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March 25, 2022

George Garcia, District Ranger
Safford Ranger District
Coronado National Forest
711 14th Avenue, Suite D
Safford, Arizona. 85546

Re: The Pinaleno FireScape Project

Dear Mr. Garcia,

Taproot Collaborative is a 501(c) (3) public charity whose mission is to unite diverse perspectives to create resilient ecosystems. We appreciate the opportunity to comment on the Pinaleno FireScape project.

As the effects of climate change and a multi-decadal drought on public lands and biodiversity becomes more apparent, it is critical that land managers foster forward thinking strategies to protect natural systems. We are encouraged to see the Pinaleno FireScape take important steps in this direction.

Of particular interest we support the proposed actions to improve and revegetate watersheds. Due to climate change over the coming century temperatures are expected to climb, while rain and snowfall patterns in the Madrean Archipelago Ecoregion are expected to dwindle.ⁱ Significant computer modeling has been done to estimate future water availability in the region. Estimates suggest as much as a 31% decrease in Colorado basin river flows by the middle of the 21st century.ⁱⁱ While local anomalies surrounding the Pinaleno's might cause slight variances to the larger basin pattern, there is no reason to think they would be significantly different.ⁱⁱⁱ

This increase in heat and reduction of moisture will further stress biodiversity already challenged by the megadrought, setting into motion a cascading loss of wildlife habitat and outdoor recreational opportunities: wet meadows will continue to dry out, water tables will continue to fall, streams will become increasingly intermittent, additional stands of trees and vegetation will be lost to insects, disease, and more intense and destructive wildfires. Anyone who frequents the area has seen ravages of these fires and subsequent erosion. The loss of the spruce-fir-pine forest

on Grant Hill, and the stunning before and after effects on the Lower Hospital Flat campground from the 2017 Frye fire are leading examples. The FireScape's proposed watershed restoration and revegetation actions are crucial additions that will give land managers an important tool to foster the long-term resiliency of these natural systems.

The use of low-cost, low-impact erosion control strategies in the Pinalenos are smart approaches given the geographical configuration of the Pinalenos. Building small, low impact water retention structures out of found materials like rock and woody debris is a strategy that dates to the prehistoric people of the southwest.^{iv} For thousands of years, throughout the Madrean Archipelago Ecoregion, indigenous people designed different forms of water retention structures. Used primarily to retain rain and snowfall for agriculture, techniques like media lunas^v and Zuni bowls,^{vi} were used extensively throughout the region. Another technique, trincheras, were used with such frequency the term was used by archeologist to refer to an entire cultural pattern that existed in Sonora, Mexico from about 800 A.D. up until Spanish Colonization at about 1450 A.D.^{vii}

Over the last fifty years the idea to duplicate these strategies to restore ecosystem resilience has been advanced by forward-thinking individuals in the private and public spheres.^{viii} In the 1960's the USFS began experimenting with check dams in the Colorado front range, documenting erosion control and water quality improvements both onsite and downstream. Beginning in mid-1980s, other techniques like gabions and gully plug were installed alongside trincheras in private landholdings on either side of the United States-Mexico border to enhance wildlife habitat.^{ix}

^xSince then multiple efforts have been undertaken in southeastern Arizona by non-profits and governmental agencies including the USFS, USFWS, and the USGS. These entities have sought to investigate the use of water retention structures to enhance wildlife habitat resiliency and alleviate drought conditions. Models consistently document an increase in vegetation and available water.^{xi}

Taproot collaborative is pleased to see the Pinaleno FireScape opens the door for the use of these tools used in the Pinalenos. They hold significant potential for assisting the regeneration climate stressed ecosystems,^{xii} while giving biodiversity and wildlife habitats greater resilience and adaptability over the next century.

Sincerely,

Scotty Johnson

Founder/Director of Taproot Collaborative

ⁱ The National Climate Assessment. 2018 <https://nca2014.globalchange.gov/report/regions/southwest>.

ⁱⁱ P.C.D. Milly and K.A. Dunne. [Colorado River flow dwindles as warming-driven loss of reflective snow energizes evaporation](#). *Science*. Published online February 20, 2020. doi: 10.1126/science.aay9187

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- iv Merrill, William L. et al, "The Diffusion of Maize to the Southwestern United States and its Impact." *Proceedings of the National Academy of Sciences of the United States of America*. Vol. 106, No. 50 (December 15, 2009), pp. 21019-21020 <https://www.pnas.org/doi/10.1073/pnas.0906075106>.
- v "Watershed Restoration: Constructing a Media Luna." Milkweed. <https://www.milkwood.net/2012/04/24/watershed-restoration-constructing-a-media-luna/>
- vi "Making a Zuni Bowl: Let Water Do the Work." Milkweed. <https://www.milkwood.net/2011/11/04/making-a-zuni-bowl-let-the-water-do-the-work/>
- vii "Trincheras" Museum of Northern Arizona, Northern Arizona University, and the US Park Service. https://swvirtualmuseum.nau.edu/wp/index.php/cult_land/archaeological-cultures/trincheras/
- viii "Photo Essay:Trincheras, dams for erosion control and streambed restoration." (2006) USDA Forest Service Proceedings. Citation Valer and Josiah Austin. <https://www.srs.fs.usda.gov/pubs/22751>
- ix Dobie, K . An amateur rancher brings the wastelands of the Southwest back to life. CNN. September 21, 2012. <http://www.cnn.com/2012/09/21/living/oprah-rancher/index.html>. Accessed June 17, 2013.
- x Barry, T . Transborder drylands restoration: vision and reality after three decades of innovative partnerships on the U.S.-Mexico border. *SAPIENS Surv Perspect Integrating Environ Soc.* 2014;7.2. <http://sapiens.revues.org/1553>. Accessed September 30, 2014.
- xi "Hydrologic investigations of rock detention structures." Norman, Laura. Joint conference for Texas and Southwest Chapters of the Society for Ecological Restoration. 2014.
- https://www.academia.edu/31149392/Hydrologic_Investigations_of_Rock_Detention_Structures
- xii Norman, Laura. Ecosystem Services of Riparian Restoration: A Review of Rock Detention Structures in the Madrean Archipelago Ecoregion. August, 2020. <https://journals.sagepub.com/doi/10.1177/1178622120946337>