

## **Greater Alpine FSC Chipping Projects:**

### **Pile Volume Distribution, Distance Sensitivity, and Chipping Efficiency for Centralized Chipping**

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### **Executive Summary**

We have analyzed data collected from chipper events organized by the Greater Alpine Fire Safe Council and the Fires Safe Council of San Diego. Unlike the other events we analyzed previously, homeowners brought their brush to a central location where the work was carried out. Two of the events were held near the center of Alpine while one was held along a well-traveled road in the backcountry. From the new data the Greater Alpine Fire Safe Council has calculated (1) the histogram for the frequency of piles of a given size; (2) individual pile volume versus distance from Chipping Center; and (3) the sensitivity of homeowners to their distance from the chipping center. As in our earlier studies, piles of less than about 350 cu ft are much more frequent than larger piles, representing we believe the size of a typical small pickup bed - homeowners who made multiple trips created the larger piles. We also found that the largest majority of homeowners lived 5 miles or less from the chipping center, strongly suggesting that Centralized Chipping Events should take place as close as possible to more concentrated residential developments. Finally, we estimate that Centralized Chipping is about 50% more cost effective than Itinerant Chipping.

## **Introduction**

The Greater Alpine Fire Safe Council, a 501 (c) 3 corporation, was founded in 2006 to implement the Alpine Community Wildfire Protection Plan. A key part of this plan is to help homeowners in especially fire-prone areas to create defensible space around their homes by providing them with a free chipping service. Homeowners must clear all flammable brush, especially chamise and buckwheat, within 100ft of their homes and stack it in orderly piles. The Greater Alpine FSC chips these piles using grants from the federal government and insurance companies and each quarter reports on the volume of brush chipped and acreage cleared. In our previous two papers, we have analyzed the case for taking the chipper to piles at the homeowner's address ("Itinerant Chipping"). In this paper, we analyze the case for having homeowners bring their piles to a centrally located chipper ("Centralized Chipping"). We are very grateful to the San Diego Fire Safe Council for collaborating with us on the first of the three events we have studied.

In earlier studies<sup>1</sup>, the Greater Alpine Fire Safe Council has developed methods for (1) calculating the volume of brush cut by homeowners; (2) estimating the area cleared around their homes; (3) estimating the time homeowners spent cutting the brush; (4) estimating the productivity of the crews, (5) calculating the histogram for the frequency of piles of a given size, (6) calculating the total volume of piles of a given size, and (7) the chipping efficiency for equally spaced piles of a given size. We use many of these same techniques in this paper and compare the new results for Centralized Chipping with the old ones for Itinerant Chipping. We hope that our results will prove useful to other Fire Safe Councils for maximizing the efficiency of their own chipping programs.

## **Methodology**

Centralized Chipping Events were organized as shown in the photograph at the beginning of this paper. An advertising campaign prior to the event in the local newspaper, on our website, and using large banners on an antique fire engine owned by one of our members created a great deal of interest. It was therefore necessary to have sufficient space at the event to accommodate a long line of vehicles. In fact, we used two chippers on occasion to deal with all of the customers in a reasonable time. Proper use of the space also ensures that customers are safely separated from the chipping machine and its crew

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<sup>1</sup> Greater Alpine FSC Chipping Projects: Methodology and Analysis; Greater Alpine FSC Chipping Projects: Pile Volume Distribution and Chipping Efficiency

## Analysis

Three separate Centralized Chipping events were studied, the first in the town center, the second three miles northeast of the town center, and the third on a well-traveled road on the eastern boundary of Greater Alpine. With data from 85 homeowners, we can now understand how to optimize our chipping efficiency according to the type of customer.

Figure 1 is the histogram for the frequency of piles of a given size. As in our Itinerant Chipping study, the frequency decreases as the volume increases. In fact, the two distributions are remarkably similar. We can only surmise that in both cases, most homeowners fill one small pickup bed with brush for chipping, whether it is to move it to the street outside their homes or to move it to a Chipping Center. Either that or this is the volume of brush typically found in the 100-foot zone around a home.

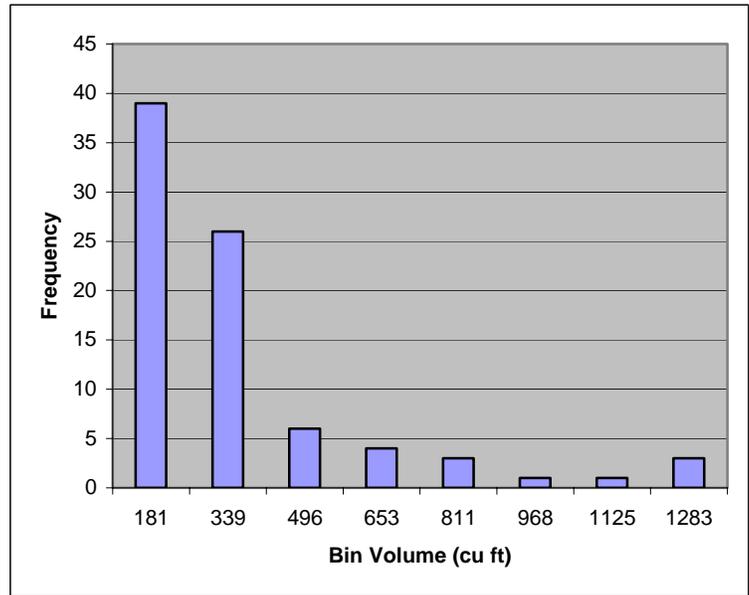


Figure 1: Frequency of piles of a given size

Figure 2 shows how the pile volume in each vehicle depends on distance the homeowner traveled to the Chipping Center. The volume of the vast

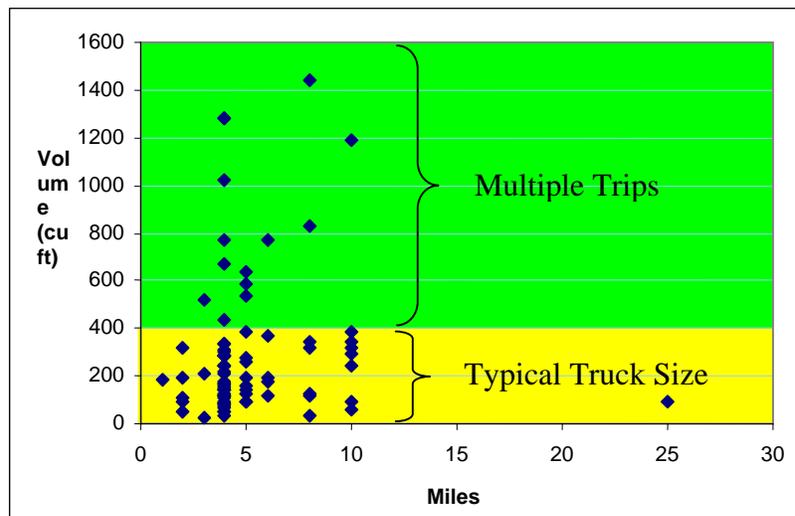


Figure 2: Individual pile volume versus distance from Chipping Center

majority of piles falls in the yellow band at the bottom of the chart that represents the capacity of a small pickup bed or other small vehicle. The piles with larger volumes arrived at the Chipping Center in multiple trips - some homeowners in fact made as many as three or four of them.

The other key take home from this figure is that most homeowners will not drive very far to a Chipping Center. With the exception of one homeowner, who drove 25 miles to the Chipping Center, all other homeowners drove 10 miles or less. Figure 3, a histogram of the total pile volume versus distance

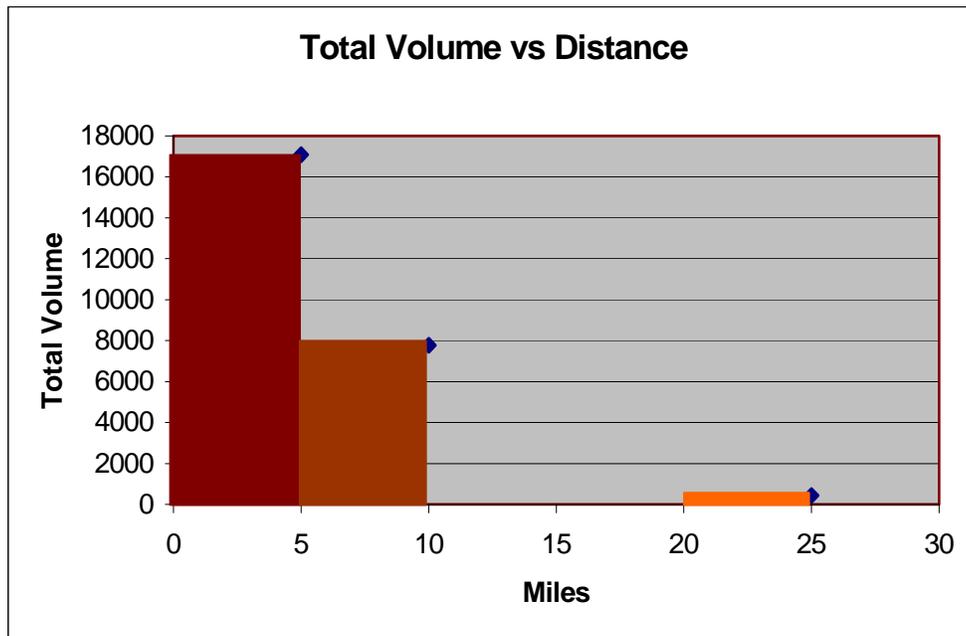


Figure 3: Histogram of total pile volume versus distance from Chipping Center

to the Chipping Center, drives this point home. In fact, most homeowners drove less than 5 miles to the Center. This finding strongly suggests that Centralized Chipping Events should take place as close as possible to more concentrated residential developments.

### Cost effectiveness of Centralized Versus Itinerant Chipping

Using the data from this and our two previous studies, we can compare the cost effectiveness of Centralized versus Itinerant Chipping. Table 1 shows

	Mean Vol Chipped / Day (cu ft)
<b>Centralized</b>	<b>9000</b>
<b>Itinerant</b>	<b>6000</b>

Table 1: Comparison of effectiveness of Centralized and Itinerant Chipping

the mean volume chipped per day in the two cases. As expected from our earlier studies, for the small pile volumes most frequently encountered in Itinerant Chipping, drive time between piles is responsible for a significant reduction - near 30% - in the volume chipped per day when compared with that for Centralized Chipping. That is, Centralized Chipping is 50% more cost effective than Itinerant Chipping in most cases.

## **Conclusions**

The three studies we have now carried out show how best to maximize Itinerant and Centralized Chipping Events. Centralized Events properly located near concentrated residential developments certainly maximize chipping efficiency since there is no time spent driving the chipper from one pile to the next. In fact, Centralized Chipping is about 50% more effective than Itinerant Chipping in most cases. Centralized Chipping, however, loses those homeowners who will not or cannot take their brush to a Chipping Center, especially when it is more than 10 miles from their home. We conclude therefore that a properly designed program of Itinerant and Centralized Chipping, especially in areas similar to Greater Alpine, best serves the community.

## **Acknowledgments**

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