's General Plan establishes a 2,000 gpm minimum fire flow requirement for subdivisions with 4 to 7 dwellings per acre.

Today, homes are increasing in size and density. In many cases, they exceed 3,600 square feet. This warrants an increase in the required fire flow to 1,500 gpm. Planning for dwellings larger than 3,600 square feet and allotting a minimal amount for at least 250 gpm for proximity to vegetation would be warranted. These issues combined more than justifies the need to establish a fire flow requirement of greater than 1,000 gpm for one or two unit dwelling units.

The storage capacity available for fire flow was also reviewed. The fire flow capacity was evaluated based on the need to provide 1,500 gpm for two hours. For the first sixteen hydrants listed, a storage capacity of 3 million gallons was used. Column six of Table 3.10 identifies the percentage of fire flow versus storage capacity of the tank. In the area identified as Lake Williams, the capacity of the tank equals the total volume that should be reserved for fire flow.

Table 3.10 Wildland Interface Fire Flow Information

(1) Water Grid Map Number	(2) Hydrants Evaluated	(3) Flow in gpm at 20 psi	(4) Flow in gpm at 20 psi	(5) Percentage of Required/Recommend Fire Flow Provided	(6) Fire Flow Storage Capacity vs. Available Capacity
M-15	214/490	1,336	1,044	89% / 69%	18% / 3M
M-20	224/490	1,443	1,044	96% / 69%	18% / 3M
B-02	471/475	1,747	2,050	116% / 136%	18% / 3M
B-23	394/713	500	520	33% / 34%	18% / 3M
M-08	547/197	2,358	1,354	157% / 90%	18% / 3M
M-12	578/038	1,378	750	91% / 50%	18% / 3M
B-28	P-25/272	258	1,333	17% / 88%	18% / 3M
M-21	614	1,378	1,078	91% / 71%	18% / 3M
W-02	DWP/No #	750	600	50% / 40%	100% / 160T
E-04	DWP/NO#	750	600	50% / 40%	32% / 500T
E-05	DWP/No#	750	600	50% / 40%	32% / 500T
F-7	44/67	375	717	25%/47%	13%/1,334M
F-2	DWP/No#		1517	100%	13%/1,334M
F-4	46/64	925	809	61%./53%	13%/1,334M
Pg. 28&29	CSD/Erwin/DWP		920	61%	13% / 2,160M
Pg. 6	CSD Whis For	1,076	1,336	71% / 89%	13% / 2,160M
Pg. 7	CSD416 Pioneer	850		56%	1.5% / 6M
Pg. 7	CSD1144 Anita	1,745		116%	1.5% / 6M
Pg. 7	CSD113 Sequoia	2,300		153%	1.5% / 6M

Section 3.11 Insurance Ratings

The latest Insurance Services Office classification that was conducted in the fall of 2001 indicates an overall 4/9 rating. This means that in areas of the City of Big Bear Lake that have hydrants, the classification is 4. In non-hydrant areas, the classification is a 9. The City of Big Bear Lake Department of Water received an overall classification of 1. This is quite good considering that there is some recognition that water main sizes in some areas are inadequate to deliver the required fire flow. The ISO "Improvement Statement" identifies that the single largest reason for receiving an overall 4 classification was the limited number of engine company personnel. Similarly ISO ratings for the San Bernardino County and Big Bear City Fire Departments are 5/4/9.

It must be said that the ISO rating does not factor in fire loss statistics, cost effectiveness of their standards or prevention, and defensible space practices within the communities. Most importantly, the ISO rating does not consider a Wildland Urban Interface scenario in its equation to determine its rating.

Section 3.12 Suggestions to Enhance Emergency Fire Response

Emergency response vehicles are hampered by inadequate fire department vehicle access. It is estimated that 20% of the roads in the County unincorporated area do not meet current minimum County street standards. Equally important is that approximately 75% of the roads are accessible by a Type 1 engine and 85% are accessible by a Type 3.

In the City of Big Bear Lake, 5% of the roads do not meet the minimum road width established by the California Fire Code. Two percent are too steep to drive on in inclement weather and approximately 5% of the roads are long, dead end roads with little to no turnaround space.

Currently, approximately five percent of the roads in the Community Services District are unimproved roads. Twenty-five percent of the roads do not meet currently adopted road width standards. Five percent of the roads are too steep for inclement weather. Ten percent of the roads are long dead end roads with limited turning capabilities.

Driveways, or lack thereof, pose a major challenge for all fire engines throughout the Valley. Many homes do not have driveways. Some driveways exceed the Fire Code minimum distance of 150 feet. Others are not all-weather surface nor constructed sufficiently to withstand the weight of heavier type equipment and thus, could crack or collapse under the right conditions.

Most driveways in excess of 150 feet lack sufficient turnaround capabilities as required by the California Fire Code.

Most generally, fire department access difficulties are a result of lots developed prior to the implementation of current fire safety standards that are currently in place in all Big Bear Valley communities.

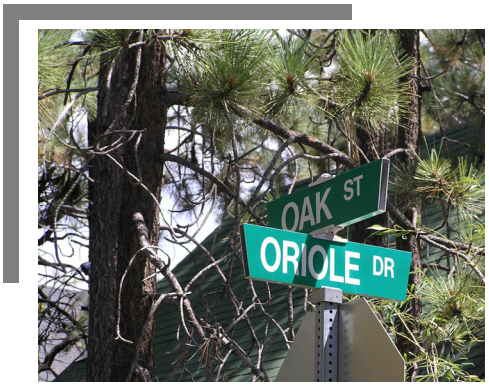
Section 3.12.1 Traffic Congestion

From time to time, traffic can be congested along Big Bear Boulevard. This impacts response times as well as increases the likelihood of an accident involving an emergency response vehicle.

To address current congestion issues along Big Bear Boulevard during peak traffic times, providing all emergency equipment with an Opticom system that activates traffic signal

lights to clear directional traffic would aid in reducing the response times in and around the Big Bear Valley.

Section 3.13 Addressing and Street Signs



Posting addresses on dwellings and assuring all street signs are present is an important key advantage to the expeditious response of fire departments.

Usually, local fire departments have map books and are familiar with the community enough that the lack of addresses and street signs are usually not a significant problem. However, it is incumbent upon us to realize that out-of-town strike teams, out-of-town Sheriff deputies, and disaster teams do not always have the luxury that the local departments have, and therefore, in many large campaign fires, lack of addressing and street signs hinder their response. The communities of Big Bear Valley should annually inspect these items.

Section 3.14 Specialized Equipment Needs

An array of specialized equipment is available for purchase. For structure protection, they include fire protection blankets and compression air foam units or gel type systems. All offer some degree of added protection.

All specialized equipment must be evaluated by each agency and community as to how best such equipment could be utilized.

Therefore, this plan suggests that all fire departments and/or political subdivisions explore options available to them from a cost versus benefit approach when consideration is given to purchasing such specialized equipment.

Section 3.15 Firefighter and Public Training Certification and Qualification

California offers a full range of training for all positions within the fire service, which is available through the California Office of the State Fire Marshal, Education and Training. This includes all levels of the incident command system and emergency operations management. These standards have been adopted for use by local fire agencies.

Public training for emergency management through Certified Emergency Response Teams (CERT) is available to the general public who choose to be involved. The greatest hindrance in achieving a greater success of this program is having a dedicated emergency manager and ongoing training.

Section 3.16 Defensible Polygons

Left blank for future discussion.

Section 3.17 Fuel Breaks (Strategic/Shaded)

Fuel breaks have a long history in the western United States. The primary reason for fuel breaks as any other type of fuel treatment is to change the behavior of the fire so significantly that, depending upon objectives and purpose of the fuel break, the spread of wildfires would be altered. In a forested area, natural fires have occurred that burn away ground vegetation and forest litter leaving larger more fire-resistive trees to live creating a shaded appearance with minimal understory vegetation. Fuel breaks are not designed to stop the progress of the fire but change the behavior by allowing a greater probability of fire extinguishment from attacking firefighting forces. Fuel breaks differ from the traditional firebreaks. With firebreaks, all vegetation is removed down to mineral soil.

No absolute standard for the width of a shaded fuel break is available. The width and extent of treatment vary dependent upon topography, vegetation structure, potential fuel radiant heat flux, weather potential, crowning potential, economic conditions, and community desires. Discussing fuel breaks of any type and width begins with identifying the current regime class and condition type within the prescribed area. Table 5.1 identifies the regime class and condition class of each management unit within the Big Bear Valley Wildland Urban Interface. Fuel break prescriptions must describe the extent of the fuels to be removed and the residual fuels in the form of the standard fuel models so that potential fire behavior can be analyzed. Post treatment evaluation of the surface fire intensity should be conducted to assure flame length objectives have been met.

Just as important as determining the appropriate width of the fuel break is to increase the height of live crown base by limbing the tree up, reducing surface fuels, increasing the width between live tree canopies of various sizes and ages, and removing all dead, dying & diseased trees within the shaded fuel break.

Section 3.18 Evacuation Plan

The San Bernardino County Sheriff's Department maintains an exhaustive Emergency Evacuation/Reentry Plan for the Big Bear Valley, dated June 2005. During the Old Fire in 2003, the Emergency Evacuation/Reentry Plan for the Big Bear Valley was successfully implemented. A systematic post evacuation review was conducted to evaluate any changes that should be implemented for future events. It was determined that repopulation of the Valley will require further review and plan modification. The agencies involved in the evacuation plan are the Big Bear Lake Fire Protection District, Big Bear City Fire Department, San Bernardino County Fire Department, San Bernardino County Sheriff's Department, United States Forest Service, California Highway Patrol, American Red Cross, CalTrans, and the San Bernardino County Road Department.

Section 3.19 Emergency Communication System / Neighborhood

Since the Old Fire of 2003, the agencies of the Big Bear Valley and the Big Bear Valley Fire Safe Council have incorporated changes in the community's communication system. The first change incorporated the implementation of the Telephone Emergency Notification System (TENS). Essentially, it is a reverse 9-1-1. TENS was implemented to provide telephone notification to all residents of an emergency and to provide specific instructions of what measures to follow during an evacuation.

A second notification system, SCAN USA, is a public warning system that almost instantaneously allows fire departments to broadcast emergency information directly to computers, mobile phones, pagers, and PDAs at no cost to the agencies or the residents. Residents can log onto SCAN USA's website to receive SCAN alerts.

The third community alert system is a Valley-wide siren alert. Because many people work and play outside and many rental homes do not have telephones, relying solely on a telephone callback system may not be enough to reach all Valley residents. The community siren alert system will be strategically placed in four locations throughout the Valley. The goal is that individuals hear the sirens throughout the Valley and tune in to the local radio or TV station for instructions as to what to do. This is similar to the use of sirens for tsunami prone communities. In 2004, a grant was awarded to purchase the siren alert system. Its projected installation will occur in late 2006.

Currently, fire agencies are totally reliant on telephone hard wire system communication between the public and dispatch. Many times, the telephone system has been interrupted and communications have affected emergency response vehicles. Fire officials are encouraged to engage in negotiation with local telecommunications to improve the reliability of the emergency response notification system.

Section 3.20 Safety Plan

Currently, potential areas of safe refuge have been determined Valley-wide by various agencies and are a part of the Emergency Evacuation Plan. All safe refuge areas are considered temporary refuge areas and not a long-term alternative. Long-term evacuation needs are addressed in the Emergency Evacuation Plan or in various other documents. The Emergency Evacuation Plan is a confidential document developed and further refined after the successful mountain evacuation during the 2003 Old Fire. The evacuation plan uses a tiered approach to evacuation, i.e., warning, voluntary, mandatory, immediate, and shelter-in-place.

Section 3.21 Escape Routes

Maps of various escape routes are maintained and distributed based upon the potential each fire could bring. These routes are part of the Emergency Evacuation Plan maintained by the San Bernardino County Sheriff s Department.

Alternate neighborhood escape routes are not as well known by locals and certainly not well known by visitors of the Big Bear Valley. The Emergency Evacuation Plan does not consider neighborhood escape routes. At this time, alternative escape plans would require a possible escort. In the future, consideration should be given to mapping alternative routes and posting signage along the road that identify the route until the route connects to a major thoroughfare.

Section 3.22 Shelter-in-Place Procedure

The current Emergency Evacuation Plan does not consider shelter-in-place procedures as a viable alternative to evacuation except as a last resort.

Section 3.23 Education

One of the key components of the Purpose and Need section of this Plan identifies the need to provide ongoing public education and mass media to provide a sustainable message about a variety of wildland fire safety issues from defensible space, what to take when evacuating, what to do about smoke drift issues, upcoming possible control burns, and forest management issues. Currently the County of San Bernardino with grant funding and through the MAST organization is seeking a marketing firm to assist with long-term public education strategies.

Section 3.24 Fire Safe Council Resources

The Big Bear Valley Fire Safe Council is an active organization that can cross political subdivisions to accomplish short and long term goals of this Plan. They have resources that are available for community-wide public education programs. The Big Bear Valley Fire Safe Council has aggressively pursued the implementation of Valley-wide Chipper Days as well as hosted community informational meetings on the Community Wildfire Protection Plan.

Ongoing plans of the Big Bear Valley Fire Safe Council include continuing attendance at seminars and meetings as well as public education events and hosting Valley-wide Chipper Days. Other activities and projects could be to conduct fuel reduction on private properties and to obtain grants for replacement of more fire resistive roofing as well as educating

citizenry about the need for the reintroduction of fire to both private and public lands. Another idea might be the purchase of Woody the Owl or Chipper the Beaver as a mascot.

Section 3.25 Fire Safe Inspector Program

Fire safe inspector programs have always been a part of the ongoing education program of any fire department. The California Department of Forestry has assigned engine companies to inspect private properties for compliance with the requirements of the Public Resource Code, Section 4291 on State responsibility area lands (SRA). The United States Forest Service applies the same State standards to structures and dwellings located on Forest Service land.

Currently, the Big Bear Lake Fire Protection District and the Big Bear City Community Services District contract out to the San Bernardino County, Land Use Services Department, Code Enforcement Division for abatement of vegetation and other fire hazard abatement issues within the Big Bear Valley. In 2005, the fire hazard abatement process was "kicked up a notch" to include limbing up trees, shrubs, and plants as well as concentrating on the removal of dead vegetation. Problematic with this change was the need for extended administrative personnel hours to explain to the community what was required to comply with the abatement notices. To help explain the changes from past standards, it was evident to the fire chiefs of the Valley that a fire safety inspector position would be beneficial.

Additional projects for the fire safety inspector could include pre-construction inspections, posting of addresses, LPG tank inspections, fire flow analysis, and public education. These types of inspections could identify additional tree thinning and vegetation removal needed to assure that new construction meets vegetation clearance requirements.

Section 3.26 Hazardous Abatement Laws

When it comes to fire hazard abatement and specifically fuel reduction, even though enforcement laws are in place for local fire departments, there remains significant ambiguity within various laws as to meanings of terms and their application. On the other hand, some vegetation clearance laws are very specific, yet not practical for implementation in a wildland intermix setting where trees and bushes are part of the native landscape. Inherently, this poses a problem in enforcement practices. Although standardization of application has occurred between agencies, review and evaluation of creating specific laws and standards that truly fit the communities of the Big Bear Valley would be desirable to enhance the consistency of vegetation clearances and fuel reduction measures.

When evaluating the hazard classification of new and existing development areas of a community, the use of the National Fire Protection Association Standard 1144 or the International Code Council's Wildland Urban Interfaces "Appendix C" provides a systematic approach to evaluating various hazard classifications. Fire protection planners would be advised to utilize either of these standards when determining hazard classifications within the

Wildland Urban Interface subunits. It needs to be stated that although the National Fire Protection Association Standard 1144 or the International Code Council's Appendix C can be used as published, agencies would be advised to evaluate these standards and/or make modifications that would more generally fit local topological, climatological conditions.

Section 3.27 Senior / Disabled Assistance

The Big Bear Valley Emergency Evacuation Plan encompasses the evacuation of senior citizens. During the Old Fire, this task was primarily accomplished by the Mountain Area Transit Authority (MARTA). Furthermore, Bear Valley Electric and the local fire departments maintain information for individuals with special health related needs.

Section 4.0
General Environmental Conditions of the Wildland Urban Interface

Section 4.1 Upper San Gorgonio/Big Bear Mountain Range

This subsection comprises the higher elevations and cooler parts of the San Bernardino mountains. The climate is temperate to cold and sub-humid, MLRA 22d. The following information is provided word for word from the Natural Resource Conservation Service website.

Section 4.2 Topographical

Topographically, the 270 square mile area generally consists of north/south facing slopes. Elevations range from as low as 4,000 feet to 10,200 feet. The major ridges generally run east to west, specifically the Sugarloaf Mountain and Holcomb Valley ranges.

Section 4.3 Lithology and Stratigraphy

This subsection contains mostly Mesozoic granitic rocks. Also, there are some pre-Cambrian Gneiss and Paleozoic marine sedimentary rocks. The mountains are a horst with faults and steep escarpments on the south/southwest, east/northeast, and west/northwest sides. Quaternary non-marine sediments and recent alluvium are small but important components of the subsection.

Section 4.4 Geomorphology

This is a subsection of steep and very steep mountains with narrow to rounded summits. There is a high rolling plateau surface at about 6,500 to 7,500 feet with some Quaternary fluvial and lacustrine deposits on it. The subsection elevation range is from about 4,000 feet

up to 11,502 feet on Mount San Gorgonio. Mass wasting and fluvial erosion are the main geomorphic processes.

Section 4.5 Soils

The soils on the steeper slopes mostly belong to the Inceptisol or Entisol orders. These soils tend to be shallow to moderately deep (20 to 40 inches) over bedrock. They are classified as Xeropsamments, Haploxerepts (formerly Xerochrepts), and Dystroxerepts (formerly Xerumbrepts). The textures of these soils typically range from sandy to loamy with clay contents usually between 5 and 15 percent. A majority of the soils contain 35 to 75 percent rock fragments 1/8 inch to 11 inches in size. Soils on more stable or more protected landscape positions express evidence of increased organic matter production as thicker darker colored surface horizons. In some of these positions, soils have less than 35 percent rock fragments but retain the typical 5 to 15 percent clay contents. The soils are somewhat excessively drained where the depth to bedrock is less to well drained where the soils are deeper.

Soils on flatter slopes share many of the same characteristics as their steeper neighbors. They belong to the Inceptisol and Entisol orders, and have similar classifications, clay contents, and rock fragments. Some of these flatter to nearly level areas have soils, which are represented by the Mollisol order. These soils are usually deep or very deep (40 to 60 or more inches), darker and/or wetter than adjacent soils on steeper slopes. Most tend to have clay contents of 12 to 25 percent and many have less than 15 percent rock fragments. The soils tend to be well drained where the land is sloping and somewhat poorly to poorly drained where slopes become flat to depressional or where water tables are near to the surface.

Most of the soils are lacking in carbonates although in a few isolated places, particularly on the northeast side of the area, there are soils which have both free carbonates and cemented layers where carbonates are an accessory cementing agent.

Soil moisture regimes are xeric with cool, moist winters and warm, dry summers. Most moisture falls during the winter and is particularly effective for leaching the soil. The xeric moisture regime is typical for areas influenced by a Mediterranean climate. Exceptions to the xeric moisture regime are aquic soil moisture regimes in depressional or wet areas where water saturates the soil for a few too many days each year.

Soil temperature regimes are classified as mesic at all but the highest elevations. A mesic temperature regime has a mean annual soil temperature at 20 inches of between 47 and 59 degrees Fahrenheit. The highest elevations (current data suggests above 7,000 feet) have soil temperatures at 20 inches of less than 47 degrees Fahrenheit.

Section 4.6 Vegetation

The predominant natural plant community is jeffery/ponderosa pine series. There are small areas of coulter pine series, mixed chaparral shrub lands transitioning to the east where there are juniper/pinion woodlands. Some fir and lodgepole pine series are common in the north facing higher elevations.

Characteristic Series by Life Form Include:

Grasslands: Alpine habitat, beaked sedge, bur-reed, creeping ryegrass, shorthair sedge, sedge, and tufted hair grass series.

Shrub lands: Big sagebrush, black sagebrush, bush chinquapin, deer brush, eastwood manzanita, green leaf manzanita, interior live oak - chaparral whitethorn, interior live oak - canyon live oak shrub, interior live oak - scrub oak shrub, mixed saltbush, mixed scrub oak, mountain whitethorn, rothrock sagebrush, rubber rabbit brush, scrub oak, and scrub oak - chamise series.

Forests and woodlands: Aspen, black cottonwood, black oak, coulter pine - canyon live oak, curlleaf mountain-mahogany, incense-cedar, jeffrey pine, ponderosa pine, limber pine, lodgepole pine, mixed conifer, mixed subalpine forest, mountain juniper, singleleaf pinion, and white fir series.

Section 4.7 Climate

The mean annual precipitation is about 30 to 40 inches. Much of the precipitation is in the form of snow. Mean annual temperature is about 40° to 50° Fahrenheit. The mean freeze-free period is about 150 to 200 days.

Section 4.8 Surface Water

Runoff is rapid. All but the larger streams are dry through the summer. There have been natural lakes on the high plateau recently, but any lakes that persisted until historical time have been replaced by reservoirs. The major body of water is Big Bear Lake. Baldwin Lake is a relatively shallow body of water and becomes a dry lake during periods of low precipitation.

Section 4.9 Underground Aquifers & Water Shed

A critical component of the National Fire Plan is the need to maintain the nation's watersheds. The watershed of the Big Bear Valley is critical to the survivability of the Big Bear Valley economy. A Geoscience Report, *"Re-evaluation of the Maximum Perennial Yield of Big Bear Lake and a Portion of Baldwin Lake Watershed"* August 2001 identifies the maximum perennial yield of each subunit within the Big Bear Valley. This report further identifies that, for the most part, the aquifers are distinctly separated into an upper and lower

aquifer. The significance is that the main domestic use aquifer is the lower aquifer. Its primary recharge occurs from deep percolation of runoff where the bedrock is in contact with the alluvium. Most generally, this is thought to occur high in the mountains above the Big Bear Valley floor.

Although the above research explains the use of the lower aquifer, the alluvium aquifer (upper level aquifer) percolation is intercepted by the vegetation and development that occurs aboveground. Little is known about the amount of absorption of such vegetation. No research is known to analyze the estimated volume that vegetation consumes nor are there estimates of the increase of available water, as a result of providing a treatment of the forest.

The overly dense forest structure that has not burned in the last 105 years could be said to have intercepted and/or retained its maximum capacity, logically depriving historical levels of water from percolating to the lower aquifer. However, the 2004/2005 rainfall statistics, which were 150% higher than normal, indicate that the water table in the lower aquifer has mostly risen back to normal levels. Yet what remains at issue is that the narrow residual estimated perennial yield of the defined aquifers versus estimated annual use leaves little to no differential from the potential impact that a large fire could cause.

Section 4.10 Threatened and Endangered Habitat Types

Within the Big Bear Valley Community Wildfire Protection Plan, there are over thirty-nine species that are listed in the Endangered Species Act. There are also sensitive species listed by the San Bernardino National Forest, the Watchlist, the Management Indicator Species (MIS), and the Land Birds (Neotropical Migrants) list.

This Plan proposes the continual implementation of the environmental review of any treatment projects to assure the ongoing safety of the wildlife species.

Yet, when a fire occurs, the current fuel loading and tree density of the forest could potentially have irreparable and long lasting impacts to the listed environmental species. Certainly, the tree density has led to an increase in insects and disease agent populations beyond historic levels.

An example of the type of ecosystem damage that could occur is evident in the once beautiful Cedar Glen area. The picture to the left illustrates the ecosystem damage that a high intensity fire causes.

The Big Bear Valley Wildland Urban Interface ecosystem is currently susceptible to the same type of damage that occurred in Cedar Glen. The forest vegetation structure on the north-facing slope of Big Bear Valley is presently in a high departure state from normal levels. The suppression of

fires and the absence of removing fuels have created an environment that, when a fire occurs, will be difficult to control and that all types of vegetation within the areas which are in a high departure state are likely to ignite and burn.

Section 5.0 Present Forest-wide Conditions

A large portion of the Big Bear Valley Wildland Urban Interface has not burned in well over 105 years and has missed approximately four fire intervals in the conifer or mixed conifer vegetation structure. According to the California Department of Forestry (FRAP) data derived from the United States Forest Service material, 42% of the Big Bear Valley Wildland Urban Interface is a Fire Regime I; 47% is a Fire Regime III; and 3% is in Fire Regime IV. For definitions of a fire regime, please refer to the Definitions section at the end of the document. Even without the drought and tree mortality issues, this is considered high fire hazard conditions with old decadent brush, heavy fuel loadings, and over-densification of trees that have not been comprehensively treated for a number of years. Although the Grand Prix and Old Fires were large fires, 70% of the fires burned in chaparral and affected only 3 to 4% of the areas with timber, leaving a large part of the forest unburned.

Map 5.0 Old fire and Grand Prix Fire Boundary

The records of large fires in the San Bernardino National Forest over the last 105 years indicate that no large fires (those fires greater than 300 acres) have occurred within Big Bear Valley, the heart of the Big Bear Valley Wildland Urban Interface. Table 5.0 indicates the approximate decade of each fire that has occurred in the last hundred and five years, the number of large fires over the last century, the approximate average size, and the total acreage burnt per decade. With this information, one could conclude that the infrequency of large fires has made the Big Bear Valley susceptible to a potential catastrophic fire.

The increase mean fire acreage per decade is one indication of the causal relationship of increasing fuel loading causing greater fire intensity which leads to difficulty in extinguishing the fires. Although intensity does not always equate to size, it does equate to the destructive ability that even smaller fires can cause damage. Evidence of a smaller fire (100 acres) in the Baldwin Lake area in the mid 1980s caused numerous homes to be destroyed but was not large enough to be included in Table 5.0. Over the last 25 years, no large fires have occurred in the Big Bear Valley. The reason for this could be a result of the introduction of aircraft, better firefighting equipment, an emphasis on increased coordination, and/or fire suppression training. Whatever the reason, it could be said it s because our firefighters apply effective modern tactics and strategies.