

Building Climate Resilience of Urban Waters, Ecosystems, and Communities

Final Report of Findings from Manzanita Canyon for Local Decision Makers
May 2016 - May 2018

2,253 volunteers helped plant 1,536 natives & remove 318 dumpsters of trash & weeds over 2 years, thereby reducing risks of wildfire, flooding, & water pollution!



Community engagement

- **Kid & adult volunteer time** over the past 2 years totaled **7,749 hours**, with an estimated value of **\$89,114 in help received**.
- **Members of the City Heights community** contributed **64% of the total volunteer hours**, and **58% of volunteer hours** were completed by **youth**.
- **33 organizations** hosted volunteers, including school clubs, nonprofits, companies, community & faith-based groups.

Recommendation

Partner with **regional cleanup efforts, local community groups** and/or **community leaders**, for consistent help in motivating and recruiting individuals to volunteer in stewardship efforts (even if the individuals themselves may only participate once).

Trash: 137.5 m³ (13.0 mt) was removed over 2 yrs, with the greatest accumulations in side canyons and access trails in the upper half of the canyon (Fig. 1).

Trash removal surveys

Trash sources can be inferred from the types of trash commonly found in each Canyon region. **Illegal dumping** was likely the major source of trash at Cooper Canyon (based on the removal of tires, furniture, and cement), while **homeless encampments** were likely the major source of trash at Jamie's Way (based on the removal of cookware, bedding, and camping gear). The upstream end of the Canyon floor was dominated by trash from **storm drain inputs** (litter) and illegal dumping (mattresses and other furniture).

Meso-trash & plastics on the Canyon floor

During Spring ('16, '17, & '18) & Fall ('16, '17) transects were surveyed at the head, middle and end of the Canyon. Meso trash (≤ 1 m length) was collected, and sorted by material (plastic, metal, glass, natural fiber, paper, other (usually wood & ceramic)). Plastics were further sorted into use categories (e.g., bags, wrappers & packaging, single use containers, fragments & pieces).

On average:

60% ($\pm 7\%$) of mesotrash (by volume) on the Canyon floor during the five surveys was plastic; **17% ($\pm 9\%$) was mostly lumber and man-made wood**.

51% ($\pm 3\%$) of mesoplastics (by count) were bags, wrappers & packaging; **15% ($\pm 3\%$)** were single use food containers & utensils, **16% ($\pm 3\%$)** were household items like synthetic wipes and electronics pieces.

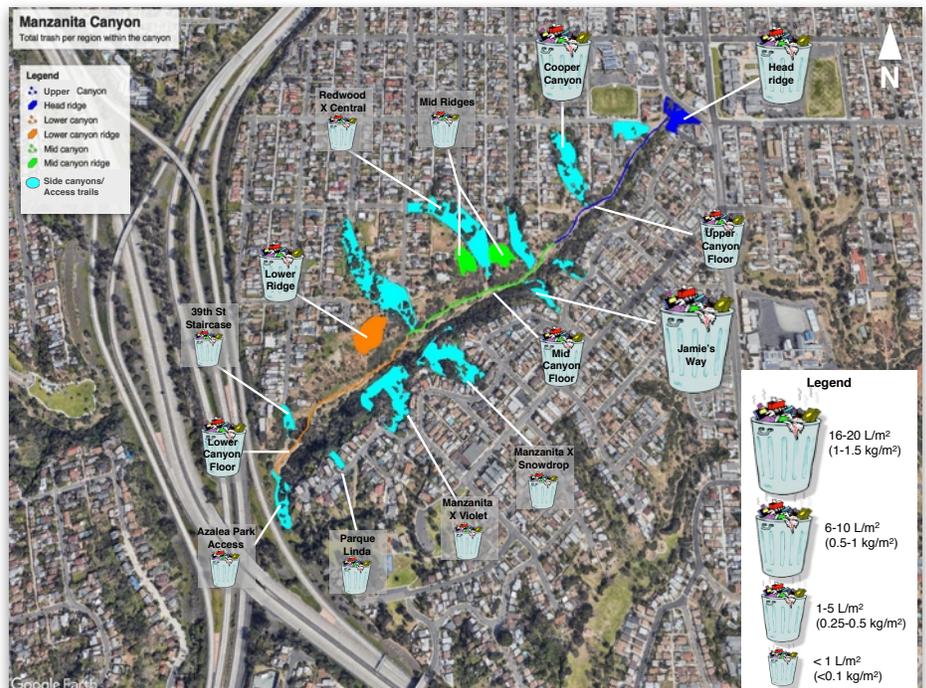


Fig. 1. Amounts of trash removed throughout Manzanita Canyon between May 2016-May 2018.

Recommendations for trash removal & prevention

Focus cleanup efforts in areas of illegal dumping and homeless camps (in cooperation with authorities and inhabitants), especially in obscured side canyons. Add effort by storm drains after rains. Prioritize regionally: Most mid-city parks and open spaces are this trashed or more (e.g., Swan Canyon)!

Work with the City to enforce illegal dumping laws, expand large item pickup services and drop-off locations, and improve clean street strategies.

Work with industry and businesses to initiate incentives for reductions or bans of single use bags, packaging, wrappers and food containers/utensils.

Educate and understand the challenges the community faces in stopping illegal dumping, reducing waste, participating in clean ups, and supporting regional strategies to help the homeless.

620.5 m³ (8.6 mt dry weight) of nonnative plants were removed, and **73 m³ of native perennial plant biomass** was added to the Canyon during the project!

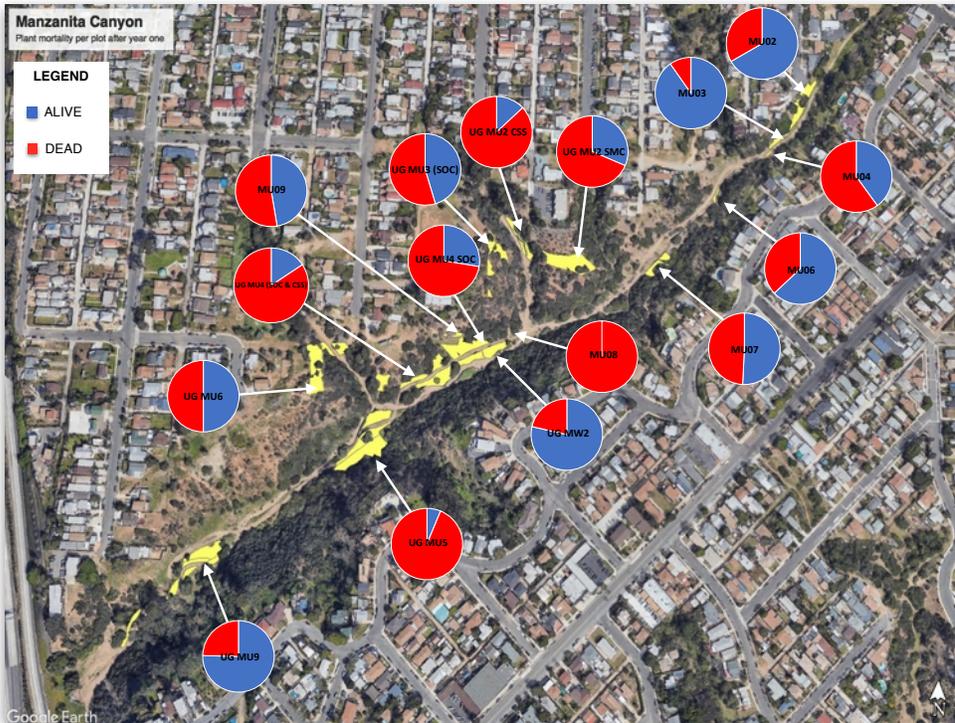


Fig. 2. Survival & mortality of year-1 plants after one year in restoration plots of Manzanita Canyon. Data are from Oct 2016-Jan 2018.

Native plant community restoration

716 natives were planted across 16 plots (Fig. 2) in winter 2016-17 ("year-1 plants"), and monitored monthly for growth and survival for one year after planting. 820 natives were planted in 6 plots in winter 2017-18 ("year-2 plants"), and monitored monthly through May 2018 (Fig. 3).

Survival

- **50% of year-1 plants survived the first year**, ranging from 0% (MU08) to 90% (MU03) survival (Fig. 2). "Dead" was defined as plants lacking green foliage or stems, and those that could not be found after an exhaustive search.
- As of May 2018, **81% of year-2 plants had survived the first few months**; in comparison, survival of year-1 plants was 85% in May 2017.

Plant survival rates are not unreasonable

considering no irrigation system and extremely dry conditions. By comparison, survival in a nearby, irrigated coastal scrub restoration between fall 2015-2016 was 56%¹.

Growth

- **Growth rate (% change in volume) of year-1 plants averaged 95% ± 39%**, ranging from -1% (yarrow in MU03) to 1569% (goldenbush in MU06).

Contributing to variable, sometimes negative, growth rates was loss of stems to natural post-transplant die back, damage from washouts, trampling or grazing, and the subsequent re-sprouting of new, thinner stems.



Fig. 3. Plot MU12 covered in nonnative annuals before being planted (May 2016), and weeded and planted with native perennials (May 2018).

Takeaways and recommendations for restoration

Dry conditions resulted in spikes in year-1 plant mortality throughout the Canyon. **Increase watering** during late summer/early fall and into early winter, during drought² to address lack of moisture. **Weed in cones more regularly** during drought to reduce water competition³.

Trampling & washouts contributed to year-1 plant mortality on canyon slopes and side canyons, especially near renegade trails (e.g., MU 04, 07, 08, & 09). **Increase erosion control and closure of renegade trails** on planted slopes.

Bunny grazing contributed to mortality of favorite species throughout the Canyon (e.g., goldenbush, buckwheat). **Keep cones on bunnies' favorite species**, especially when conditions are dry and food gets scarce.

Canyon ridges experienced high mortality likely due to a mix of dry conditions, clay soils and chosen species — many year-1 scrub oak and wart-stem ceanothus died by summer's end. **Use a planting palette that matches established plant species** in areas lacking obvious causes of mortality (e.g., coyote bush, rock rose on canyon ridges).

In future efforts, consider & allocate resources for:

Expanding use of mulch to maintain soil moisture and enhance microbial activity conducive to natives^{4,5}.

Planting in diverse clumps in open areas and denuded soils for partial shade, mycorrhizal inoculation and/or stabilization^{6,7}.

References

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4. Zink & Allen. 1998. DOI: 10.1046/j.1526-100x.1998.00617.x
5. Talley & Dayton. 2014. Native planting diversity and introduced plant litter influence the development of an urban coastal scrub ecosystem. Unpub MS.
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- 7 Byers, et al. 2006. <https://doi.org/10.1016/j.tree.2006.06.002>