

Cascade Shores Community Wildfire Hazard Assessment



Assessment Conducted on November 20, 2013 by:

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Joanne Drummond, Executive Director, Fire Safe Council of Nevada County
Sean Griffis, Battalion Chief, Cal Fire
Jim Turner, Battalion Chief, Nevada County Consolidated Fire District
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Jan Guevel, Cascade Shores Homeowners Association
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Karen Hatton, Cascade Shores Homeowners Association
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Harry Wander, Cascade Shores Homeowners Association

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Cascade Shores Homeowners' Association, Nevada City, California

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The Firewise Communities/USA[®] (www.firewise.org) program is designed to provide a collaborative and effective management approach for preserving the natural environment while pro-actively addressing the issue of wildfires. Retaining aesthetic views and protecting wildlife habitats are the values of the residents who live in Firewise Communities/USA[®]. The Firewise program is appealing and effective because it may be tailored for adoption by any community and/or neighborhood that is committed to ensuring its citizens maximum protection from wildland fire.

The following community wildfire hazard assessment is intended as a resource to be used by the citizens of the Cascade Shores Homeowners Association (CSHOA) for creating and maintaining a Firewise Community. This community wildfire hazard assessment is designed to give a brief description of the area for basic understanding to community residents of both minor and significant fire hazards. A simple plan should be developed from the information in this hazard assessment and should be implemented in a collaborative manner, and monitored and updated annually as needed to suit the community and progress made on the goals set in the plan. By continuing to keep a community focus on wildfire hazard mitigation, the community will ensure that their efforts to attain the goal of the CSHOA to become a nationally recognized Firewise Community/USA[®] is reality.

The Firewise Community wildfire hazard assessment was conducted on November 20, 2013 by: Dario Davidson, Registered Professional Forester #2314; Joanne Drummond, Executive Director, Fire Safe Council of Nevada County; Sean Griffis, Battalion Chief, Cal Fire; Jan Guevel, Cascade Shores Homeowners Association (CSHOA); Joan Hardy, CSHOA; Karen Hatton, CSHOA; Kent Rees, CSHOA; Donn Thane, Tahoe National Forest; Travis Thane, Tahoe National Forest; Harry Wander, CSHOA; and Jim Turner, Battalion Chief, Nevada County Consolidated Fire District.

During the assessment and development of this report, members of the group discussed how to best mitigate and identify the fire risks to individual homes and the entire watershed.

AREA DESCRIPTION

Cascade Shores is located about 5 air miles east of Nevada City, along the south shore of Scotts Flat Lake. The area of influence of the Firewise Community extends beyond the subdivision proper, and includes the areas south and west to the boundaries of the Banner Mountain Firewise Community. Elevations range from about 3000 feet next to

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Scotts Flat Lake, to about 3400 feet on the higher hills. The slope percent varies from nearly flat to over 65% due to the undulating topography. The aspect is primarily northerly, as a high ridge to the south parallels Deer Creek, anchored by Quaker Hill at about 4000 feet elevation. However, some parcels along the periphery reach a more southerly aspect. Cascade Shores lies within the upper part of the Deer Creek watershed.

The infrastructure is well developed, with paved roads, municipal water supplies, fire hydrants, overhead power and communication lines and about 420 homes on about 500 parcels with approximately 1000 residents. To the west, along Pasquale Road is a large undeveloped parcel owned by Nevada Irrigation District. To the east lies Tahoe National Forest and Sierra Pacific Industries lands, both undeveloped and managed for a variety of forest resources.

Sierra Nevada mixed conifer/hardwood forest is the dominant vegetation type, with scattered patches of chaparral, canyon live oak forest and mixed hardwood forest. The dominant trees are over 100 feet tall and some reach over 3 feet in diameter. Most of the area contains Cohasset soil, which is a very productive forest soil type. Because of the productive soils and the mild climate, tree growth has been rapid and the forest in the vicinity is overstocked in most areas, providing dense shade to the forest floor. A few patches of dying ponderosa pine were observed during the field review, indicating severe overcrowding. Overall, the forest appears to be healthy and very few disease agents are visible.

LAND USE AND MANAGEMENT

The area has a long history of mining and timbering beginning in the middle 19th century. A hydraulic diggings lies to the north of Cascade Shores and is partially submerged by Scotts Flat Lake. The original forests were logged off during periodic entries from the late 19th to middle 20th centuries. Each subsequent interval allowed forest regeneration to fill in the openings, leading to the current dense forest condition. In the early 1960s the land upon which sits Cascade Shores was owned by Boise Cascade, a lumber company. Boise Cascade logged the property and subdivided it into rural residential lots, creating the Cascade Shores community. Lots sold and were slowly developed over the last several decades. Since the residential development began the landscape has evolved to become more forested with denser understory vegetation. These changes, in combination with the increase in people and homes within the watershed, have created a fire hazard situation of concern for many residents and fire protection professionals. Many landowners in Cascade Shores have cleared the underbrush and pruned trees, breaking up the fuel continuity and reducing total fuel load. This has greatly improved fire safety within the community.

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Scotts Flat dam was originally built in 1948, and today when full holds about 49,000 acre-feet and has a surface area of approximately 850 acres. Scotts Flat Lake has a large influence on the environment of the community. It provides a very large fuel break on the north side of the subdivision. However, the majority of wildfires move with the prevailing southwesterly winds or the strong and dry northeast winds, paralleling the lake.

As we know from vegetation and fire history research, as well as old documents and journals, the vegetation in this area today is quite different than it was prior to the Gold Rush. Pre-Gold Rush, the forest was much less dense, with larger trees separated by sunny openings. There were more open, grass and shrub areas than today. Before the Gold Rush the area was maintained in an open, park-like condition by Native American periodic burning and natural fires.

(http://evergreenmagazine.com/web/Thomas_C_Blackburn_and_Kat_Anderson_.html)
(For more information read [Fire in the Sierra Nevada Forests](#), by George Gruell).

The dominant species – ponderosa pine, sugar pine, California black oak, Douglas-fir, incense-cedar, manzanita and Ceanothus – have evolved for thousands of years along with periodic fire. Our Mediterranean climate, with cool, wet winters and warm, dry summers, has also played a role in the adaptations of these species.

The best example is ponderosa pine, which promotes fires in its vicinity by producing and shedding flammable needles that lie loosely on the ground beneath the trees, as well as on the competing vegetation below. This material dries rapidly and burns readily, producing enough heat to kill any encroaching competitors. At the same time ponderosa pine protects itself from the effects of fire by producing large buds, thick bark and an open canopy. Its rapid growth rate allows ponderosa pine to quickly grow above the competing plants and most of the effects of surface fires. Fire scar studies have shown many ponderosa pines have survived dozens of fires over centuries.

A fire regime is a combination of intensity and periodicity of fire. The fire regime in this area originally consisted of low to moderate intensity fires burning every 10 to 20 years, maintaining the pre-settlement forests in an open and park-like condition, as noted in early historic journals and photographs. The frequent fire interval kept forest undergrowth from building up to the dangerous condition we see today. During the Gold Rush era land use practices greatly modified the vegetation and fire regime. After the start of the 20th century fire suppression efforts became more organized, better funded and benefitted from improving knowledge and technology, such as aircraft, chemical retardants and bulldozers. This allowed great success in fire suppression

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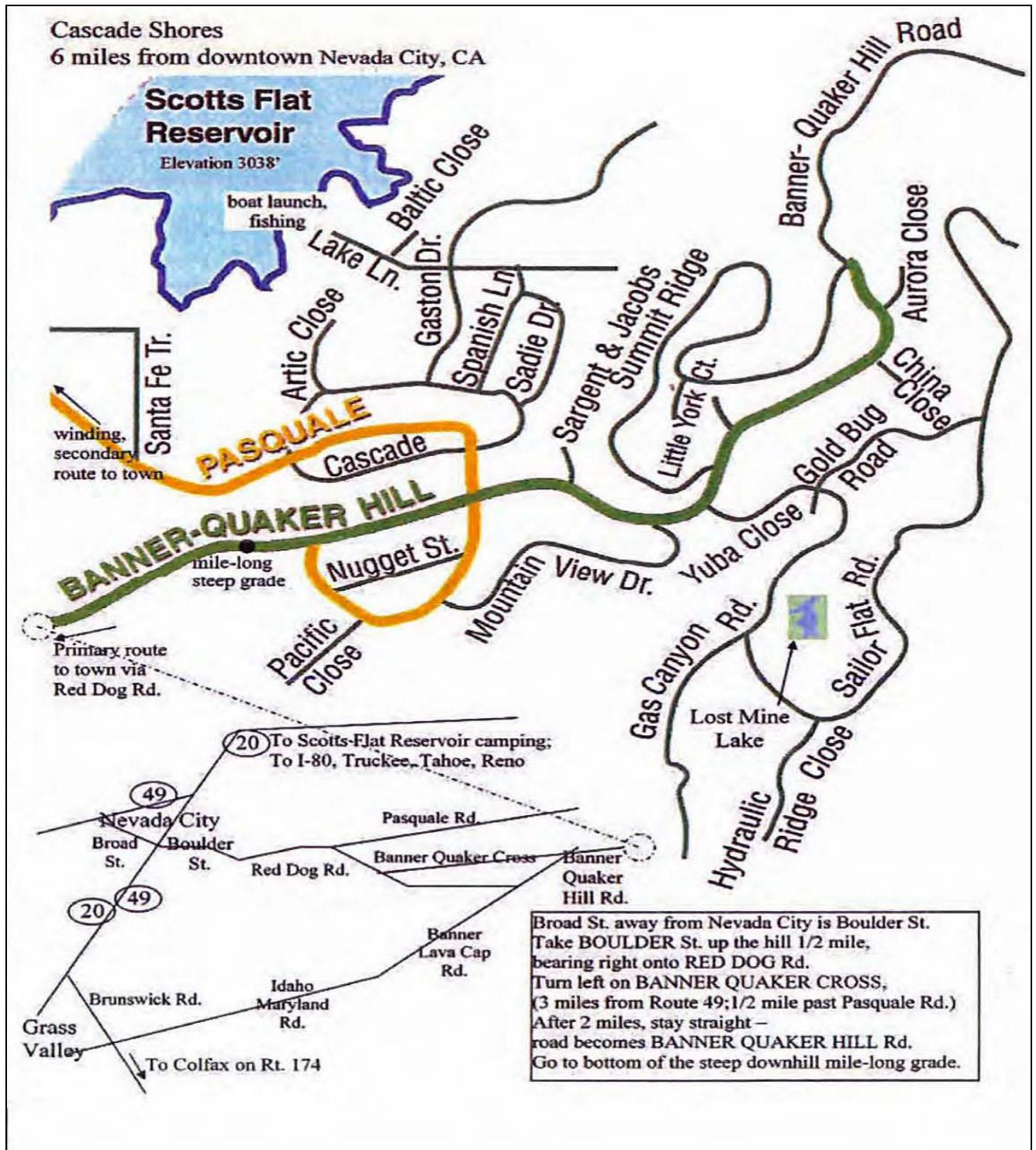
efforts and improved public safety. Unfortunately, these successes led to a buildup in forest fuels never experienced in this region. In our local climate the accumulation of vegetation (i.e., fuel) greatly exceeds the decomposition rate. This leads to an incessant annual buildup in fuel loading. As a result, recent fires have become more difficult to control, and, combined with the increase in population in the Sierra Nevada foothills, more threatening to life and property.

The fire regime cannot be returned to its original conditions. Fuels, however, can be modified through many available methods. Each landowner is responsible for fuel management on their property. If all landowners actively reduce fuel levels and flammability wildfires burning in the area will be easier to control and result in less property and environmental damage. We can no longer expect the fire protection agencies to save our homes without our own contributions to fuel management.

REGIONAL COLLABORATION

Due to the limited ingress and egress from the Cascade Shores community there is a need to address areas outside the community subdivision as it greatly affects access for emergency equipment and public evacuation routes. The hazard assessment team discussed the need to engage landowners outside their community in order to improve the landscape fuels management and reduce the wildfire hazard and the threats it poses to lives, homes and the environment. The area of emphasis was determined to be access along Pasquale Road and Banner Quaker Hill Road. These areas are to be considered when conducting educational activities and scoping formal projects in order to have the greatest impact in wildfire mitigation efforts. The Banner Mountain Firewise Community directly abuts the Cascade Shores community for a short distance along the western border of the Cascade Shores community boundary. Working together, these two neighboring Firewise Communities will be better able to effect change in the ground conditions along these critical evacuation corridors.

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MAP OF THE CASCADE SHORES HOMEOWNERS ASSOCIATION



Legend

- Grass Valley
- Nevada City
- Banner Homeowners Assoc.
- Highway/Freeway
- Arterials
- Collectors
- Local Roads
- Rivers
- Lakes

Banner Mountain Homeowners Association

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Miles

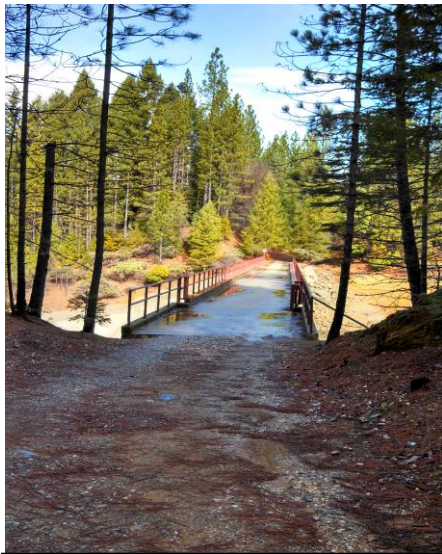
Banner Homeowners Association
Banner Homeowners Association is a non-profit organization established for the purpose of representing the interests of the homeowners in the Banner Mountain area. The Association is not responsible for the actions of its members or for the actions of any other person or entity. The Association is not a government agency and does not have the authority to enforce any laws or regulations. The Association is not a legal entity and does not have the ability to sue or be sued. The Association is not a financial institution and does not provide any financial services. The Association is not a real estate agent and does not provide any real estate services. The Association is not a law firm and does not provide any legal services. The Association is not a medical professional and does not provide any medical services. The Association is not a religious organization and does not provide any religious services. The Association is not a political organization and does not provide any political services. The Association is not a labor union and does not provide any labor services. The Association is not a trade association and does not provide any trade services. The Association is not a professional association and does not provide any professional services. The Association is not a service organization and does not provide any service services. The Association is not a social organization and does not provide any social services. The Association is not a cultural organization and does not provide any cultural services. The Association is not a sports organization and does not provide any sports services. The Association is not a recreational organization and does not provide any recreational services. The Association is not a charitable organization and does not provide any charitable services. The Association is not a religious organization and does not provide any religious services. The Association is not a political organization and does not provide any political services. The Association is not a labor union and does not provide any labor services. The Association is not a trade association and does not provide any trade services. The Association is not a professional association and does not provide any professional services. The Association is not a service organization and does not provide any service services. The Association is not a social organization and does not provide any social services. The Association is not a cultural organization and does not provide any cultural services. The Association is not a sports organization and does not provide any sports services. The Association is not a recreational organization and does not provide any recreational services. The Association is not a charitable organization and does not provide any charitable services.

An aerial photograph of a forested landscape. A large, irregular area is outlined in green, covering most of the central and left portions of the image. Within the green-outlined area, there is a smaller, more complex area outlined in red, located towards the upper right. The terrain is heavily forested with varying shades of green and brown, indicating different vegetation types or perhaps a fire scar. A winding road or path is visible on the right side, and a small cluster of buildings or structures is visible in the lower left corner. The overall scene is a dense, mountainous forest.

Source: Max, DigitalGlobe, GeoEye, AeroVista, USGS, Airbus, GeoEye, GeoEye, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653,

EMERGENCY PREPAREDNESS & EVACUATION

There are two exits out of the community. The first is Pasquale Road and the second is Banner Quaker Hill Cross Road. Both of these routes ultimately funnel onto Red Dog Road and then Boulder Street before intersecting with State Route 49/20 in Nevada City. Banner Quaker Hill Road is a very steep grade and is often closed in the winter months due to the danger it poses under icy road conditions. Pasquale Road traverses the grade and is a very narrow road with a dense forest. The hazard assessment team discussed the potential for improving Pasquale Road with vegetation management, but due to the steep topography and current fuel loading, it would be very difficult to implement a treatment that would provide enough fuels reduction to safely evacuate the public under a wildfire event.

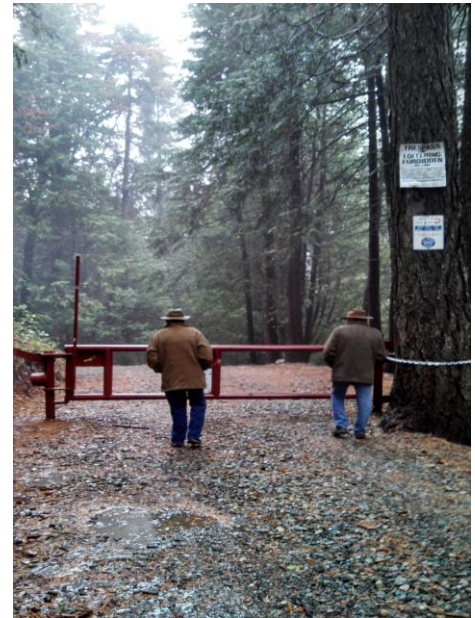


Road over spillway at Scott's Flat Dam.

There is another access road over the dam for Scotts Flat Reservoir on property owned by the local water agency, Nevada Irrigation District. However, current fuel loading conditions would prohibit the use of this route under wildfire conditions. The hazard assessment team recommended pursuing a project that would clear 200-300 feet alongside the dam access road in the Nevada County Community Wildfire Protection Plan as this project would provide access for emergency equipment and allow the residents to evacuate along Banner Quaker Hill Cross Road or Pasquale Road as conditions permit. The dam access route

would allow ingress and egress under emergency conditions only as directed by Fire Incident Command, but would also serve as a community fuel

break to protect Cascade Shores, Banner Mountain and ultimately Nevada City from a fire originating from the nearby forestlands. Due to the narrow passage on the road over the dam spillway, it is not recommended for use by public traffic in an emergency.



Nevada Irrigation District's dam road access.

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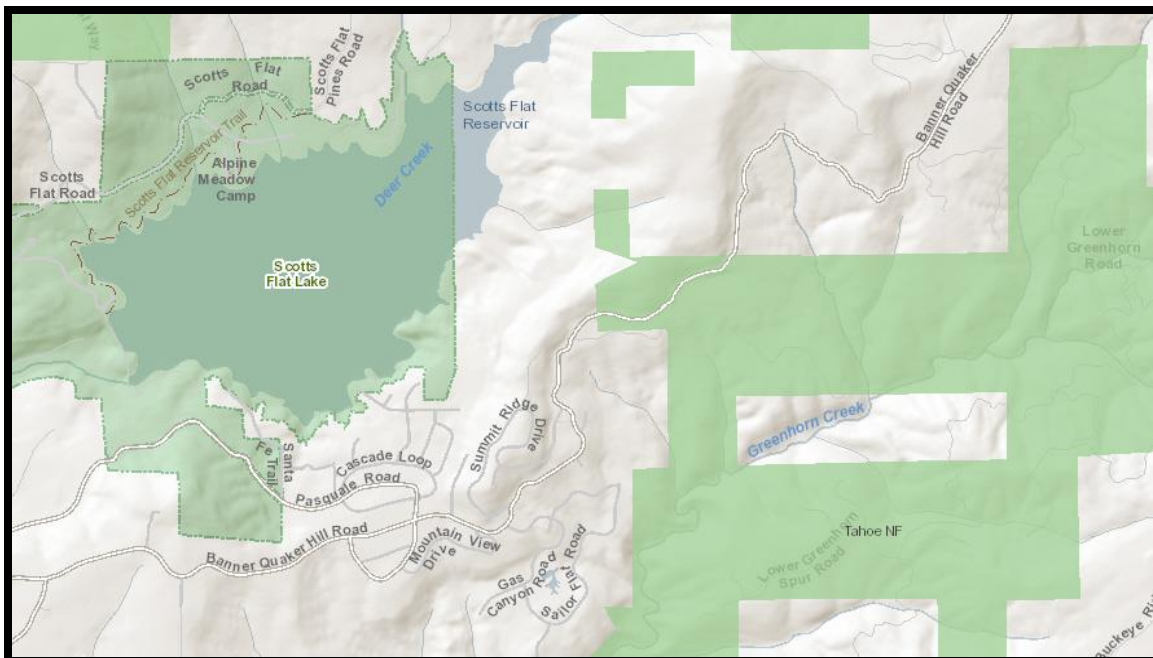
Cascade Shores Homeowners' Association, Nevada City, California

The hazard assessment team highly recommends individual families develop an emergency evacuation kit and plan in order to properly prepare well in advance of an evacuation order. An emergency evacuation planning guide is available online at: <http://www.areyoufiresafe.com/get-fire-smart/emergency-preparedness/> A neighborhood emergency preparedness and evacuation guide specifically for Cascade Shores/Pasquale Road/Banner Quaker Hill Road was developed in the early 2000's, but has since become outdated. The assessment team recommends working with the Nevada County Office of Emergency Services and the Fire Safe Council of Nevada County to update this plan to provide the most accurate information to residents.

The assessment team also recommends that families register their cell phones for emergency notifications with the Nevada County Office of Emergency Services online at: <http://www.mynevadacounty.com/nc/igs/oes/> and look for the City Watch link. The emergency notification system will only be activated by County public safety personnel.

PUBLIC LANDS & LANDSCAPE WILDFIRE MITIGATION EFFORTS

The CSHOA is situated adjacent to the boundary of the Tahoe National Forest to the east. Nevada Irrigation District owns lands surrounding their reservoir, Scotts Flat Lake to the north and west. The fuel loading conditions on these public lands greatly influence fire behavior surrounding the CSHOA community.



Map of the CSHOA with Tahoe National Forest lands to the east.

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TAHOE NATIONAL FOREST EFFORTS

The Tahoe National Forest is very pro-active in addressing fuel loading and improving forest health, particularly near communities at risk to wildfire. In June of 2013, the Forest Service and CAL FIRE hosted a wildfire simulation exercise for western Nevada County. The purpose of the simulation was to improve interagency coordination if a major wildfire were to occur. Over 50 people from 15 different agencies participated. The simulation began with a briefing as if a fire was actually occurring. All the details of the fire were shared – location, size, rate of fire spread and direction, number of firefighters and equipment, etc. The participants then broke into four separate groups to discuss command protocols, community support needs, public information processes and tactical fire suppression/law enforcement operations. They discussed what actions they would take and planned how they would interact with the other groups. As the simulation progressed other events were added including evacuations, road closures, communication outages, and loss of dispatching capacity. After an hour's discussion, the group got back together to share successes and lessons learned. All reported that it was a very worthwhile exercise. Several participants stated that they were able to identify processes, programs, or equipment that they could share to aid in this emergency operation. Future simulations and additional coordination efforts are planned as a result of this exercise.

The wildfire simulation exercise considered a north wind driven fire event originating on the Tahoe National Forest to the east of Cascade Shores. The path of the fire was predicted to burn through the communities of Cascade Shores, Banner Mountain, Cedar Ridge and portions of Woodpecker Ravine until it was stopped before hitting the community of Alta Sierra.

Local, State, and Federal agencies and others such as the Fire Safe Council of Nevada County have been working to reduce the fuels in western Nevada County for many years. In the area east and northeast of Scotts Flat Lake and the Cascade Shores subdivision, several projects in different ownerships are coalescing to provide better wildfire defense. In 2012, the Tahoe National Forest completed a 16-acre project to reduce the fuels east of Cascade Shores along travel-ways on National Forest System land to provide safer evacuation routes and reduce intensity of fire behavior so that firefighters have a greater chance of suppressing the fires. Additional work in this area is being prioritized for contract in 2013 and completed 35 acres of hand cut, hand pile, and pile burn treatments. Small trees (less than 10 inches), brush, and any hazard trees would be removed along the roads.

Two other community defense projects roughly in the same area are being planned for fuel reduction. One project is located immediately north of Highway 20 in the Rock Creek/Madrone Springs area. This project will treat a total of 565 acres through hand

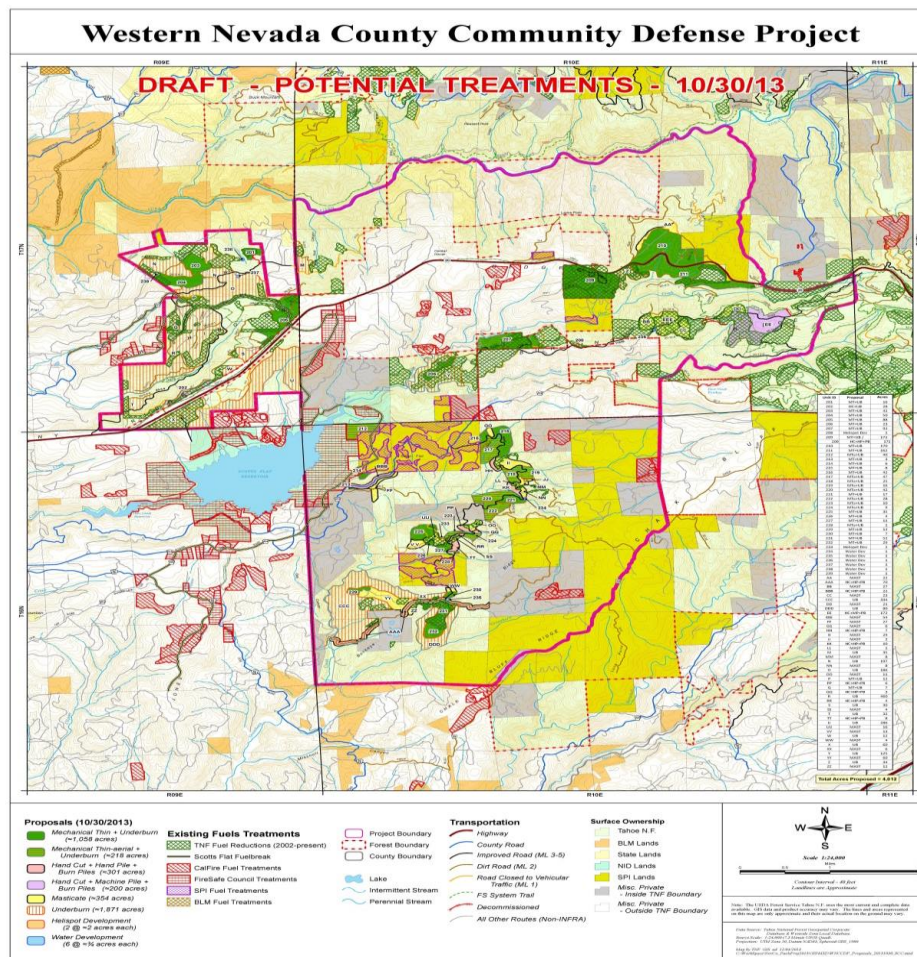
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cut, hand pile and pile and burn treatments. There will also be 343 acres treated by mastication in 2014. A larger project is being planned to reduce additional fuels not only in the Rock Creek area north of Highway 20 but also east of Scotts Flat Lake and Cascade Shores. The environmental review/analysis has just begun. Depending on the analysis, treatments may include thinning small or medium size trees, cutting and piling the brush, burning the piles, and/or under burning. More information on these projects will be forthcoming and local residents will be invited to participate in public involvement discussions.

The hazard assessment team recommends formally support the Western Nevada County Community Defense Project as the proposed treatments would directly benefit the CSHOA in terms of wildfire mitigation across the watershed.

MAP OF THE TAHOE NATIONAL FOREST PROJECT AREA NEAR CSHOA



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NEVADA IRRIGATION DISTRICT BIOMASS PROJECT

The Nevada Irrigation District (District) is continuing its proactive role in being good stewards of their lands and the watershed through the implementation of a Cal Fire funded biomass fuel reduction project. The harvesting of the biomass will significantly help lower the fire danger on 300 acres of District owned lands surrounding Scotts Flat Reservoir. The project involves the removal of a portion of the overstocked understory, and some of the diseased, and damaged trees in the over story. The harvested biomass will then be utilized to support a renewable energy source and help finance the project. As an added benefit, the thinning will provide for defensible space on adjacent private properties, while increasing tree spacing. This increased spacing will help to promote healthy regeneration and provide for larger trees for the future. Managing the lands in this fashion preserves a healthy watershed by maintaining a strong managed forest, all while reducing fuel continuity and the potential fire threat to adjacent landowners in the area.

The cooperation, planning and execution of wildfire mitigation directly benefits the residents of CSHOA and they should actively support these efforts in their community and with the greater public in western Nevada County.

NEVADA COUNTY COMMUNITY SHADED FUEL BREAK

The Nevada County Community Shaded Fuel Break project began in 2004 and was completed in July of 2011 with assistance from private landowners, CAL FIRE and the USDA NRCS cost share incentive programs. The Shaded Fuel Break project area was developed to add protection to the community of Cascade Shores, the Scotts Flat Lake area, and the cities of Grass Valley and Nevada City.

The Nevada County Community Shaded Fuel break was developed out of a need to have a strategic plan to help protect cities and communities in the event of a catastrophic fire and to protect the forests from fires in the urban-wildland interface. The project area encompassed approximately fifteen miles, was up to one quarter mile in width and consisted of mostly large, privately owned parcels. Several meetings were held with Cascade Shores Homeowners Association, Lightning Tree Road Association, Nevada Irrigation District and the Forest Service to coordinate land treatments and develop cooperation in order to complete the fuel break project.

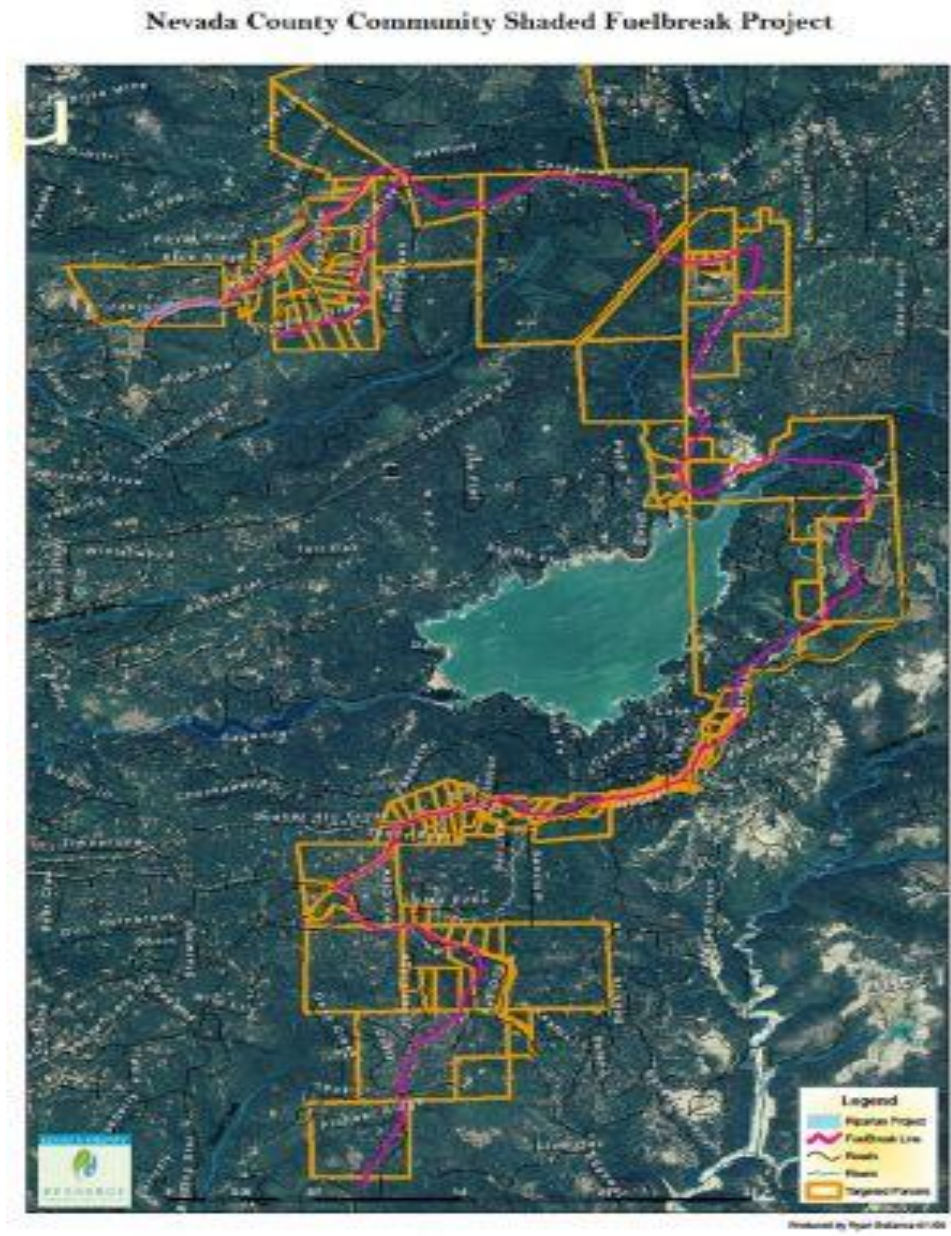
Cooperating agencies provided education, awareness and cost-share funding information for private landowners. This program was voluntary and had flexible prescriptions for a shaded fuel break while educating landowners to Best Management Practices (BMP's) on their land including clearing brush, thinning and pruning. The project area had over 60 years of fuels accumulation and is in a high fire severity zone.

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Cascade Shores Homeowners' Association, Nevada City, California

The Nevada County Resource Conservation District offers conservation seminars and workshops throughout the year on issues important to Nevada County landowners and should be promoted with the CSHOA residents to improve their understanding of fuel management, forest health, wildlife habitat and managing invasive species.

MAP OF THE NEVADA COUNTY COMMUNITY SHADED FUEL BREAK



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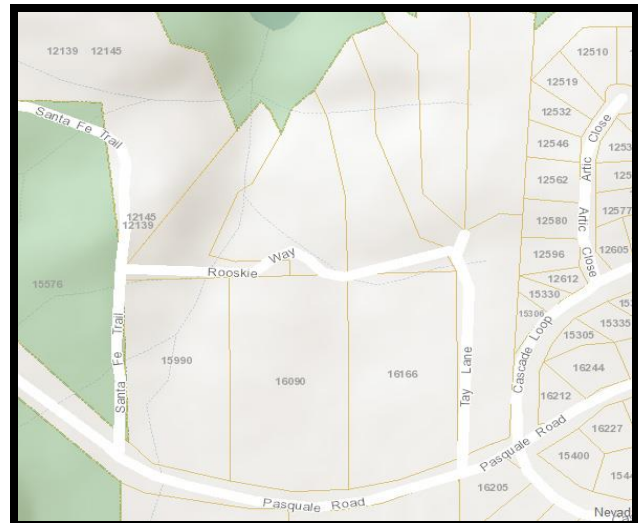
With so much effort being placed on wildfire mitigation projects in this critical hazard area, it is extremely important that residents in the CSHOA recognize the need to address their own property through increased management of fuels and the susceptibility of their structures to burn through ember intrusion. Educating and encouraging all community residents to implement effective defensible space, reduce tree stocking for forest health and manage vegetation on their properties will greatly increase the likelihood of their homes surviving a wildfire.

UNDEVELOPED PROPERTIES

Undeveloped properties and vacant lots (currently 85 in CSHOA) pose a threat when interspersed among developed home sites in the community if the vegetation is not managed. Some residents are unable to achieve their 100 feet of defensible space as required under California Public Resource Code 4291 due to home placement and the adjacent property boundary ownership. The assessment team recommends neighbors work together to achieve the required 100 feet of managed vegetation around homes to provide firefighters the ability to protect structures during fire events.



Fuel loading on vacant parcels affects the overall safety of the community.



Lakeview Estates larger, undeveloped and unmanaged parcels directly affect those living adjacent to them.

The County of Nevada is currently considering adoption of a vegetation management ordinance which would provide policy to address undeveloped properties as they affect defensible space. The assessment team recommends CSHOA support the adoption of this policy and work with Nevada County Consolidated Fire District to address the hazards supported by local ordinances. There is a new subdivision, *Lakefront Estates*, which has larger vacant parcels that directly affect the defensible space of homes that are adjacent to the parcels. These parcels are overgrown with

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vegetation and dead material on the ground. This poses a significant threat to adjacent properties. The assessment team recommends contacting the owner of these properties to address this fuel loading. There are a number of downed trees across the access road which will impede an emergency suppression response. Again, working through the local fire department to contact the landowner in order to address the access issues would enable fire fighters and equipment to utilize the existing roadways in *Lakefront Estates* in the event of a wildfire ignition.

FOREST HEALTH

As a result of previous land uses and subsequent residential development, most of the trees within Cascade Shores are about 100 years old or less. Occasional older trees occur over the landscape, providing valuable diversity and wildlife habitat structure.

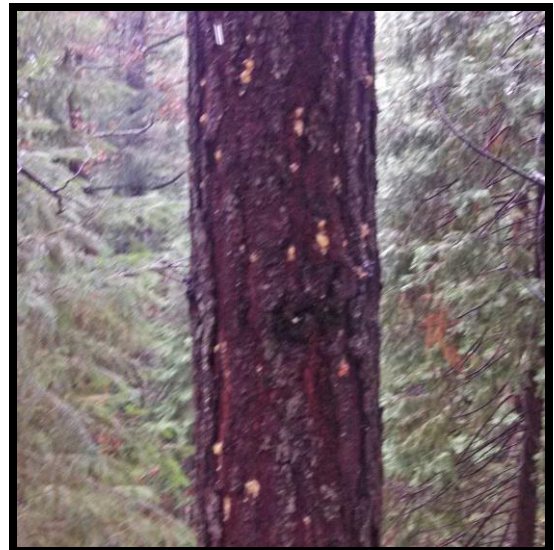


Several trees killed by bark beetles

The most important threat to forest health observed within Cascade Shores, along with potential wildfire, is tree overcrowding, especially ponderosa pines. Ponderosa pine is a shade intolerant tree and requires space around the canopy to remain healthy and resistant to diseases and insects. When growing in an overcrowded situation pines are in competition for the limited resources of the site (i.e. water, soil nutrients and sunlight). During droughts bark beetle (*Dendroctonus spp.* and *Ips spp.*) populations build up and can devastate weakened and healthy pines alike. Thinning by removing the smaller, suppressed trees can

greatly extend the life of the large, dominant trees.

Another threat from tree crowding is the tall, skinny form suppressed trees develop. This



Pine tree "pitching out" sap to retard bark beetles

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makes the trees more susceptible to breakage during heavy snow events. Incense cedar is especially vulnerable due to the brittle characteristics of its wood. The Registered Professional Forester recommends an overall reduction in the forest stand for improved forest health.

The level of tree parasites observed within the area is generally quite low. Being relatively young trees most of them are healthy and fast growing. Two common tree parasites were observed during the Firewise assessment - neither is abundant.

Western gall rust (*Peridermium harknessii*) In the Sierra Nevada foothills western gall rust attacks only ponderosa pines. This endemic rust fungus infects growing tips of pines in the spring with a ball-like swelling occurring the following year. Normally not a significant threat to the health of the host tree, in large numbers the vigor of the tree can be reduced, allowing other agents to attack the host. Individual pines have varying levels of resistance to the rust. The most susceptible trees are obvious after severe infections begin to affect their health. These trees should be considered for removal as they can attract bark beetles or deteriorate further creating a hazard to structures and people from collapse.



Western gall rust on pine tree.

True mistletoe (*Phoradendron spp.*) attacks California black oaks and other hardwoods. These are the leafy clusters emerging from the trunk and larger branches. No severe infections were observed during the Firewise Assessment. Unless the mistletoe population in an individual host tree is large, the trees tend to grow and remain healthy despite the parasite. The strength of severely infected branches could be compromised, leading to potential breakage. Careful pruning can reduce mistletoe infections in individual host trees.

Standing dead trees, also called snags, can be a fire hazard if they occur near structures or access roads. In other locations they are valuable wildlife habitat elements. Woodpeckers excavate cavities for nesting in the decaying wood, and are followed in subsequent years by secondary cavity nesters, such as chickadees and nuthatches. Many insects live in the wood and bark of dead trees, providing a food source for foraging birds. Snags are essential habitat features and should be retained where they do not pose a threat to structures, access roads or fuel breaks.

FUELS MANAGEMENT

There has been some excellent fire hazard reduction work completed by landowners within CSHOA, however it is not consistent throughout the community.

In addition to reduced fire hazard for the property, the benefits of this work include:

- **Reduced fire hazards for neighboring properties** – the condition of each parcel can affect the fire hazard on adjacent parcels
- **More aesthetically pleasing landscapes** – to closely resemble early historic conditions
- **Better long-term health of residual trees and shrubs** – remaining plants experience less stress from root and sunlight competition
- **Improved wildlife habitats**
- **Increase in plant diversity** – more sunlight to the ground will improve growth of new wildflowers and grasses
- **Ability to secure and maintain homeowner's insurance policies**

The goal of fuel management is to reduce the intensity and rate of spread of approaching wildfire and reduce the potential of single-structure fire developing into a larger wildfire. Fires can be classified into three types:

- **Ground fires** burn along the ground, moving slowly, with low heat output. Many times they only smolder. These fires pose the lowest danger and are carried primarily by leaf litter or mowed, dry grass.
- **Surface fires** burn along the ground with greater intensity and can move rapidly. They can cause significant damage to structures as well as trees and shrubs. They are carried by leaf litter, dry grasses that have not been grazed or mowed, twigs, branches, small shrubs and trees and downed logs. Surface fires can kill large, mature trees by girdling, crown desiccation or root damage.
- **Crown fires** burn from the ground to the tops of the trees. These are by far the most destructive and dangerous fires. A crown fire cannot be sustained without a high intensity surface fire feeding convective and radiant heat into the tree canopy. Large quantities of fuel on the ground combined with ladder fuels lead to catastrophic crown fires.



The 49'er Fire in 1988 burned 33,000 acres in western Nevada County.

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We can easily predict which type of fire will occur in an area by evaluating the existing fuel. **Fuel** is anything available for combustion – in our case vegetation, live or dead. The factors that determine which type of fire will occur include some that we have no control over (such as weather) and others that we can manipulate with fuel management.

Factors we have no control over:

- **Topography** – Heat rises, so fires burn hotter up slopes. The steeper the slope the hotter and faster a fire will burn. Gullies can channel hot gasses and fire, causing a “chimney” effect. Consider these factors when selecting a building site and in fuel reduction projects.
- **Atmospheric conditions** – humidity, ambient temperature, wind speed and direction. Our prevailing winds come from the southwest, therefore, most of our fires burn toward the northeast. Primarily in the autumn dry, hot winds can blow day and night, out of the northeast (Santa Ana winds). These winds, with accompanying low humidity cause the most dangerous fires.
- **Fuel moisture content** – without irrigation, this factor is dependent on the atmospheric conditions. Small diameter fuels (pine needles, dry grass) can change moisture content in a matter of hours. Larger fuels (logs) may take days or weeks to significantly change in moisture content.

Factors we can manipulate:

- **Amount of fuel** – more fuel equals greater fire intensity and rate of spread
- **Type of fuels** – size, structure, arrangement, flammability (natural oils) all affect fire behavior and can be targeted for manipulation
- **Continuity of fuels** - horizontally – patchy or continuous
 - vertically – ladder fuels vs. open layer between ground and canopy



Good example of defensible space and Firewise landscaping in the community.

Planning fuel management should consider various zones surrounding the structures. Utilizing these zones helps set priorities and bring into focus where the greatest hazards exist.

Home Ignition Zone includes the first 10 feet surrounding structures. Fuels in this zone frequently lead to ignition of structures. Keep fuel to a minimum, including live plants, wood piles, and patio furniture. Refer to the Firewise Plant Guide

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for Western Nevada County available from the Fire Safe Council of Nevada County for a list of suitable plants. Patrol this zone periodically during fire season to be sure leaves or pine needles have not accumulated near the structures.

Defensible Space Zone is the first 30 feet from structures. This zone can include irrigated landscaping or properly maintained native vegetation. Well irrigated, low growing plants are suitable within the Home Ignition zone. This provides a moist, green layer close to structures that is difficult to ignite. Avoid plants with natural oils (such as junipers) or with heavy dry leaf and twig accumulation as they are more flammable.

Reduced Fuel Zone includes the area at least 100 feet from structures, sometimes greater where steep slopes occur. This area can be maintained in native vegetation provided that it is periodically managed to minimize the fire danger.

In managing fuels, the most obvious thing to do is reduce the overall amount of fuel. In a forest situation this can be done by removing ground fuels by cutting, raking, burning or chipping. This method also reduces the continuity of fuels, creating a patchy situation.

Thinning overcrowded forests separated the canopies of adjacent trees and will reduce the continuity of fuels. Thinning also improves the health and growth rate of the trees retained. Pruning of the trees will reduce the quantity of fuel and affect the vertical continuity of fuels. Pruning trees to 10 feet (no more than ½ the total height though) can greatly reduce the ladder fuels when combined with thinning and ground fuel removal.

Mowing or grazing the grass to less than 4 inches high will greatly reduce fire intensity and rate of spread. Not every square foot needs to be cut to 4 inches. Strategically placed islands of taller grass or wildflowers provide cover, feeding and nesting opportunities for wildlife, particularly if in proximity to water.



Ember intrusion testing by the Institute for Business & Home Safety. Learn more at: <http://www.disastersafety.org/>

EMBER INTRUSION

Even with the best individual Home Ignition Zones providing fire protection, a wildfire in the area will create a significant amount of firebrands (burning embers) which may ignite vegetation and structures. These embers, carried by wind,

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can pelt your property well ahead of the main fire front, potentially causing numerous spot fires. These tiny firebrands may represent the most significant threat of fire within the community. The embers emulate a military artillery barrage and not only threaten homes but the landscape forestland if sufficient vegetation management does not limit the fuel available for the fire to consume. The majority of homes that burn in a wildfire are not consumed by crown fires, but are consumed from ember intrusion on the structure. If a single home in this community was to ignite by firebrands during a wildfire, it would place the surrounding homes and watershed at risk. In order to greatly reduce the ignitability of homes in your community, residents should inspect roofs, decks and the immediate ground surrounding these structures (within 10 feet) for fine fuels. Remember – fuels may be non-vegetative and include items such as furniture, door mats, brooms, and decorative items such as baskets and planters. Any fuels found in this area should be removed regularly in order to reduce the potential of a firebrand ignition. The goal of removing the fine fuels from within ten feet of the structures is to help stop firebrands from triggering a structure ignition from items immediately adjacent to the home.

The CSHOA is interspersed amongst the forest, trees are expected and appreciated around homes. Hardening structures from ember intrusion will increase their survivability in the event of a wildfire and subsequent fire branding in the community. Results from the 1961 Belair-Brentwood Fire found that 95 percent of the structures that survived maintained 30-60 feet of clearance and had non-flammable roofs.

Although wood shake roofs are not present in the community, roof maintenance is an ongoing issue to homes everywhere. All roof types may ignite if allowed to accumulate flammable material under overhangs, in gutters and other complex areas of the roof. These materials are easily ignited by firebrands and may put the entire home a risk, which in turn places the entire community at risk. These materials are also easily mitigated by sweeping or blowing off and will greatly reduce the potential for home ignition.



Firebrand testing on various decking material products. For more information visit:
<http://firecenter.berkeley.edu/>

Some structures have wood siding or wood construction features. Wood tends to stand up fairly well to radiant heat, although it can ignite when flames or super heated air (convection) heat comes into direct contact with it. In the event this flammable material ignites, it would move to the structure and

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ignite it. In order to mitigate for this type of siding, residents must ensure that direct flame contact cannot occur. Residents should set a high priority to remove highly flammable and dead vegetation within a minimum of 10 feet from the house. Residents should consider boxing in the eaves of the home for increased protection from firebrand intrusion. Other flammable material such as coconut door mats and deck furniture should also be removed from this area during fire season. Landscaping should be well irrigated if located within the 10 feet directly adjacent to the structures.

Privacy is a common issue in most communities including the CSHOA. Vegetative screens used for privacy from neighbors or the roadways should be thinned and pruned in order to reduce the risk of ignition and fire spread. Removing the smaller trees in these areas will also promote growth in the larger trees that are less susceptible to fire and enhance overall forest health. When vegetative screens are incorporated, the use of more fire resistant trees such as black oak may be used. Another way to mitigate the fire risk associated with privacy screening residents desire is the break up the horizontal and vertical continuity of the screening by placing clumps of vegetation to provide strategic visual barriers.

Some homes in the community utilize wood as a source of heat. One of the fire risks associated with using this type of fuels to heat homes is that the wood needs to be stored somewhere. Some of the wood here is stored next to homes or other structures. Wood piles are highly flammable, hence their use for heat fuel, and burn for extensive periods of time. During the fire season, all wood piles should be stored at least 30 feet from all structures, covered with a fire rated tarp, or stored in building with fire rated roofing. Wood fuel pellets should be treated in the same manner as natural firewood.

Decks help residents enjoy the natural environment as living space. However, they pose a significant fire threat to the home if not properly maintained. Remember – if it's attached to the house, it's part of the house. Many decks have accumulations of flammable materials both on and underneath them. If this material was ignited by a firebrand, it would easily ignite the deck and then the house. All decks should be kept free of flammable material, both above and below, in order to reduce the threat of a firebrand ignition. Where feasible, decks should be screened with a 1/8 inch metal mesh screening in order to reduce the amount of firebrand impingement and flammable material build up. Stairs may also be screened in the same manner. A piece of metal flashing between the deck and the house will also reduce the exposure from firebrands.

Another consideration for decks, entry ways or other wooden walkways is outdoor furniture décor and their potential source of firebrand ignitions. Outdoor furniture cushions are very flammable and were observed on some decks. These cushions can

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ignite and put the entire structure at risk. It is advised to store such items when not in use. This goes for anything flammable including door mats, brooms, umbrellas, etc.

Inadequately screened vents are a main source of firebrand ignition potential. By using a 1/8 inch metal mesh screen on all home vents, homeowners will greatly reduce the firebrand access to their structures. This standard is now California building code within the Wildland Urban Interface (most all of Nevada County.)

Double paned windows (with one tempered glass) provide a better heat shield than single pane windows. Using this type of window provides increased insulation from the outside elements and benefits the home through associated energy savings as well as increased fire safety.

RECOMMENDATIONS

- Take precautions to ensure that high intensity fire remains at least 100 feet away from homes. Continue working to eliminate low intensity fire from coming into contact with structures by creating and maintaining a "fire free zone" – allowing no fire to burn within a minimum of 10 feet of homes.
- Educate and encourage existing and new property owners to manage their property to reduce fuel loads, and ladder fuels.
- Continue to monitor compliance with existing regulations and work with Nevada County Consolidated Fire District and Cal Fire for enforcement of regulations under PRC4291 and local ordinances for vegetation management on undeveloped properties and vacant lots.
- Educate the community about the overstocked forest – more tree thinning is needed for forest health. Bark beetles are killing trees and reducing the overall number will help them survive drought conditions and insect attacks.
- Educate the community about emergency preparedness, including air ambulance services, evacuation routes and the ability to register cell phones for local emergency notifications.
- Continue to maintain good clearance along the roads.
- Continue to work with undeveloped lot owners to mitigate the vegetation fuel loading and invasive weeds as they impact the entire community.
- Initiate contact with the owner of Lakefront Estates to mitigate the high fire hazard on the adjacent undeveloped subdivision. Work with Nevada County Consolidated Fire District to address the access issues in Lakefront Estates which may impede fire suppression response due to the number of downed trees across the roadways.
- Formally support the proposed CWPP project for a fuel break along Scotts Flat dam road.

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- Work with the Nevada County Office of Emergency Services to update the existing emergency preparedness and evacuation guide for the community.
- Formally support the Tahoe National Forests' Community Wildfire Defense Project.
- Track and formally support the emerging County of Nevada's vegetation management ordinance.
- Formally support forest management efforts by Nevada Irrigation District for tree thinning and biomass utilization projects.
- Host an annual education event for residents to keep them informed of actions they may take to keep the community fire safe and ongoing progress on the Firewise Community Action Plan.

COMMUNITY PARTNERSHIPS

By adopting the Firewise Communities/USA® program, working with the Fire Safe Council of Nevada County and continuing the work the community has already accomplished, residents can create a balance that will allow them to safely co-exist with wildfire while maintaining the natural forest setting and quality wildlife habitat the resident's desire. Most people have chosen to live in the Sierra foothills in part because of the quality of the environment, climate, wildlife and aesthetic appeal. It is important for the residents to understand the implications of the choices they are making regarding fire safety. These choices, such as home siting, building materials selection, landscaping and proper maintenance of the home, directly relate to the ignitability of their home and surrounding environment during a wildfire event.

Collaboration with the following entities will greatly leverage the CSHOA efforts to achieve goals set to address the hazards identified in this plan:

CAL FIRE, Station 20, Nevada City – (530) 265-4589

Fire Safe Council of Nevada County, Grass Valley – (530) 272-1122

Neighboring Communities & Landowners

Nevada County Consolidated Fire District, Grass Valley – (530) 273-3158

Nevada County Resource Conservation District, Grass Valley – (530) 272-3417

Nevada Irrigation District, Grass Valley – (530) 273-6185

Tahoe National Forest, Nevada City – (530) 265-4531

NEXT STEPS

In order to complete the Firewise Community application, the CSHOA Firewise Committee needs to accept this community wildfire hazard assessment and develop an

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action plan to pro-actively address the issues identified and track progress on the goals set. The action plan will integrate the following:

- Annual Firewise Community/USA education day event to be held each year.
- Invest a minimum of \$2.00 annually per capita in the Firewise Communities/USA program. This work may be done by volunteers (valued at \$21/hr), homeowner association vegetation management along roadways, Fire Safe Council chipping services, or grant funded contractors on priorities set by the CSHOA Firewise Committee.
- Submit an annual report to the Firewise Communities/USA program to retain the community Firewise designation.
- Other priorities for the community include new residents' education, monthly newsletter education and maintenance reminders, guest speakers at board meetings and annual homeowner's association meeting and ongoing use of www.cascadeshores.org website along with www.areyoufiresafe.com to communicate fire safety issues to the community.

Please remember that there are many actions your community may take to reduce the effects of wildfire. Your actions directly impact whether your home will survive a wildfire. In the event of a wildfire, there will NOT be a fire engine to protect every street in the neighborhood. It is up to you, not firefighting agencies, to ensure the survivability of your home and community. Take pro-active measures now to protect your home and community before the fire comes. A prepared community is a safer community.

KEEP UP THE GREAT WORK!

