# Two Years Later: Residential Rebuilding Efforts Since the Montecito Debris Flow

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## Introduction

The Thomas Fire and subsequent debris flow on 9 January 2018 devastated portions of Montecito and the surrounding communities. The debris flow killed 23 people and damaged or destroyed hundreds of homes and commercial properties. Following the debris flow, Santa Barbara County inspected over 600 structures for damage. Properties were marked either Green (typically 0-10 percent damage), Yellow (typically 10-60 percent damage), or Red (typically 60-100 percent damage). Green Tag properties were deemed safe, Yellow Tag properties were allowed restricted use, and Red Tag properties were deemed uninhabitable. Approximately 38 percent of dwelling structures initially received a Green Tag, 29 percent of dwelling structures received a Yellow Tag, and 33 percent of dwelling structures received a Red Tag.

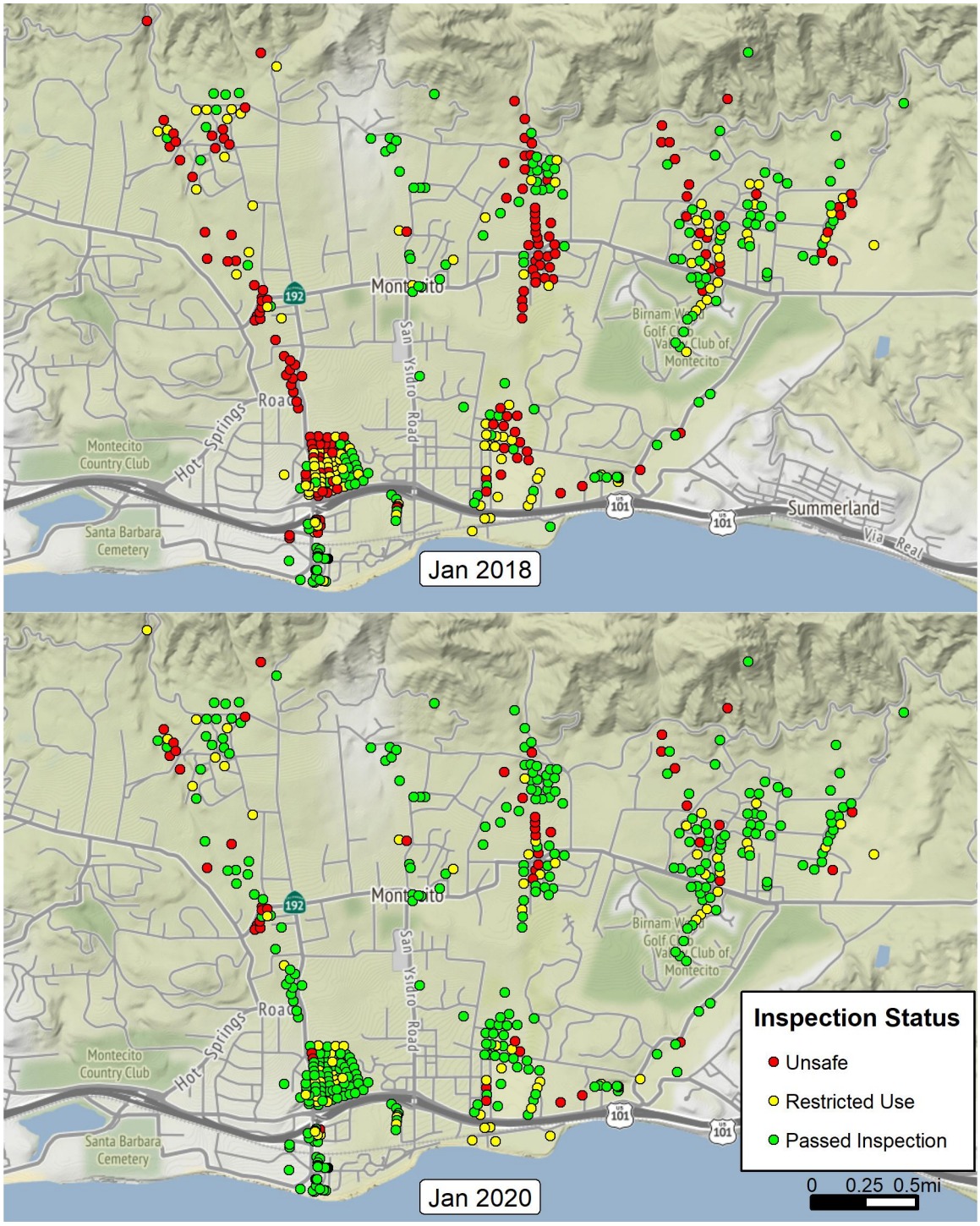
RDN published a report last year focusing on recovery efforts one year after the disaster. At that time most parcels had returned to Green status. However, we found that most of the completed building projects were demolitions as opposed to repairs.

This report (1) updates our analysis of recovery efforts and (2) additionally projects the timeline for unfinished building efforts. Figure 1 displays the initial inspection results from January 2018 and the current inspection status as of January 2020. Although most of the structures have passed inspection as of January 2020, there are still a considerable number of damaged structures. RDN obtained building permit history from the Santa Barbara County Planning website for the 285 parcels categorized with a Yellow or Red Tag in January 2018 or January 2020. RDN categorized each permit associated with recovery from the debris flow into one of five project types:

- **No Activity** - Parcel had no building permit activity.
- **Partial Demolition** - Partial demolition of a structure.
- **Full Demolition** - Full demolition of a structure.
- **Repair** - Like for like repairs associated with debris flow damage.
- **Repair & Remodel** - Building upgrades, in addition to repairs associated with debris flow damage.

In addition to project type, RDN collected the permit application submittal date, permit issue date, final inspection date (if the project was completed), and the estimated cost associated with each building permit. Estimated costs are those provided by the contractor during the permitting process. Contractors have an incentive to underestimate the cost of the project to reduce permitting fees, so we argue the presented costs represent the lower bound of actual building costs.

**Figure 1: Initial and Current Inspection Status**



# Current Status of Recovery

## Projects by Permit Status

Santa Barbara County inspected over 600 structures on 462 parcels following the debris flow event. Two hundred eighty five parcels had one or more structures that were moderately or severely damaged (Red or Yellow Tag). Property owners completed different kinds of building projects to fix damage caused by the debris flow, these projects ranging from mud clearing (which did not require permits) to demolitions and structural repairs (which required permits). Figure 2 displays the number of permitted projects that have been completed ("Closed" permits) or are are still in progress ("Open" permits). The red bar to the right represents parcels that have had no relevant permit activity since the debris flow. Building permit histories have provided project-level data, so the two bars on the left represent the number of projects. However, to provide scale for the amount of work that has not been undertaken, we plot the number of parcels that have not undertaken any projects on the right.

**Figure 2: Total Projects by Status**

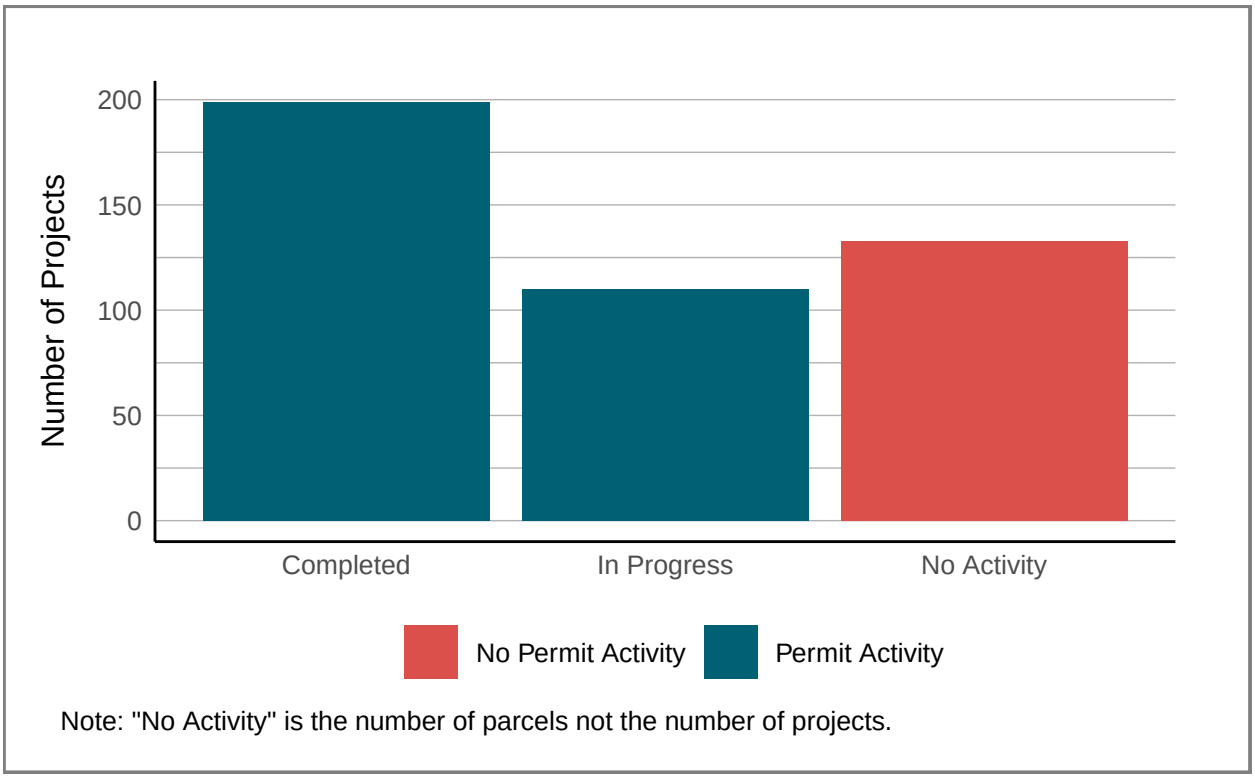
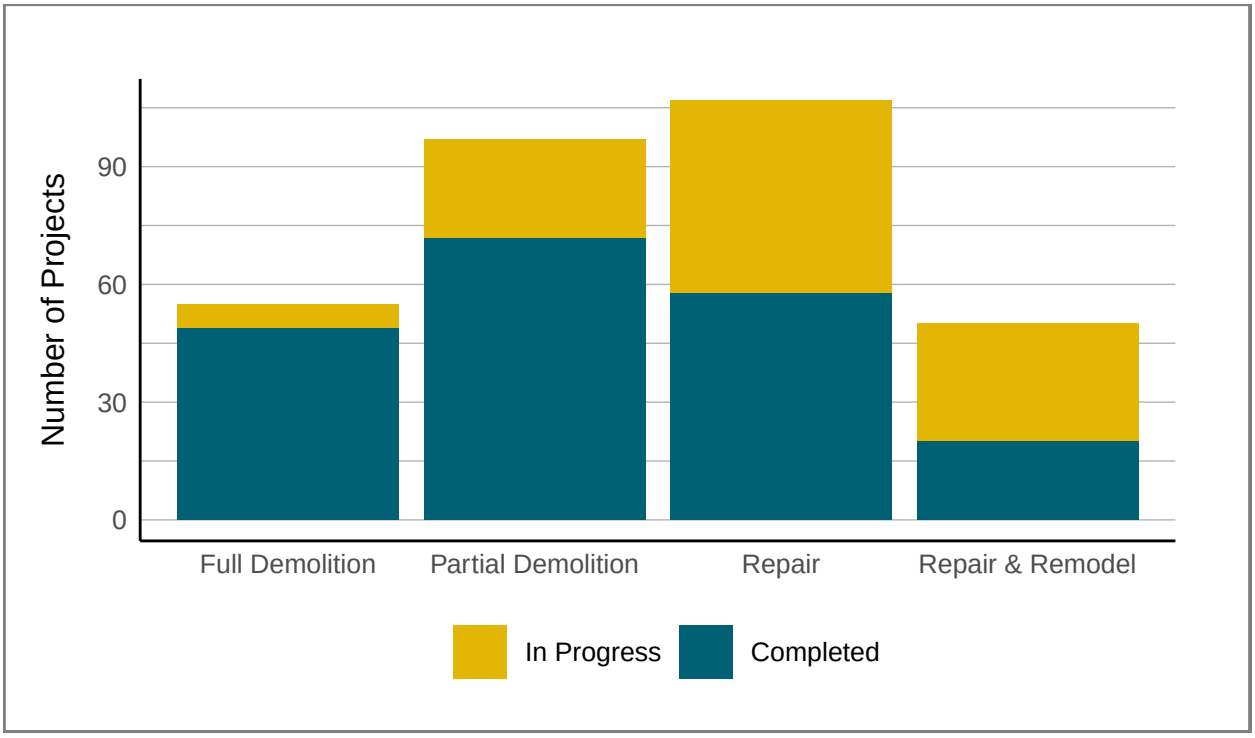


Figure 3 displays the number of current building projects by project type and status. The vast majority of Full Demolition projects have been completed, whereas a number of Partial Demolitions are still underway. The only types of projects for which permits require a detailed review by the county are Repair and Repair & Remodel projects. Over half of ongoing Repair projects have been completed, whereas roughly one-third of Repair & Remodel projects have been completed.

**Figure 3: Number of Projects by Status and Project Type**



## Cost

To date, the total cost of all building permits associated with the rebuilding efforts is $31,667,880. Table 1 displays the breakdown of total costs by project type and status.

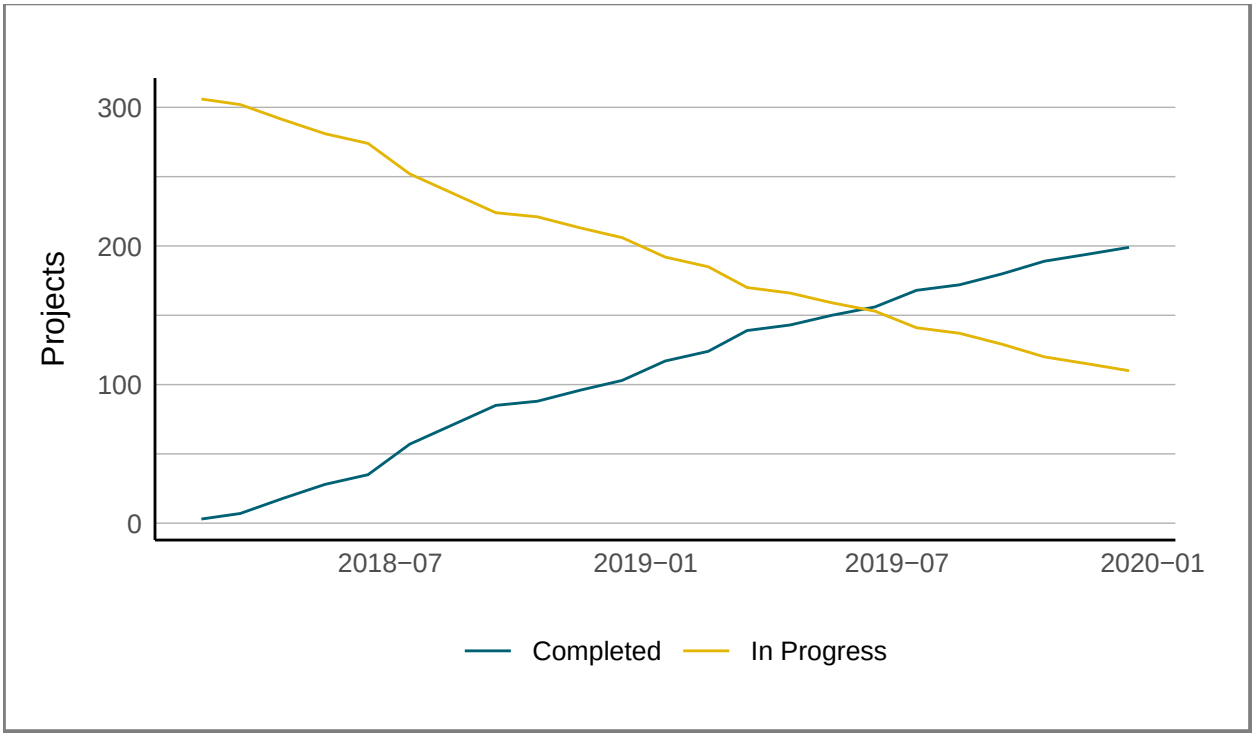
**Table 1: Total Project Cost by Type and Status**

| | Project Status | | |
|---|---|---|---|
| Project Type | In Progress | Completed | **Total** |
| Full Demolition | $296,000 | $1,305,000 | **$1,601,000** |
| Partial Demolition | $437,894 | $1,488,269 | **$1,926,163** |
| Repair | $9,833,180 | $7,587,412 | **$17,420,592** |
| Repair & Remodel | $7,516,125 | $3,204,000 | **$10,720,125** |
| **Total** | **$18,083,199** | **$13,584,681** | **$31,667,880** |

## Timeline

Projects have been completed at a steady pace since the disaster. Figure 4 charts the cumulative number of permitted projects. Roughly 200 projects have been completed thus far, at a pace of approximately 9 projects per month.

**Figure 4: Cumulative Progress of Rebuilding Efforts**



## Forecasting Future Recovery

In this section we estimate the timeline for rebuilding the remaining damaged properties. For the purpose of this analysis, incomplete recovery efforts fit into one of two categories:

1. **Projects In Progress** - These are projects for which permits have been issued and repair efforts are active, or permits are in the process of being issued.
2. **Outstanding Projects** - These are anticipated projects for parcels that sustained damage, but for which there has been no permit activity.

In the next three sections we will evaluate the ongoing recovery process by projecting expected completion times for the two categories of projects.

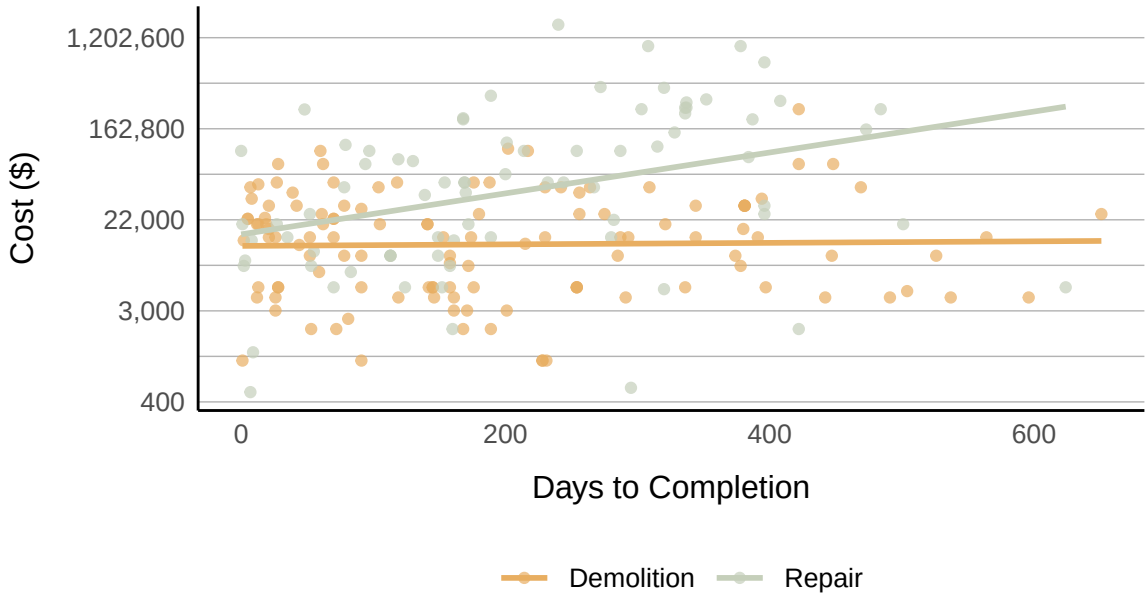
### Projects In Progress

In this section we evaluate the timeline of completed projects considering the project cost. The first step to estimating when recovery efforts will be complete is examining how long the finished projects have taken to complete. The median time to completion for demolition projects was 161 days from the date the permit was issued, whereas the median time to completion for repair projects is 171 days. Demolition permits are typically issued the same day as the permit application, whereas repair permits have to undergo a review process.

Figure 5 plots cost (scale is in natural log form) against the time to completion, which we define as the number of days between when the permit is issued and when the final inspection is complete. Partial and Full Demolitions are grouped together as "Demolitions," and Repairs and Repair & Remodels are grouped together as "Repairs."

The plot demonstrates a weak but positive relationship between cost and completion time for repair projects. In other words, more expensive repair projects have taken longer to finish than less expensive repair projects. However, there is essentially no relationship between cost and time to completion for demolition projects, suggesting that the size of demolition projects is not a strong determining factor for the duration of the project.

**Figure 5: Cost Vs. Completion Time**




Note: Cost plotted in natural log form.

Subsequently, we can estimate the completion time for outstanding projects with the following model:

$$d_i = \beta_0 + \beta_1 c_i + T + \beta_2 c_i T + \epsilon_i$$

where $d_i$ is the days to completion for project $i$, $c_i$ is the cost of project $i$, $T$ is a indicator variable for the type of project, and $\epsilon_i$ is an error term.

## Outstanding Projects

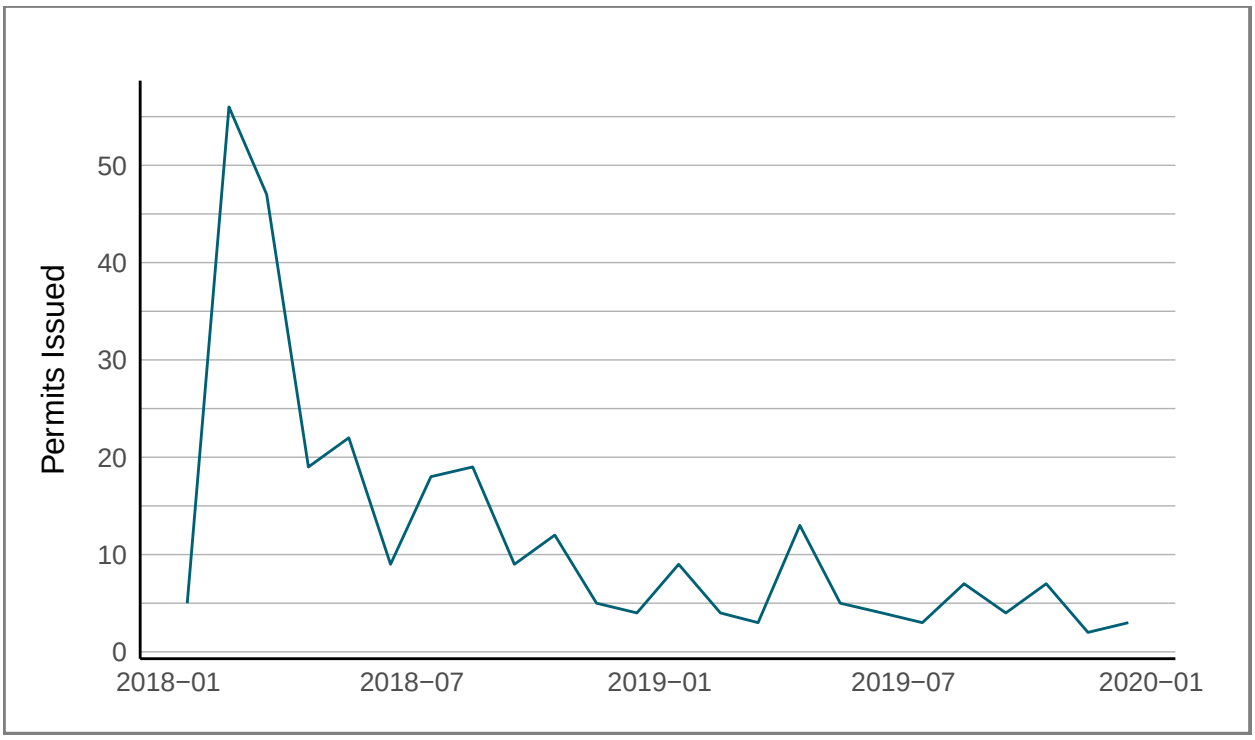
Up to this point we have captured projects that are currently in the production pipeline. However, it is unlikely that owners have filed for all the recovery-related permits. The next step is therefore to estimate the number of outstanding projects. To do so, we first revisit the list of damaged properties. We assume that each structure that was initially tagged Yellow or Red will need one demolition project and one repair project. Next, we take out all projects that have been accounted for in the permitting process (In Progress and Completed). In addition, we take out projects from all parcels that are currently labeled Green but have had no permitting activity under the assumption that debris removal on these parcels represent sufficient recovery. We are left with the number of outstanding demolition and repair projects. Table 2 displays the number of outstanding projects by type.

**Table 2: Estimated Number of Outstanding Projects**

| | Demolitions | Repairs |
|---|---|---|
| Number of Projects | 184 | 204 |

To determine how many projects are likely to begin each month, we can examine the rate at which permits have been issued since the debris flow (see Figure 6). There is a clear downward trend in the monthly volume of permits, which is unsurprising as many people began rebuilding shortly after the disaster.

**Figure 6: Recovery Permits Issued by Month**




After an initial spike and subsequent decline in permitting activity following the debris flow, permitting activity has been relatively stable throughout 2019. Since last May, the county has issued an average of approximately four permits per month. To estimate recovery time for parcels that still need to submit permit applications, we assume that this trend will continue, and that four building permits will be issued each month, consisting of two demolition permits and two repair permits.

Additionally, we utilize Santa Barbara County Assessor data to estimate the cost of outstanding projects. To do so, we first collect the 2017 and 2018 property tax assessments for all parcels damaged by the debris flow. Second, we find the ratio of lost assessed structural value from 2017 to 2018 to the median lost assessed structural value. In so doing, we are implicitly assuming that parcels with more damage will have rebuilding projects that are

more expensive than parcels with less damage. At this point, we have an estimate for the relative damage to a parcel compared to the median damage to all parcels. We then multiply this ratio by repair costs by parcel for outstanding projects to estimate the project cost by parcel. We do not apply this ratio to demolition projects, as the variation in cost of demolition projects was much lower in the observed data than the cost of repair projects.

## Results

Figure 7 displays RDN's estimate for the recovery timeline, broken down by current status. If current trends continue, we estimate that rebuilding efforts will not be fully complete until early 2029, with an estimated cumulative total project cost of $57,529,065.

We note, however, that some building codes changed in response to the debris flow and there has been uncertainty in the insurance market. Additionally, some families have decided to move out of the area and have left the rebuilding process to new-buyers. All of these factors could result in a longer recovery than anticipated.

**Figure 7: Estimated Timeline of Rebuilding Efforts**