

Example fire Damage Appraisal Report

Prepared for ***

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Attached separately:

- Appraisal Calculation Excel Spreadsheet
- Site Maps

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I. Summary

Many trees, plants, and shrubs at ***address*** were damaged or destroyed in a fire. I appraised the loss to the plant material on subject property based upon my site observations and upon satellite imagery. I did not include the cost of removing debris from site or the costs of any earth movement or irrigation systems.

I appraised the total depreciation of plant material in the managed areas of the subject property that was damaged or lost in the fire to be \$2,240,343.00. This total amount of depreciation is subdivided as follows:

- The total depreciation from assets near the main house and the horse corrals was \$459,140.00.
- The total depreciation from assets in the picnic table area was \$187,490.00
- The total depreciation from assets within the areas under cultivation was \$419,774.00.
- The total depreciation from assets overhanging or immediately adjacent to the roads and trails on the property was \$1,173,939.00.

In addition to the assets within the managed areas of the property, I also appraised the depreciated reproduction cost of the unmanaged trees on all other parts of the property. The total depreciation from these assets was \$89,100.00.

The combined total depreciation from both managed and unmanaged assets was \$2,329,443.00.

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II. Background and Assignment

In ****year****, the fire burned the trees, plants, and shrubs at ****address***. In November of 2020, I was asked to prepare an appraisal of the damaged and destroyed plant material.

I visited the subject property on April 22, 2021 to document an itemized list of damaged plant material. I prepared this appraisal report based on my site observations.

Throughout this report and in the attached Excel spreadsheet, I refer to damaged plant material by asset number (e.g. “Asset 2”). Each asset number corresponds to an entry listed in the separately attached Excel spreadsheet. Some asset numbers refer to groups of more than one tree or plant when the individuals share substantially the same attributes.

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III. Observations and Discussion

Land

The subject property is approximately 150 acres of land just north of ***. It is comprised of three parcels that form a somewhat rectangularly-shaped property running east-west and paralleling the canyon. A gravel road runs along the northern edge of the property (“lower road” in the attached Excel spreadsheet). Generally, the southern edge of the property follows the ridgetop south of the canyon, and the northern edge of the property follows the creek at the bottom of the canyon.

A single-family residence structure sits partway up the slope on the western half of the ranch. ****client**** used it as his primary residence for several years prior to the fire, and he continues to do so. Adjacent to the residence structure was a barn that burned down in the fire.

The eastern four-fifths of the property is an oak woodland growing on a north-facing slope of the canyon. Several trails meander through the oak woodland and connect the lower road to the dirt path that runs along the ridge top. There are three major trails and several minor trails and spurs extending off the main routes. The Picnic Table Trail leads to a picnic area among a group of oaks overlooking the canyon.

Equestrian Facilities

At the western edge of the property are horse corrals. Although there are several small corrugated metal-roofed shade structures for the horses, most of the equestrian area depends upon the shade of many mature coast live oaks (*Quercus agrifolia*). For one and one-half years prior to the fire, ****client**** provided equestrian boarding services for a fee. The fire temporarily disrupted his equestrian facilities, but the services for boarders have since resumed.

As a value-added benefit for his boarders, ****client**** made the trails on his property available for horseback riding. Prior to the fire, most of the trails were completely shaded by coast live oak canopy, making for a pleasant riding experience. After the fire, much of the overhead canopy was lost, reducing the shade and privacy of the trails.

Cultivated Areas

The southern edge of the canyon slope curves southward to form a western-facing slope adjacent to the main house. This western-facing slope has historically been used for growing avocado trees. I observed metal irrigation lines running parallel along terraces cut into the hillside where avocado trees grew prior to the fire. Nearly all of the avocado trees that existed before the fire were destroyed.

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The property extends to the southwest into a second valley, through which the south property line passes. In this valley, I observed several dozen Mexican elderberry trees (*Sambucus mexicana*) of approximately the same age growing at regularly-spaced intervals. I inferred from the trees' common age and regular spacing intervals that they were planted by humans.

Data Collection

I met with ***client*** for a preliminary walkthrough of the property in the afternoon of April 22, 2021. I then returned on May 13, 14, 25, and 26, 2021 to collect data for this report. I limited the scope of the field inventory to the managed assets around the improved portions of the property and along the horse trails. I supplemented my field data collection with satellite imagery of the property to estimate the number of trees growing in the unmanaged areas of the property.

In making my observations for this inventory, I combined my field observations with the satellite imagery of the property and with the testimony of ***client***. To avoid double-counting data, I gave highest priority to data I collected from my personal observations, then to ***client***'s testimony, then to satellite imagery.

client identified several assets that I did not personally observe on site. In the attached spreadsheet, I indicated the source of the data supporting each itemized asset. In one column, I indicated whether I observed each asset on site or relied upon the owner's testimony.

Tree Condition

The trunks of many assets were charred by the fire, but many of the trees were still salvageable. The fire partially damaged tissue that conducted water from the roots to the foliage. Trunk charring and heat damage reduced the vigor of these trees and predisposed them to insect infestation. I depreciated their condition ratings according to the severity of the charring.

Other assets sustained fire damage in their canopies but their trunks appeared to be intact and substantially undamaged. Most trees in this category appeared to be vigorously resprouting. Accordingly, I only deducted a small percentage for depreciation. Other trees were severely heat-damaged and had thinning canopies. I assigned greater percentage depreciation deductions for them.

Some trees had clear evidence of pre-existing defects. Accordingly, I applied a deduction to their pre-loss condition ratings. Common pre-existing defects included trunk cavities, root damage, severe leans, and suppression by competition.

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The fire completely destroyed the aboveground portion of several assets. But although the main trunks of these assets were completely burned, their root systems survived the fire and are now vigorously resprouting. This occurred most frequently with the elderberry trees. Because these assets still have some salvage value following the fire, I assigned a nonzero post-loss condition rating.

Unmanaged Trees

As separate line items in this appraisal, I also appraised the loss to the unmanaged trees on the property for Assets 528-532. To calculate the quantity of unmanaged trees, I reviewed satellite imagery and counted all of the distinct tree-shapes not growing within the boundaries around the horse corrals, main house, or agricultural areas. Then I subtracted from this total count the number of trees I inventoried along the roads and trails. The remainder after subtraction represented an approximation of the quantity of unmanaged trees damaged in the fire that were not otherwise counted in my field data collection.

Next, I segmented this total number of unmanaged trees by tree species. I approximated species distribution from my field observations. I made the extraordinary assumption that 25% of the trees I counted in satellite images were 10-year-old toyon shrubs (*Heteromeles arbutifolia*), and 75% were 40-year-old coast live oaks. I made the extraordinary assumption that the toyon shrubs were damaged but not destroyed, and I assigned them depreciation ratings of 50%. I subsequently segmented the oak population proportionately to each of four major categories of depreciation ratings I observed in the field ranging from total loss to minor heat damage.

The approximation of quantities, species, and sizes of unmanaged trees in this inventory is significantly limited in its level of precision.

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IV. Appraisal Methodology

After I assembled the loss data from documents I was provided, I calculated the Reproduction Cost of each asset. I used three techniques of appraisal:

- 1) Trunk Formula Technique, (“TFT” in the attached spreadsheet);
- 2) Extrapolation by Canopy Volume (“Volume”); and
- 3) Cost Compounding Technique, (“CCT”).

Trunk Formula Technique and Extrapolation by Canopy Volume estimate the Reproduction Cost of a tree too large to be directly replaced by extrapolating the cost to reproduce a smaller tree based on a specified size metric (trunk cross sectional area and canopy volume, respectively). Cost Compounding Technique estimates the Reproduction Cost of a tree by extrapolating an interest rate raised to the power of the number of years to parity (plant age).

A. Trunk Formula Technique

The theory of the Trunk Formula Technique is to scale up the cost of the largest commonly available nursery tree relative to the total cross-sectional area of the tree trunk. The unit cost per square inch of nursery stock is calculated for the Largest Commonly Available Nursery Tree (LCANT), and it is multiplied by the cross-sectional area of the subject tree being appraised. This is the basic reproduction cost of the tree. It represents the cost to reproduce a defect-free copy of the tree with one of the same size and species.

After calculating the basic cost of the tree, depreciating factors may be introduced. Since hand-selected nursery stock is in theory the best quality, the basic cost may be adjusted downward by a Condition rating to reflect any defects in health, structure, and form. The Condition rating is a subjective rating between 0% and 100% as determined by the appraising arborist. Guidance is given as a framework for general ratings in Table 4.1 of the Guide for Plant Appraisal 10th Edition, Second Printing (CTLA 2019, p. 44).

Functional Limitations reflect the features of the tree/site interaction that restrict or constrain growth or function due to poor placement or size. External Limitations reflect restrictions to the tree involving legal, biological, or environmental conditions external to the property (CTLA 2019, p. 9). Functional Limitations and External Limitations are also subjective ratings ranging between 0% and 100% as determined by the appraising arborist, with similar guidance provided. For purposes of this appraisal report, I did not evaluate Functional Limitations or External Limitations. For all of the assets in this report, these values were assumed to be 100% both before and after the fire.

The final appraised Trunk Formula Technique Reproduction Cost of the tree is the product of the total cross-sectional area, the unit cost of trunk area, and the three depreciating factors: Condition, Functional Limitations, and External Limitations.

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1. *Trunk Area*

First, the diameter of the subject trunk is measured (DBH). The height of the measurement is conventionally made at 4.5 feet above natural grade. If the subject tree has multiple trunks, the diameter of each individual trunk is measured. The cross-sectional area (A) is calculated by the formula $A = \pi/4 d^2$. Then the cross-sectional area of each trunk is added together to arrive at the total trunk cross-sectional area.

The DBH quantity in the attached Excel spreadsheet is a sum of the estimated diameters of each of the trunks. To calculate the total cross-sectional area of each multi-stem tree, I calculated the area of each stem and added together the areas.

Some of the trees I observed were stumps cut at a height below 4.5 feet. For purposes of this report, I made the extraordinary assumption that the diameter measurement of each stump was equal to the former trees' respective DBH measurement. Thus, the calculated trunk areas for each of the respective stumps may be expected to be an upper bound for the actual trunk cross-sectional area that would have been calculated if the trees had been measured at 4.5 feet above grade.

Much of the groundcover under the oaks was poison oak (*Toxicodendron diversilobum*) that had regrown after the fire. To avoid an unpleasant rash, I visually approximated the diameters of trees that were surrounded by poison oak.

2. *Unit Cost*

Unit cost is the theoretical cost of producing one square inch of trunk cross-sectional area. It is the basis for extrapolation in the Trunk Formula Technique of appraisal. It is calculated by the following steps:

- a. Determine the size of the LCANT;
- b. Obtain wholesale nursery prices of the LCANT;
- c. Calculate the median price of the LCANT;
- d. Calculate the trunk cross-sectional area of the LCANT; and
- e. Divide the median price by the cross-sectional area of the LCANT.

The calculation result is expressed in dollars per square inch of trunk cross-sectional area.

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a. Determine the Size of the LCANT

The Guide for Plant Appraisal 10th Edition provides data supporting a conclusion that the LCANT for the West Coast is the 24” box size (CTLA 2019, p. 146). While the text provides an option for either the 24” box size or the 36” box size, I chose the 24” box size by default because in my experience with prior nursery queries, many more tree species are available at the 24” box size. However, I deviated from this size for two species that were only available in 15-gallon size at the largest: *Rhus integrifolia* and *Quercus dumosa*.

b. Obtain Wholesale Nursery Prices of the LCANT

To obtain nursery pricing, I queried several reputable local nurseries for the wholesale prices of procuring the LCANT of each species included in the inventory.

c. Calculate the Median Price of the LCANT

I calculated the median tree cost from the pricing data for each species and size queried.

d. Calculate the Trunk Cross-Sectional Area of the LCANT

In the western U.S., trees are sold by container size, not by trunk size. The American Standard for Nursery Stock contains a conversion table listing container sizes and trunk diameters (Z60.1 2014, pp. 15-19). Trunk sizes for the #25 container class (24” box size) range from 1.5 inches to 2.5 inches. I selected a trunk diameter of 2 inches for the Unit Cost calculations of the 24” box size LCANT and 1.5 inches for the 15-gallon size LCANT.

e. Divide the Median Price by the Cross-sectional Area

I divided each of the LCANT prices by the cross-sectional area of each respective LCANT to calculate the unit cost for each tree.

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3. Condition Rating

For purposes of this appraisal, I assumed that the pre-loss condition ratings of all the trees and plants were 100% unless I had clear evidence to the contrary. Pre-loss condition rating deductions were applied for trees with preexisting defects including but not limited to significant cavities, substantial leans, and co-dominant stem defects. Itemized pre-loss deductions are noted on the attached Excel spreadsheet.

Partial losses were rated with each asset's post-loss condition. Factors supporting a post-loss depreciation rating deduction included canopy volume shrinkage, canopy browning, and trunk charring. Some assets had substantially resprouted post-fire, and I determined they could be salvaged. I assigned them nonzero post-loss depreciation ratings and noted my reasoning in the spreadsheet for each individual asset.

4. Functional and External Limitations

Functional Limitations reflect the restriction on tree growth or intended use in the landscape based on the interaction of site and species. External Limitations are the restrictions on tree growth or intended use with respect to attributes outside the control of the property owner such as known fatal pests, drought restrictions, invasive species status, and utility easement conflict. For purposes of this appraisal, I assigned a value of 100% to each of these depreciation ratings both before and after the fire.

5. Installation Cost

For purposes of the Trunk Formula Technique, Installation Cost is the cost to install the LCANT, which may be much lower than the cost to ship and install a replacement tree identical to the tree being appraised. In this appraisal technique, installation cost does not scale with the size of the tree being appraised. Rather, Trunk Formula Technique models the cost of planting the LCANT and then growing it in place to the size of the tree being appraised.

I calculated the installation cost of these trees by multiplying the wholesale cost of the LCANT by a markup factor of 1.5x to reflect the cost of installation, cleanup, contractor overhead, and profit. Then I multiplied the basic reproduction cost by the Condition, Functional Limitations, and External Limitations ratings. Finally, I added the installation cost of the LCANT to the result to arrive at the depreciated replacement cost for the Trunk Formula Technique.

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6. Depreciated Cost

I performed this calculation twice for each asset: once for the pre-loss depreciated cost, and once for the post-loss depreciated cost. I subtracted the post-loss depreciated cost from the pre-loss depreciated cost to determine the amount of loss for each asset. Finally, I rounded the resulting calculation to the nearest two significant figures, per the guidelines of the Guide for Plant Appraisal (CTLA 2019, p. 33).

B. Volume-Based Extrapolation

Assets 251, 325, 421, and 454 were more appropriately appraised as shrubs instead of trees. I appraised the reproduction cost of these plants by extrapolating on the basis of canopy volume (CTLA 2019, p. 57). With a volume-based calculation, the unit cost is the dollars per unit volume of space occupied by the canopy of the LCANT (\$/ft³).

It is possible for an identical canopy volume to be occupied by differently-sized stems. So, to avoid distortion that would more readily occur on a plant with many stems and to provide a clearer representation of the size of each shrub, I used canopy volume as the basis for the calculation. While it would have been possible to measure each of the trunks and to extrapolate based on the trunk area of the sum of the stems, I chose to use a canopy volume-based measurement instead.

I approximated the volumes of the subject plants and their respective LCANTs by calculating the volume of a half-ellipsoid with a major radius equal to the shrub's height and a minor radius equal to half the canopy spread. I approximated the pre-loss spread to be equal to the height of the shrub in the field. I used the following formula:

$$\text{Volume of Half-Ellipsoid} = \frac{1}{2} * (\frac{4}{3} \pi (\frac{1}{2} * \text{spread})^2 * (\text{height}))$$

After I calculated the unit cost of a shrub in dollars per cubic foot, I multiplied it by the volume of each respective damaged asset to calculate the basic costs. Finally, I applied depreciation in the same way as described above by multiplying each basic cost by the depreciation ratings and then adding the planting cost of the LCANT.

C. Cost Compounding Technique

I appraised Assets 528-532 using the Cost Compounding Technique. Cost Compounding Technique extrapolates the cost of an initial investment by an interest rate applied over the number of years to grow an asset parity. It is modeled using the formula for compound interest, which is commonly used in forestry applications.

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First, I estimated the cost of an initial investment of planting and installing replacement trees. Then I extrapolated an 8% interest rate over a period of time equal to the time I estimated it would take the replacement trees to grow to the size of the subject trees. The resulting extrapolation was the basic Reproduction Cost. I then applied depreciation as described above.

The trees comprising Assets 528-532 were unmanaged forest trees. Replanting is commonly performed in forest management, but the planting size of new trees is not commonly the 24” box size in such situations. Usually, the replacement seedlings are much smaller. The smallest available size of coast live oak and toyon for which I was able to acquire nursery data was the 1-gallon size. Thus, I used the 1-gallon replacement size as the basis for extrapolation for assets growing in the unmanaged areas of the property.

The technique of Cost Compounding has limited precision because small changes in the selected interest rate can have a large impact on the result of the final calculation.

D. Other Appraisal Approaches

I did not use any other approaches for tree appraisal. I did not calculate the present value of the income generated by the benefits provided by the trees. I did not calculate the difference in market value of the subject property before and after the loss.

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V. Conclusion

I appraised the total depreciation of plant material in the managed areas of the subject property that was damaged or lost in the fire to be \$2,240,343.00. This total amount of depreciation is subdivided as follows:

- The total depreciation from assets near the main house and the horse corrals was \$459,140.00.
- The total depreciation from assets in the picnic table area was \$187,490.00
- The total depreciation from assets within the areas under cultivation was \$419,774.00.
- The total depreciation from assets overhanging or immediately adjacent to the roads and trails on the property was \$1,173,939.00.

In addition to the assets within the managed areas of the property, I also appraised the depreciated reproduction cost of the unmanaged trees on all other parts of the property. The total depreciation from these assets was \$89,100.00.

The combined total depreciation from both managed and unmanaged assets was \$2,329,443.00.

The level of precision that may be expected from this appraisal is subject to some limitations, as discussed in the Limitations section. Detailed calculations are included in the attached Excel spreadsheet.

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VI. Limits of Assignment

- *Appraisal Methods:* To appraise the trees, I used the Reproduction Method, as outlined in the Guide for Plant Appraisal 10th Edition. I extrapolated the Reproduction Cost using the Trunk Formula Technique, Cost Compounding Technique, and extrapolation by volume.

I did not calculate the present value of the income generated by the benefits provided by the trees. I did not calculate the difference in market value of the subject property before and after the loss.

- *Inventory Data Collection:* My investigation was limited to five ground-based all-visual inspections of the property years after the fire. Some of the losses may have been hidden underneath regrowth or cleaned up prior to my site visit. I only recorded data on the trees, plants, and shrubs that I personally observed on site or that the property owner described to me. In the attached spreadsheet, I have identified the source of data for each itemized asset.
- *Size Measurements:* When remnants of damaged or destroyed assets were available to measure in the field, I collected actual measurement data. For tree stumps cut below 4.5 feet above grade, I made the extraordinary assumption that the DBH of the removed trunk was equal to the diameter of the stump that I was actually able to measure. When the presence of poison oak precluded direct trunk measurements, I visually approximated the sizes of the trees.
- *Species Identification:* The species of some of the trees and plants were not identifiable from the remnants on site. Where a tree's species was unknown, I used my professional judgment to assign a species for purposes of the appraisal calculation.
- *Depreciation:* In the absence of clear information to the contrary, pre-loss depreciation was not applied. It is possible that some of the totally destroyed assets were in suboptimal condition prior to the fire.
- *Excluded Costs:* The appraisal only includes the replacement costs of the plant material. It does not include any site preparation costs such as loss cleanup, grading, or irrigation installation.
- *General Limitations:* All of the information provided to me regarding the history of the site and the subject trees was assumed to be true. If any information is found to be false, the conclusions in this report may be invalidated.

This report is not a risk assessment. My expertise in this matter is limited to arboriculture, and this report is not intended to be legal advice. I do not guarantee the safety, health, or condition of the subject trees. There is no warranty or guarantee, expressed or implied, that problems or deficiencies in the subject trees may not arise in the future.

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Arborists are tree specialists who use their knowledge, education, training, and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living trees. Clients may choose to accept or disregard the recommendations of the arborist, or to seek additional advice.

Arborists cannot detect every condition that could possibly lead to structural failure of a tree. Trees are living organisms that fail in ways not fully understood. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy or safe under all circumstances, or for a specified period of time. Likewise, remedial treatments, like any medicine, cannot be guaranteed.





Trees can be managed, but they cannot be controlled. To live near trees is to accept some degree of risk. The only way to eliminate all risk associated with trees is to eliminate all trees.

VII. Works Cited




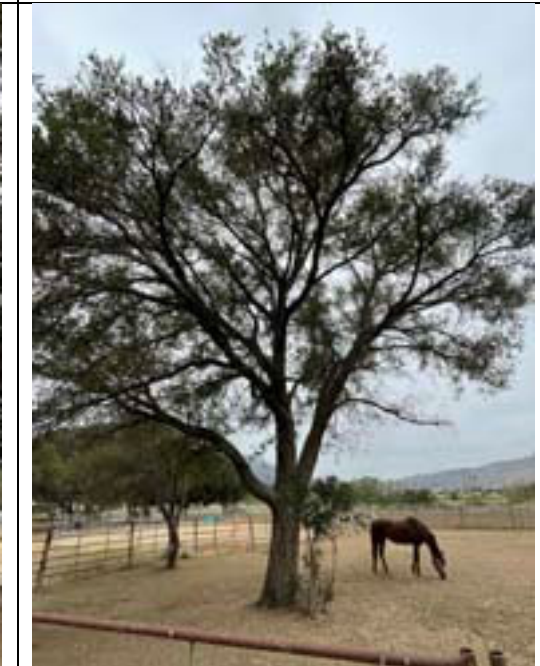
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VIII. Photos and Figures

	
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Asset 3 Photo 1	Asset 4 Photo 1





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Asset 218 Photo 1	Asset 219 Photo 1





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Asset 228 Photo 1	Asset 229 Photo 1
	
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Asset 246 Photo 1	Asset 247 Photo 1





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Asset 248 Photo 1	Asset 249 Photo 1
	
Asset 250 Photo 1	Asset 251 Photo 1



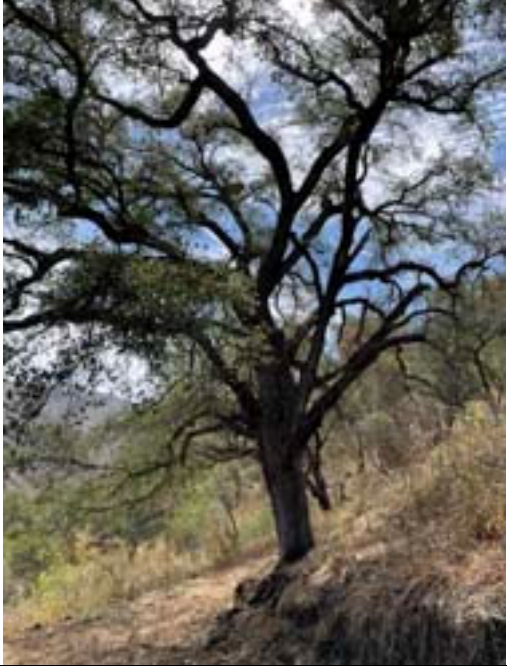

Privileged – Attorney Work Product

	
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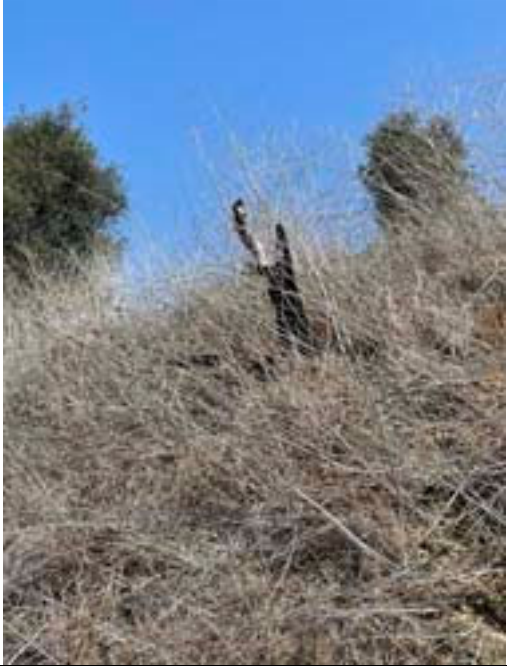

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