OPERATION SUPER-SOAKER: WILDFIRE PREVENTION IRRIGATION SYSTEM

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PRESENTATION OVERVIEW

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INTRODUCTION

- 1.1 Problem Statement
- 1.2 Background
- 1.3 Needs Statement
- 1.4 Objective

1.1 PROBLEM STATEMENT

- California has had 2 major wildfires in 2018 and 2019 with 2020 and 2021 close behind.
- Climate Change part of the blame for the uptick in California Fires. The warmer temperatures lead to an environment devoid of moisture providing excellent tinder.
- The intensity of these disasters are growing each year. Thousands of homes are at risk for evacuation and many ecosystems are being destroyed.

1.1 PROBLEM STATEMENT

Live Footage of a 2018 Wildfire in Shasta County, a County in the northern part of California

1.2 BACKGROUND

- This past April, Governor Newson has authorized the funding of $536 millions dollars towards fire prevention, more than double what the state's done in the past.
- The cost of the Governor's initiative seems expensive, but pales in comparison to the cost of fire damage. In 2018, California faced $102.6 Billion dollars in wildfire damage, roughly 0.5% of the annual GDP of the United States.

1.2 BACKGROUND

To deal with wildfires, California's government currently relies on:

- Prescibed burning
    1. Reduce the amount of fuel for wildfires
    2. Encourage growth in plants and trees
- Direct firefighting with water or flame retardant chemicals

1.3 NEEDS STATEMENT

Issues with the previous methods:

- Prescribed burning contributes to pollution

- Hundreds and thousands of gallons of water are used to fight fires

- Flame retardant chemicals contaminate the water supply and the ecosystem

USGS, 2009

1.4 OBJECTIVE

- Obtain permission to implement our irrigation system in Day valley
- Receive a grant to cover our materials and labor costs.
- Receive permission from elected officials to direct water towards our pipelines
- If our results prove that an irrigation system reduces unintentional fires in an acre of land, we can implement this system in other high-risk areas.

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PROPOSED TECHNICAL APPROACH

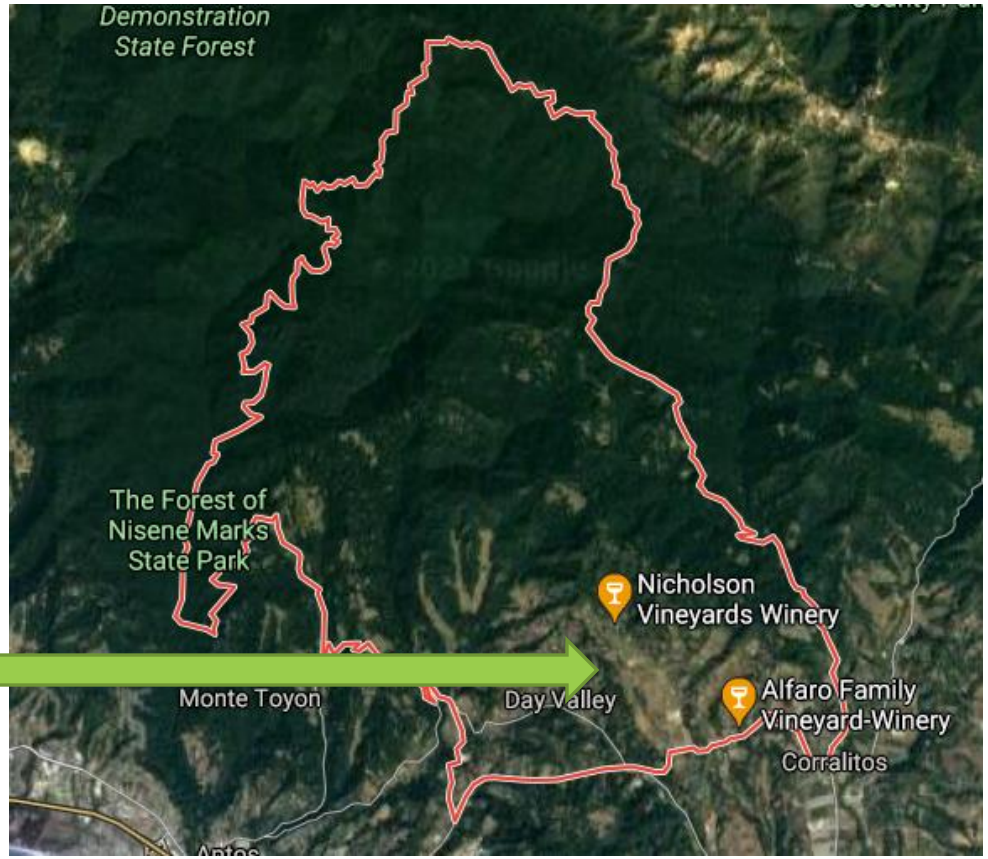
- 2.1 Technical Approach
- 2.2 Location and Time
- 2.3 System Design
- 2.4 Implementation

2.1 TECHNICAL APPROACH EXPLAINED

- Operation Super-Soaker and Plan Mini-Soak have one objective: Keep the ground moist.
- An area of moisture should not exhibit the same wildfire spread as an area with no moisture.

2.2 LOCATION AND TIME

DAY VALLEY, CALIFORNIA



2.2 LOCATION AND TIME

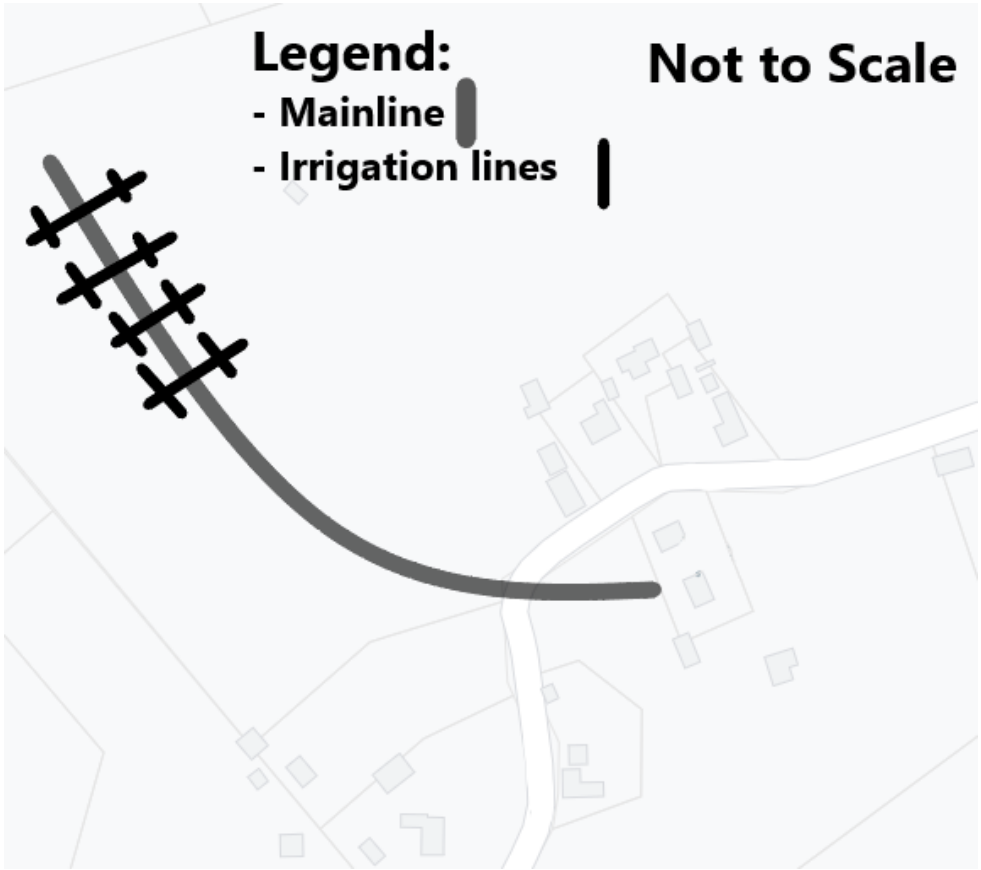
DAY VALLEY, CALIFORNIA

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2017	12.39	9.76	3.18	3	0.06	0.08	0	0	0.13	0.05	2	NA
2018	3.30	0.20	7.25	2.06	0.04	0	0.02	0	0	0.10	3.70	2.65
2019	5.23	7.38	5.06	0.38	1.86	0.08	0.01	0.02	0.01	0	0.56	10.08
2020	1.93	0	3.75	3.01	0.82	0.03	0	0	0	0	1.18	1.91

Precipitation Data in Inches based on Watsonville, California (NOAA)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2017	26	30	30	37	41	43	50	53	40	34	30	19	19
2018	27	21	27	35	38	44	49	48	44	37	25	24	21
2019	23	27	33	38	40	47	39	39	37	25	25	25	23
2020	28	21	28	35	41	46	46	49	44	34	24	25	21
Mean	26	25	30	36	40	45	46	47	41	33	26	23	21
Max	28 2020	30 2017	33 2019	38 2019	41 2020	47 2019	50 2017	53 2017	44 2020	37 2018	30 2017	25 2020	23 2019
Min	23 2019	21 2020	27 2018	35 2020	38 2018	43 2017	39 2019	39 2019	37 2019	25 2019	24 2020	19 2017	19 2017

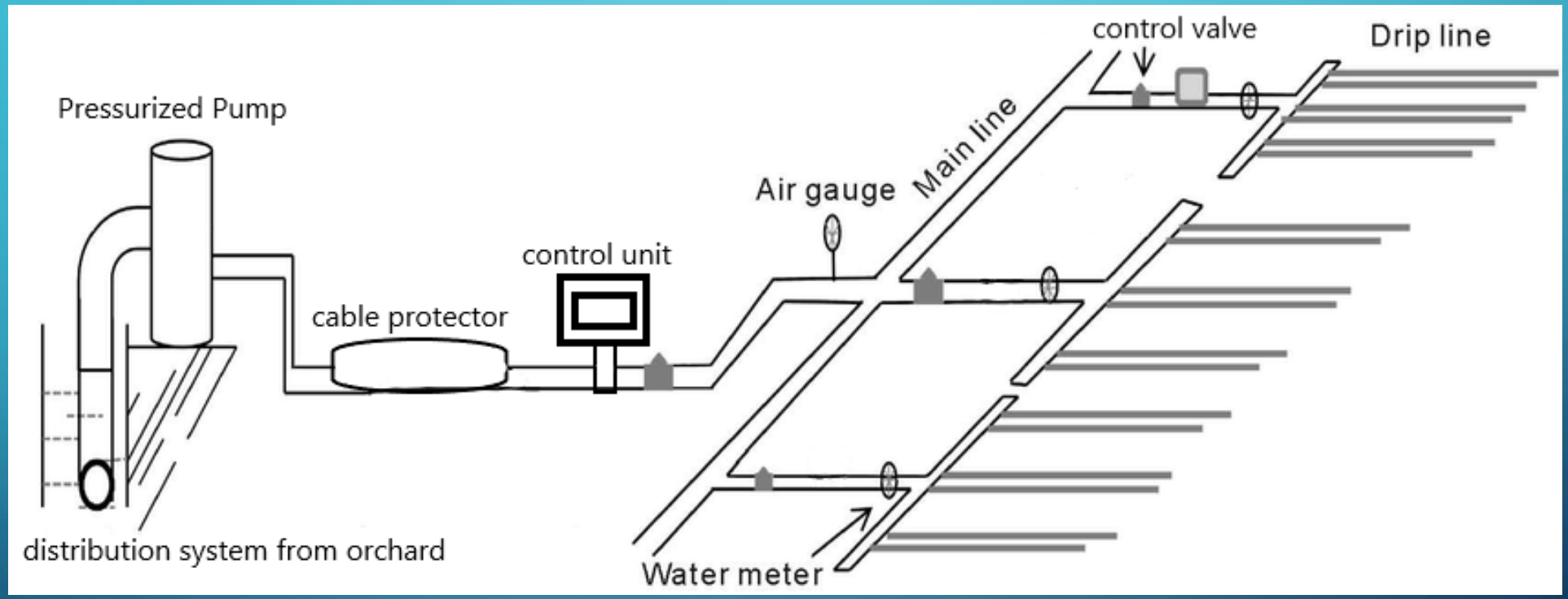
4-year monthly minimum recorded temperatures in Central Coastal California (NOAA)



2.3 SYSTEM DESIGN

- From the mainline, smaller irrigation pipes extend outward through the area of the acre to sprinkle water across the acre.
- Mainline: About a third of a mile long

2.3 SYSTEM DESIGN AND INFRASTRUCTURE



2.4 IMPLEMENTATION

- The irrigation will go on for the summer months until the heat begins to drop, signalling the end of the wildfire season. This will continue for two years until enough data has been collected for the purpose of the larger scale systems.
- If the data is as we predicted, that this system will keep the soil moist during the summer, and prevent wildfires from being uncontainable, then we will implement the system in other high-risk towns that are likely to evacuate if a wildfire were to strike their area.

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EXPECTED PROJECT RESULTS

- 3.1 Measures of Success

3.0 EXPECTED PROJECT RESULTS

- Day Valley will be much more fire resistant
- This in conjunction with the state efforts to fire-proof homes will make Day Valley safer
- Local areas will be able to rebuild from past fires and bring back tourists and residents, generating revenue for the area

3.1 MEASURES OF SUCCESS

The measure of success is determined by the occurrence of fires in the area being irrigated. All this data is already recorded by CAL FIRE. If the area being irrigated sees a drop in fire occurrences and duration, then the program works.

4. SCHEDULE

Task	Start Date	End Date
Get approval and funding from Governor Newsom	6/1/2021	9/1/2021
Create job postings •The employees we need include construction workers •We also want to hire an Environmental Engineer to study and modify the design if necessary	9/1/2021	9/2/2021
Order materials from supplier	9/1/2021	10/1/2021
Plan out a scheduled prescribed burning with the State Fire Prevention Department	9/2/2021	9/8/2021
Hire workers •This time period includes reading resumes and hosting interviews. Orientation will occur during the final week of hiring.	9/8/2021	10/1/2021
Construct pipeline and irrigation system according to the planned architectural design	10/7/2021	5/1/2022
Install moisture sensors and develop automated system	5/10/2022	5/20/2022
Monitor Day Valley area for wildfires using CAL FIRE	5/20/2022	5/20/2024

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BUDGET

Materials and labor	Quantity	Cost
Mainline 12-inch diameter PVC pipes	2,400 feet	$60,000
Drip lines (PVC piping)	5,000 feet	$95,000
Pressurized Pump	1	$2,500
Air Gauge	1	$300
Cable Protector	1	$200
Control Unit	1	$1,000
Water Meters	10	$2,500
Moisture sensors	10	$2,000
Laborers	10	$441,000

Total: $604,500

CONCLUSION

- The goal of our proposal is to reduce the number of wildfires that California experiences each year.
- We just need:
  - Permission to construct a pipeline through a portion Day Valley
  - Funding to cover our expenses

THANK YOU

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