

Serene Lakes:

A Fire Evacuation Nightmare

by Joseph Gray

Evacuating the Serene Lakes community in the face of a wildfire would be a nightmare. With only Soda Springs road for an exit, and up to 1,000 homes dependent upon it, one can imagine the traffic jam that would occur if the area faced a quickly advancing wildfire. It is unthinkable what could happen if Soda Springs road were cut off. One wonders how bad the situation is, and if anything can be done to reduce the danger. Would a second egress help? Would widening Soda Springs Road help? Would a community evacuation plan and notification system help? The answers to all of these questions are a resounding yes. What is not clear is how much these will help, and how much worse the proposed Royal Gorge development would make the problem. Fortunately, there is new highly regarded research from Professor Thomas Cova of the University of Utah which provides ways of measuring the evacuation risk.

This study takes Professor Cova's research and applies it to the Serene Lakes Community, and then expands the scope to include the proposed Royal Gorge development. The results are not good for Serene Lakes and even worse with any new development. Recommendations are then made on what should be done to improve the situation, including limiting development, exploring the feasibility of a second egress, widening Soda Springs Road, reducing the fire hazard, creating an evacuation plan, installing an evacuation notification system, and developing emergency "sheltering-in-place" strategies.

University of Utah Research

Professor Thomas Cova of the University of Utah is a leading expert on evaluating and modeling evacuation in the face of hazards. He has been conducting research on how to improve evacuation times, and how to avoid evacuation problems. In his paper, "Public Safety in the Urban-Wildland Interface: Should Fire Prone Communities Have a Maximum Occupancy?", published in the August 2005 issue of the Natural Hazards Review publication of the American Society of Civil Engineers, Professor Cova argues that the same fire safety concepts that are used in public buildings can and should be applied to communities. Just as concepts such as the number, capacity and arrangement of exits in an building are used to set a maximum

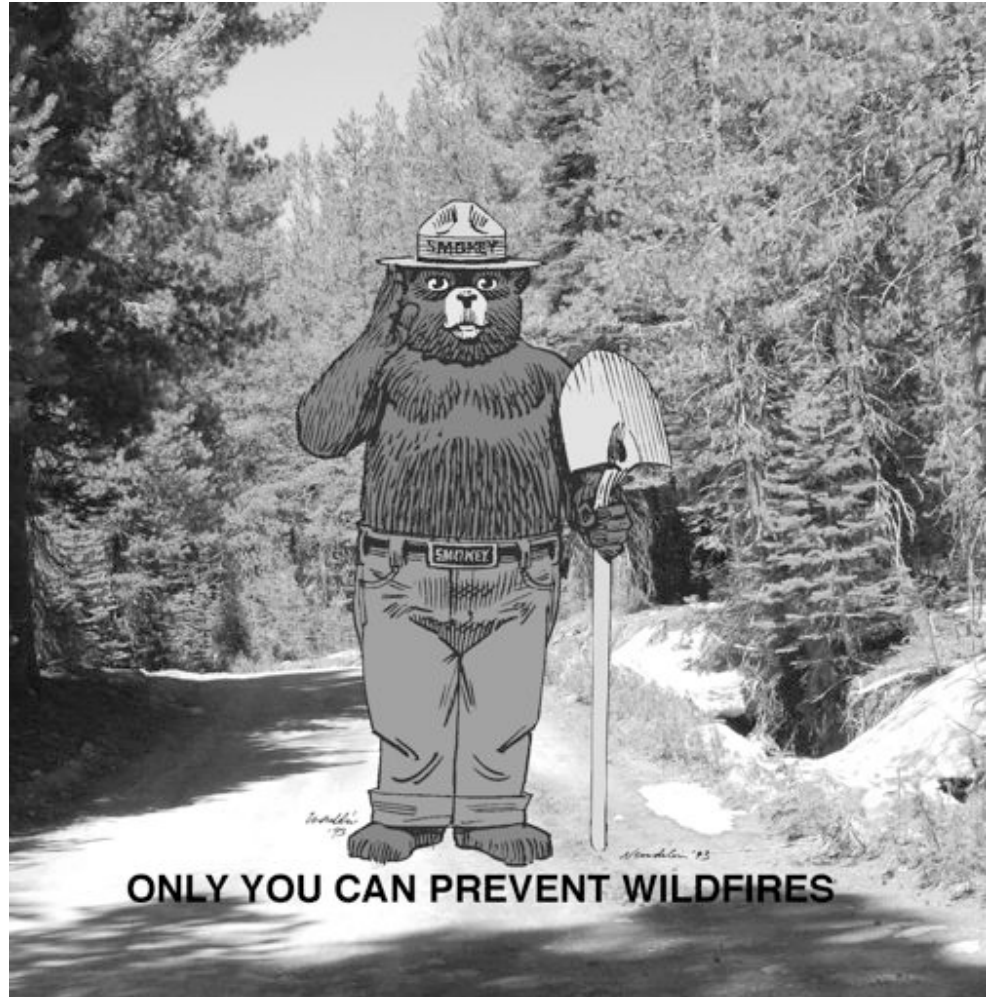


Photo taken where Pahatsi/Kidd Lake Road crosses Royal Gorge lands. Smokey courtesy of www.SmokeyBear.com. Smokey also says these forests need thinning!

occupancy for the building, public agencies should use similar criteria for setting the maximum number of homes in a community. These concepts can also be applied to existing communities to guide how fire safety can be improved.

The Cova Criteria for fire evacuation safety

The Cova paper suggests six criteria that must be satisfied in order to reach a satisfactory level of safety in a fire prone area. The six criteria for fire evacuation safety in a community are:

1. **Housing Density:** The housing density criteria is aimed at limiting the number of homes along roads. This reduces the number of households to evacuate, expands the defensible space between buildings, and allows driveways to be

spread out to prevent evacuation bottlenecks when everyone backs out at once. Cova suggests that the average housing density be no more than one home for every 20 meters (66 feet) of road. This requires that driveways, including those on both sides of the road, are spaced no closer than an average of 66 feet. This criteria is measured by dividing the total length of roads in the community by the number of houses.

2. **Number of Exits:** Having multiple exits is essential for fire safety, both in a building and in a community. Multiple exits are needed to both spread the traffic during evacuation and to provide alternate exits if one or more exit is blocked by fire. Cova suggests that the number of exits is a

See **Evacuation** on Back

WATER, WATER EVERYWHERE...?

by Tom Appelbaum

As Jeanne and I were returning from The Summit and our recent July 4th mini-trip, westward through the 50 or so miles of dense smoke between there and Auburn (with an emphasis on burn), we couldn't help discussing the impact of the proposed Foster-Syme development with regards to the possibility of effectively fighting a fire in and around Soda Springs.

No matter what the cause, the ability to fight and eventually contain a fire in the Sierra Nevada mountains is dependent on many things, not the least of which is the availability of water. That resource is one of the main topics of debate whenever the Royal Gorge project is discussed, and we would hope that this extended fire season, in conjunction with the projected changes in the weather patterns of the Sierra Nevada range, would bring to light the need to take most seriously

the amount of water needed to support any and all growth at The Summit, let alone this oversized (our opinion) project as it is currently proposed. Has anyone at the public or private level factored in the very real possibility of fire? Have the appropriate agencies chimed in about what it would take to protect such a large community as would exist if the plan as proposed were to be implemented? Is their enough water to support any and all contingencies? We're kinda thinkin', no.

The California Department of Water Resources has recently created a program, an Integrated Regional Water Management Plan, or IRWMP. This is a "...non-regulatory process...intended to promote regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development... and a strong economy." These IRWMP's would eventually be "used in the State Water Plan and become the regional basis for its implementation." The Mono Lake Committee has lately been involved in using this tool to "address water issues, coordinate

projects across jurisdictional boundaries, and attract funding...". The MLC has done an amazing job saving Mono Lake. Perhaps all the groups interested in what might happen up at The Summit could participate in an IRWMP to figure out just how large any new development should be before any plans are submitted, and we could indeed Save the Summit, just like the bumper sticker says...!

As we've done with all of our writing, we'll end this piece with a request to Foster-Syme to please scale down your development; invest in the community by respecting the wishes of the majority; donate, or sell at an acceptable profit, Van Norden meadow and other parts of your holdings to one of the several land trusts that exist to help conserve special areas in the Sierra Nevada range; and set an example for the rest of the large property owners in California of how to truly create a conservation community. The opportunity is right there in front of you, as long as it doesn't go up in smoke.

Tom and Jeanne Appelbaum

Evacuation From Front

function of the number of households, proposing that there are at least 2 exits for communities with more than 50 homes, 3 for more than 300 homes, and four for more than 600 homes.

3. **Exit Capacity:** The exits must also have sufficient capacity to insure that the community can be evacuated within a half hour. Each exit's capacity is calculated as the maximum number of vehicles per hour that each exit can sustain, divided by two for the one-half hour window of evacuation. There is not sufficient capacity if this number is less than the number of vehicles needing to evacuate.
4. **Exit Arrangement:** If exits are too close together, then a fire could block both of them. To avoid this, Cova suggests that if there are "n" exits, then they should be separated by at least "d/n" miles, where "d" is the maximum distance across the community. For example, a subdivision that is two miles across at the maximum width, and has three exits, should space the exits by at least 2/3 mile. Exits closer than this should be considered a single exit.
5. **Maximum Distance from Exit:** In order to minimize the evacuation time for any home, especially in rural areas where homes can be cut off by fire, Cova suggests that there no home should be further than 2 miles from its closest exit.
6. **Exit Vulnerability:** Exits need to be protected from fire to prevent closure. Cova suggests that a 30 foot defensible space is needed on either side of the road.

Applying the Cova-Criteria to Serene Lakes

Serene Lakes is a community of 1,080 lots with Soda Springs road as its only exit. In the summer, when the fire danger is the highest, the community is very busy, with hundreds of families, thousands of people, and at least one or two cars in every driveway. This is especially true of popular weekends such as the Fourth of July, Serene Lakes Days, and Labor Day.

If a wildfire forced an emergency evacuation, and one assumes an average of one and a half cars per household, then there would be a stream of 1,620 cars, SUVs and RVs attempting to go down Soda Springs Road at once. Given this scenario, here is how Serene Lakes measures up to the Cova criteria.

Water District records, Google Earth and other public documents can be used to gather the information shown in Table 1.

The information in Table 1 can be used to check compliance with each of the fire evacuation safety criteria. The results are shown in Table 2.

Table 1: Serene Lakes Information

Serene Lakes		with proposed Royal Gorge units
lots:	1,080	2,140
Vehicles:	1,620 (1.5 per home)	3,210
Roads:	9.4 miles	18.6 miles
Exits:	1	1 [perhaps 2]*
Maximum distance from exit:	1.2 mi.	1.4 mi.
Exit capacity:	1,162 vehicles per hour (vph)**	1,162 [or 2,324] vph

*Numbers in brackets '[']' are for two exits.

** The exit capacity for Soda Springs Road can be estimated using an equation Cova extracts from the 1997 Highway Capacity Manual. This equation estimates the maximum exit capacity of Soda Springs Road to be 1162 vehicles per hour. Note that this agrees with the value given in the Manual for stop sign controlled intersections (1,100 vph) such as at the intersection of Pahatsi/Soda Springs Road and Soda Springs/Donner Pass Road.

Table 2. Fire Evacuation Safety Results

Criteria and Requirement			Serene Lakes		with proposed Royal Gorge units	
1	Housing Density	> 66 ft/unit	46 ft/unit	FAIL	46 ft/unit	FAIL
2	Number of Exits	4 or more	1	FAIL	1 [or 2]	FAIL
3	Exit Capacity	all vehicles in 30 minutes	581 of 1,620 cars in 30 min.	FAIL	581 [or 1162] of 3,210 cars in 30 min	FAIL
4	Exit Arrangement	"d/n"	n/a	FAIL	n/a	FAIL
5	Maximum Distance from Exit	2 mi.	1.2 mi.	PASS	1.4 mi.	PASS
6	Exit Vulnerability	30 foot defensible	~8 feet	FAIL	~8 feet	FAIL

Serene Lakes fails

As the table shows, Serene Lakes fails all of the safety criteria except for the maximum distance to the exit. According to the Cova criteria, Serene Lakes is too dense, has too few exits, does not have sufficient exit capacity, and has an exit that is not fire-safe.

Of particular interest is the exit capacity. These calculations show that it could take as long as an hour and a half (1,620 vehicles at a rate of 1,162 vehicles per hour) to evacuate everybody down Soda Springs Road. This is primarily due to Soda Springs road having a single outbound lane. The inbound lane needs to be kept clear for emergency vehicles and can not be used. Even adding a second outbound lane, or a second exit road, the evacuation would still exceed the 30 minute goal by 10 to 15 minutes.

Cova points out that the 30 minute evacuation goal is based upon real life. In the 1991 Oakland Hills fire, most of the fatalities were people trapped in cars trying to evacuate within the first 30 minutes. Within an hour nearly 790 houses had burnt. In last year's Angora fire, by one account, residents had as little as 5 minutes to evacuate.

Royal Gorge's proposed development makes a bad situation worse

The proposed Royal Gorge development doubles the number of possible units within the Serene Lakes area without solving any exit problem. At most there might be a second exit road built, but this doesn't even begin to compensate for the doubling of the number of vehicles needing to exit.

If one considers the number of vehicles still in the development waiting to exit after a half hour as "at-risk", then the current community will have 1,039 cars "at-risk." The Royal Gorge development, even with a second exit, would double this number to 2,048. Without a second exit road the number jumps even higher to 2,629.

This means that the proposed Royal Gorge development will double the number of lives at risk even if a second road is built. Most of those "at-risk" lives will be in the new development, as those lots are further away from the exits.

It is useful to note that Cova recommends four exits for communities with more than 600 lots. If four exits could be built, then the current Serene Lakes community would be able to evacuate within the 30 minute target. Add in the extra Royal Gorge lots, however, and even four exits would leave 886 vehicles and their occupants waiting to exit after 30 minutes.

What can be done

Many things can be done to improve the fire safety of Serene Lakes. Some suggestions are:

- a. **Limit development:** With evacuation times for the current community at well over an hour, it would be irresponsible to allow any more homes without adding several more exits. While adding a second exit to accommodate more development might sound good, the proposed Royal Gorge development, even with a second road, will dramatically increase the evacuation hazard. As mentioned above, the current Serene Lakes community leaves around 1,000 cars at-risk in an

evacuation, the Royal Gorge development, even with a second exit, would leave 2,000 at risk. Even three exits would not be enough to make the proposed development safer than the current community. A moratorium on new development until a sufficient number of exit roads can be built is required to keep a bad situation from becoming worse.

- b. **Road Improvements:** The Serene Lakes community needs to look at what can be done to improve evacuation times. A second road would be great, but is it feasible? Adding a second exit lane to Soda Springs Road could also help. At a minimum, the only exit, Soda Springs Road, needs to be made fire-safe with a reasonable defensible space on either side of the road. These options need to be studied to determine if they are possible, how much they would cost, and where the funding would come from.
- c. **Reduce the fire hazard:** The community and its surrounding forests need to be made safer. Not only would getting rid of the deadwood and excess fuel help to prevent fires, it would serve to slow down a wildfire to give people more time to evacuate. The Serene Lakes Community, Royal Gorge, the local fire district, the US Forest Service, Cal Fire and Placer County need to work together to ensure that the fuel reduction work is done soon and done correctly.
- d. **Develop a fire evacuation plan:** A plan needs to be developed that addresses important topics such as evacuation notification, exit routes, traffic control and emergency sheltering-in-place options. A suggested list of questions to be examined is: Can a remotely activated evacuation siren be mounted on the Fire Station? Can reverse-911 phone calls be used? Can the water district, which is staffed around the clock, be used to notify people to evacuate? Can traffic control officers be stationed at critical intersections such as Pahatsi and Soda Springs Road to keep cars moving? Can residents shelter-in-place on the lake, on lot-1 or at Ice Lakes Lodge? Planning is needed to reduce evacuation chaos and save lives.

Conclusion

The University of Utah research underscores the fire evacuation problems of Serene Lakes and emphasizes the evacuation danger of our single exit road. The danger can be reduced, but only by working with public agencies to ban development unless adequate exit roads are built, to make road improvements, to reduce fire hazards and to create a fire plan.

Fire Safety To-Do List:

- Clean up your property, or hire someone to do it
- Haul your cuttings down to the collection point, and also make a donation
- Sign up for chipping
- Email or write your state senator to encourage passage of ab2447, Assemblyman Dave Jones' fire safety bill, which requires at least 2 exits for new developments.