Witch Creek Fire

Olivia Husak

AGENDA

1. Wildfire Introduction
2. Witch Creek Fire Overview
3. Sequence of Events
4. Error Analysis
5. Cause and Effect Cycles
6. Wildfire Size Accumulation Demonstration
7. Concluding Remarks and Questions

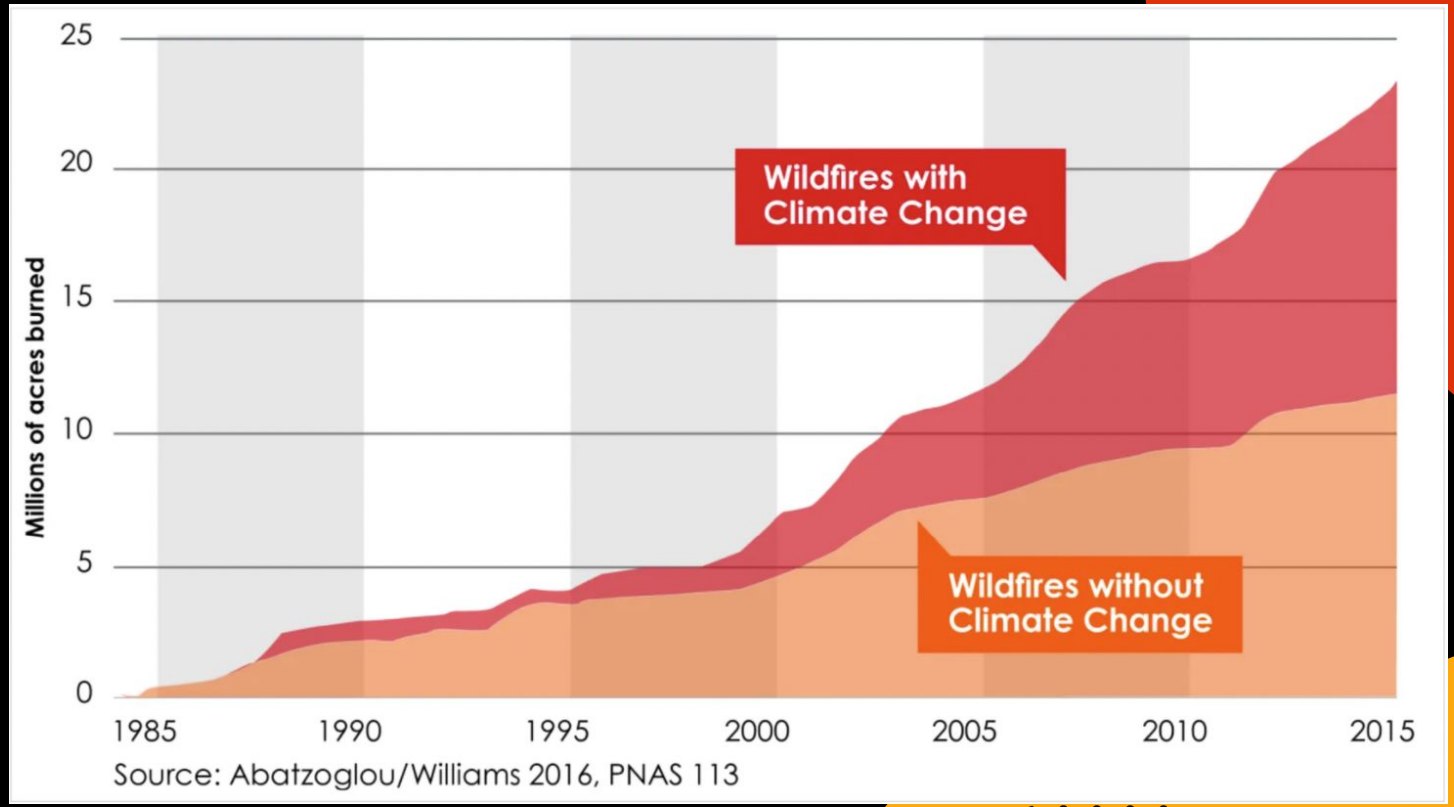
01

Wildfire Introduction

ABOUT WILDFIRES

- Naturally occurring disasters
- Necessary to remove dead trees, leaves, and competing vegetation from the ground so new plants can grow
- Over the past decade, there was an average of 62,693 wildfires annually in the US
- Wildfire sizes are increasing due to global warming
- Estimated 95% are human caused

ACRES BURNED BY YEAR



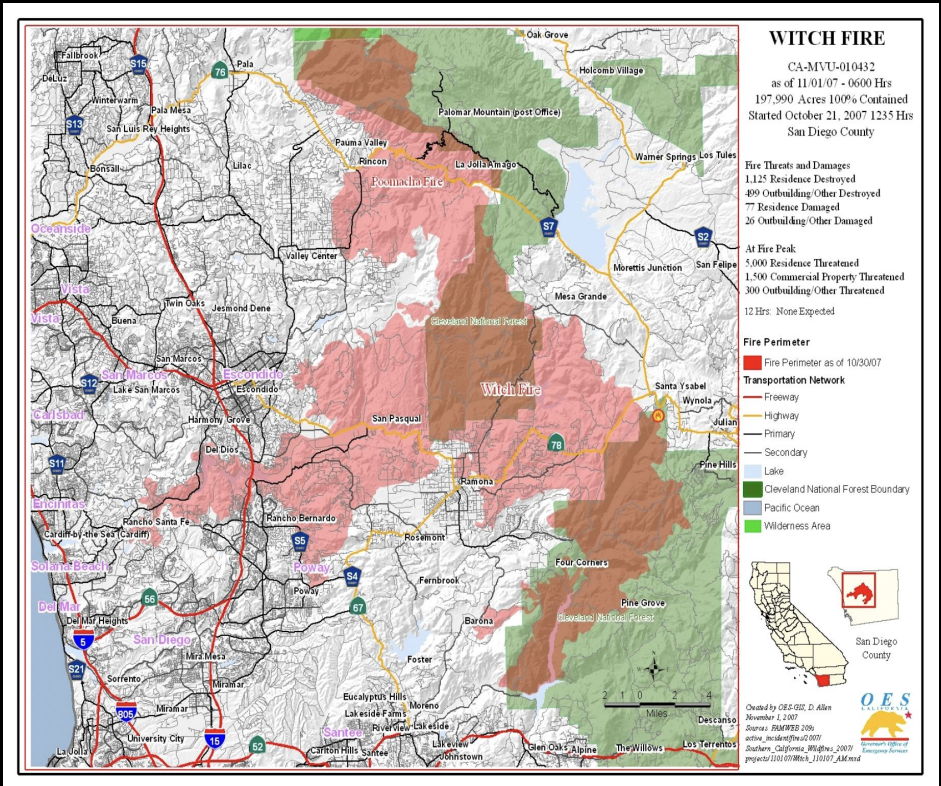
02

The Witch Creek Fire

WITCH FIRE OVERVIEW

- Sixth most destructive wildfire in California record
- Started on October 25, 2007 and burned for 17 days in San Diego County
- Burned 198,000 acres (merged fire totalled 250,000 acres)
- Destroyed 2,000 buildings
- 10 deaths from complex fire
- Over $1.3 billion in (insured) damages

Fire Map


WITCH FIRE
CA-MVU-010432
as of 11/01/07 - 0600 Hrs
197,990 Acres 100% Contained
Started October 21, 2007 1235 Hrs
San Diego County
Fire Threats and Damages
1,125 Residence Destroyed
499 Outbuilding/Other Destroyed
77 Residence Damaged
26 Outbuilding/Other Damaged
At Fire Peak
5,000 Residence Threatened
1,500 Commercial Property Threatened
300 Outbuilding/Other Threatened
12 Hrs: None Expected
Fire Perimeter
Fire Perimeter as of 10/30/07
Transportation Network
Freeway
Highway
Primary
Secondary
Lake
Cleveland National Forest Boundary
Pacific Ocean
Wilderness Area
San Diego County
Created by OES-GIS, D. Allen
November 1, 2007
Sources: FAMWEB 2009
active_incidentfires/2007/
Southern_California_Wildfires_2007/
projects/110107/Witch_110107_AM.mxd
Miles
Oak Grove
Holcomb Village
Palomar Mountain (post Office)
Pauma Valley
Rincon
La Jolla Amago
Poomacha Fire
Warner Springs
Los Tules
Morettis Junction
San Felipe
Mesa Grande
Cleveland National Forest
Witch Fire
Santa Ysabel
Wynola
Julian
Pine Hills
San Pasqual
Ramona
Rancho Bernardo
Rancho Santa Fe
Cardiff-by-the Sea (Cardiff)
Rosemont
Four Corners
Fernbrook
Pine Grove
Barona
Foster
Eucalyptus Hills
Lakeside Farms
Moreno
Riverview
Lakeside
Lakeview
Johnstown
Glen Oaks
Alpine
The Willows
Los Terrentos
Descanso
Santee
Carlton Hills
Miramar
Sorrento
Mira Mesa
Del Mar Heights
Del Mar
Solana Beach
Encinitas
Carlsbad
Vista
Oceanside
Escondido
San Marcos
Lake San Marcos
Harmony Grove
Del Dios
Twin Oaks
Jesmond Dene
Buena
Valley Center
Lilac
Bonsall
Winterwarm
Pala Mesa
San Luis Rey Heights
Fallbrook
DeLuz
Pala
Poway
San Diego
Miramar
University City
La Jolla

03

Sequence of Events

TIMELINE

1

IGNITION

Two power lines collided, throwing sparks onto nearby brush in San Diego County

3

SPREAD

Witch Fire spread rapidly with optimal weather conditions and thinly spread fire department due to neighboring wildfires

6

MERGE

Uncontained, the Witch Fire merges with local wildfires to nearly double in size

17

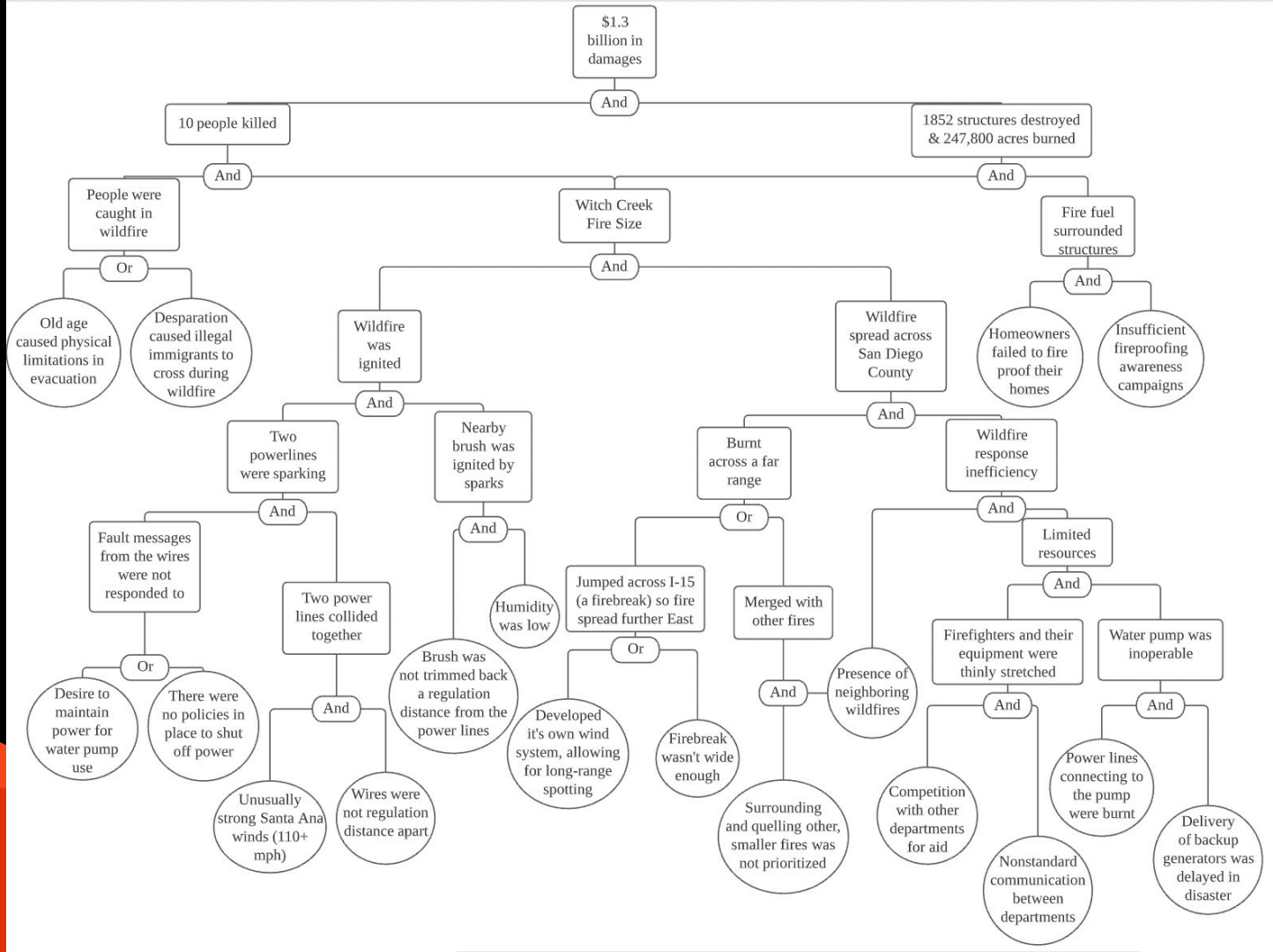
EXTINGUISH

With outside assistance, the Witch Complex Fire is 100% contained

04

Error Analysis

FAULT TREE DIAGRAM



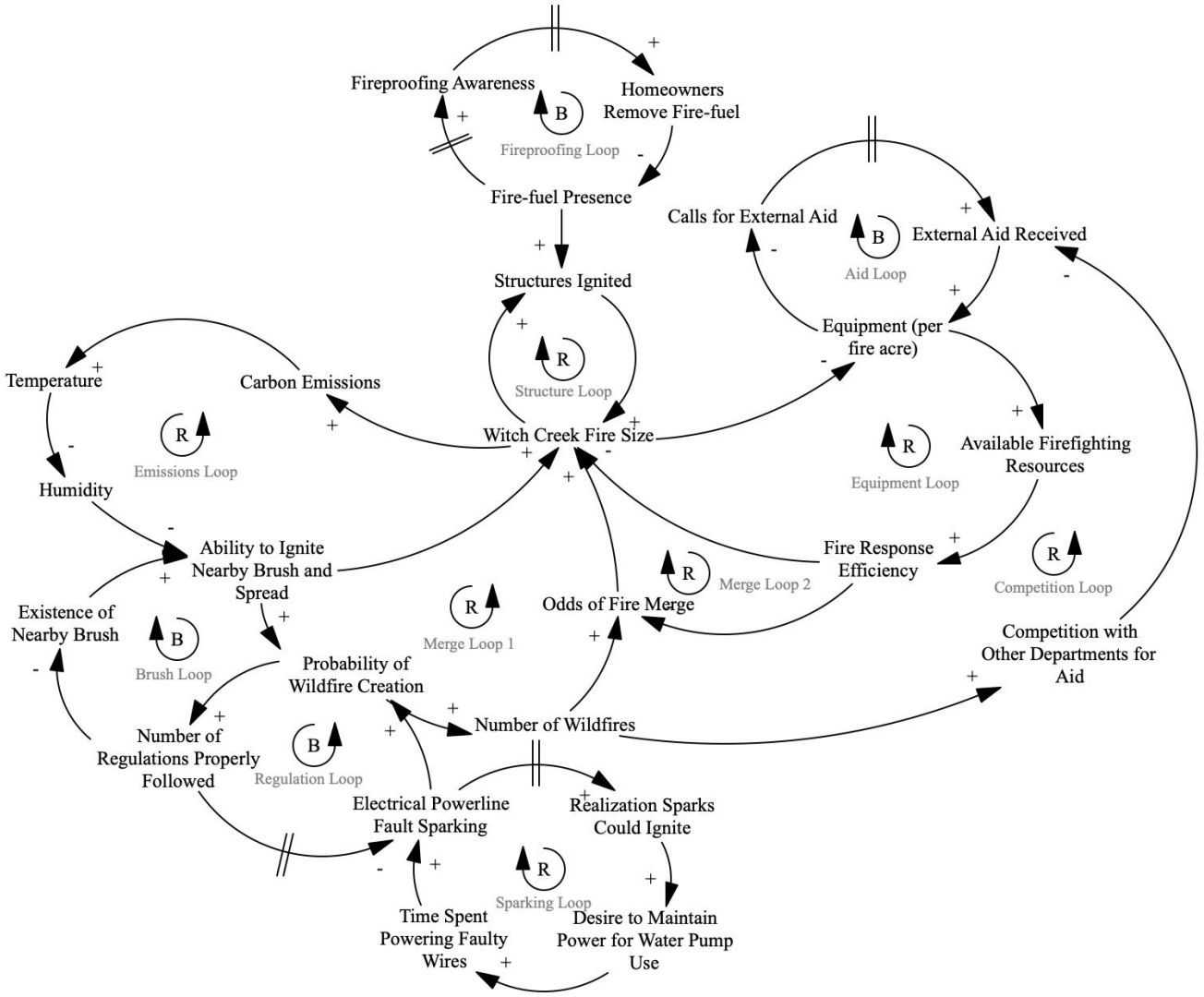
MAIN ERRORS

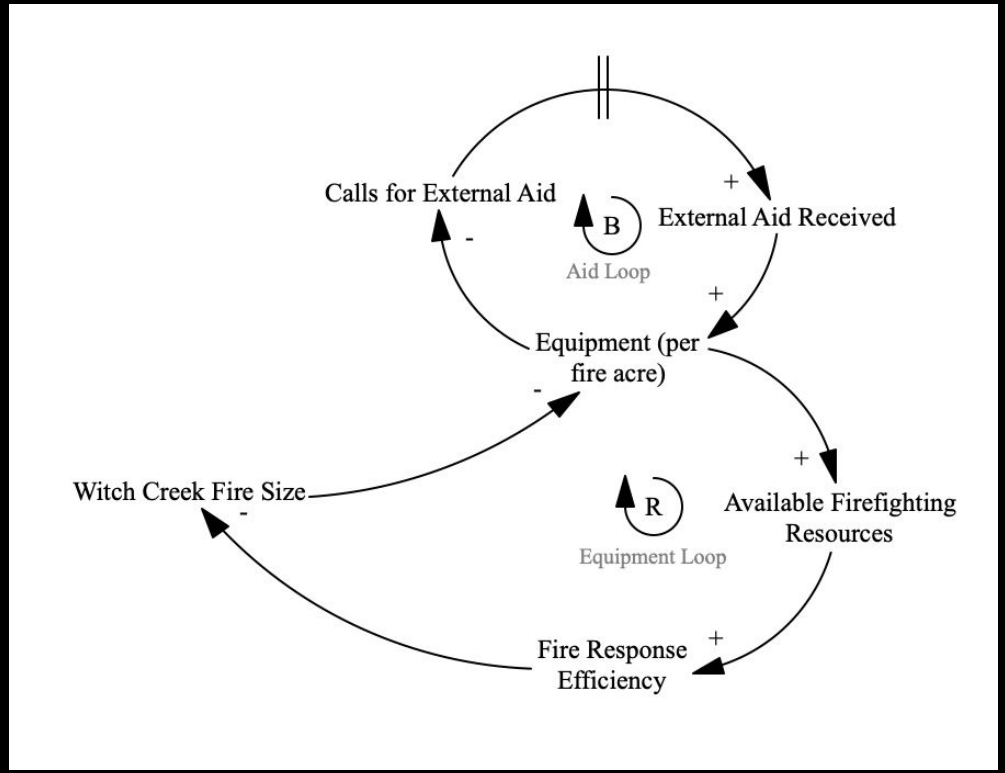
- **Environmental**: wind, heat, dryness
- **Task**: powerline regulations not followed, fault messages not responded to
- **Equipment**: water pump failure
- **Management**: lack of resources and preparation for fire magnitude, no policy in place for shutting off power from sparking power lines
- **Human**: homeowners didn't fireproof their homes

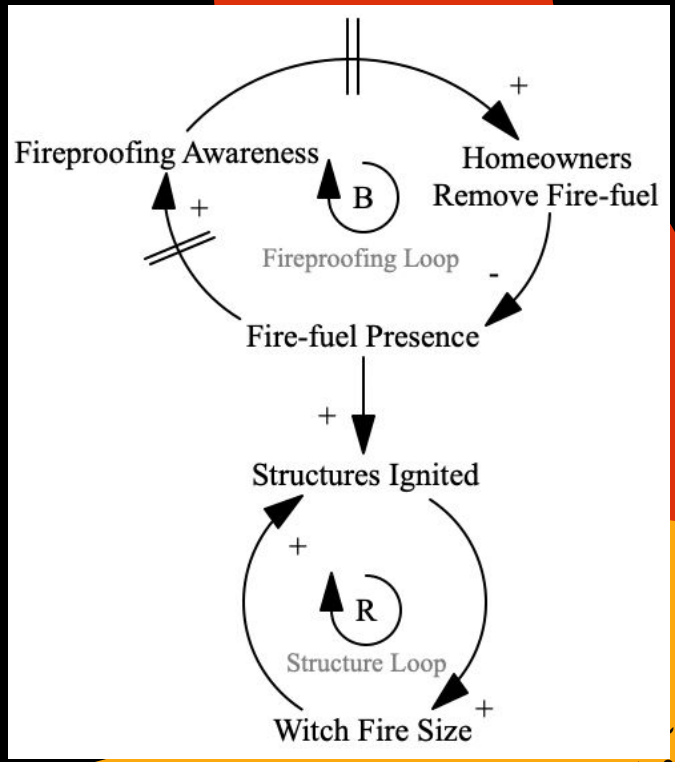
05

Cause and Effect Cycles

CAUSAL LOOP DIAGRAM



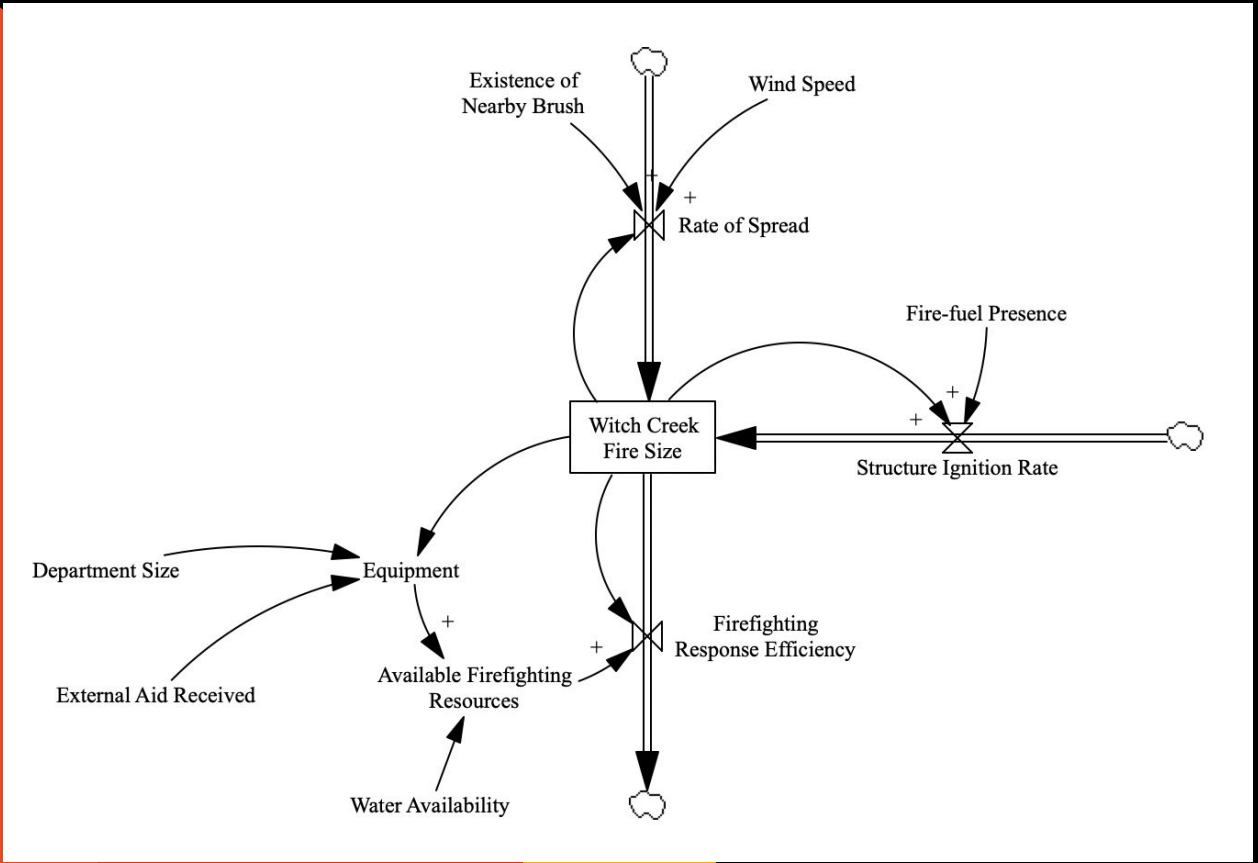

Calls for External Aid
B
Aid Loop
External Aid Received
Equipment (per fire acre)
Witch Creek Fire Size
R
Equipment Loop
Available Firefighting Resources
Fire Response Efficiency


Fireproofing Awareness
B
Fireproofing Loop
Homeowners Remove Fire-fuel
Fire-fuel Presence
Structures Ignited
R
Structure Loop
Witch Fire Size

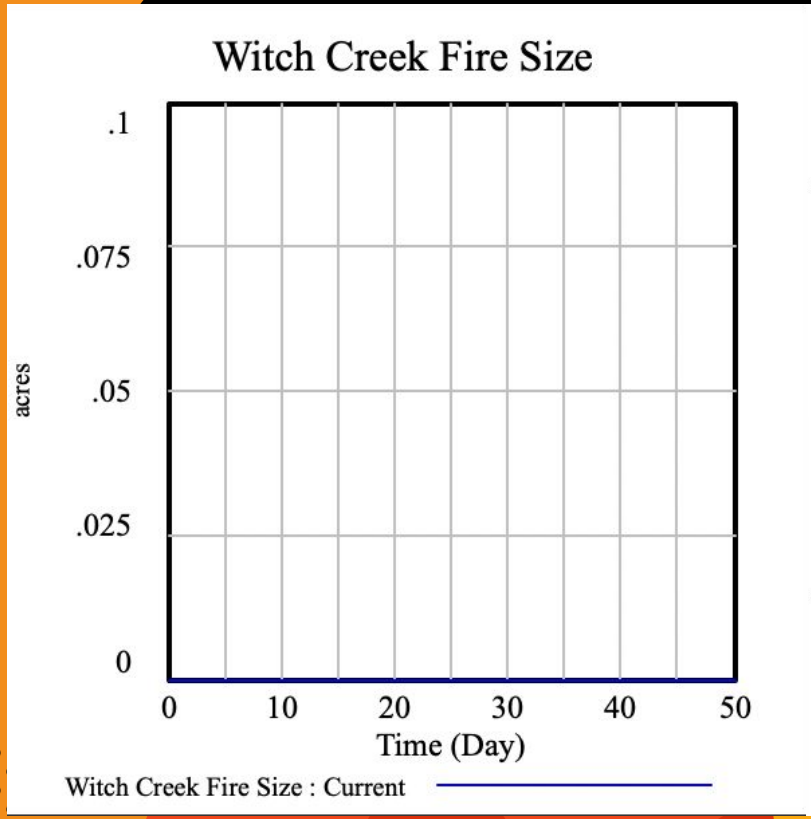
06

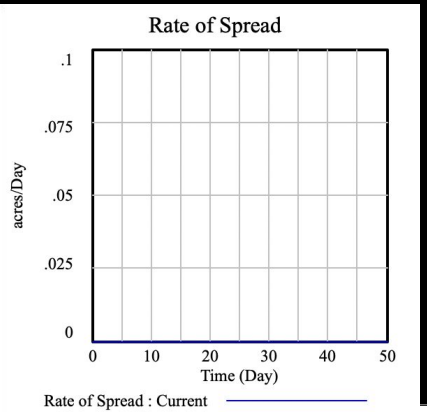
Wildfire Accumulation Simulation

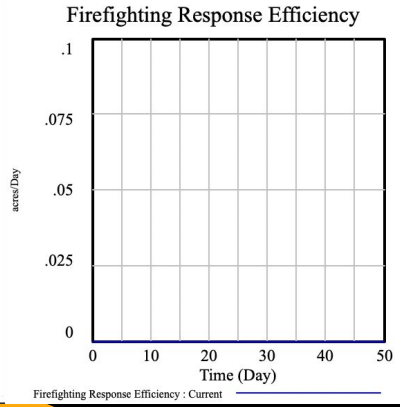
STOCK AND FLOW DIAGRAM

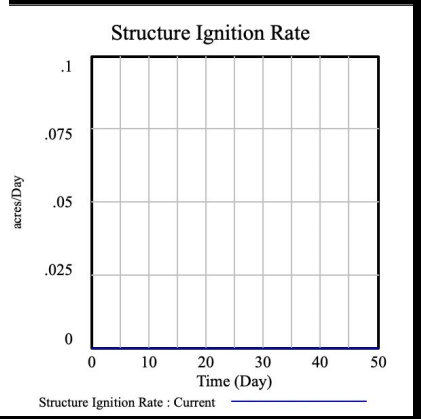


HAPPY LAND SCENARIO

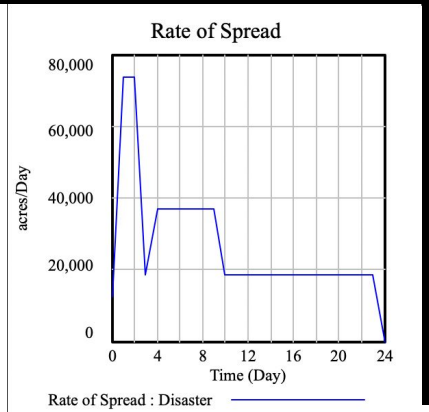


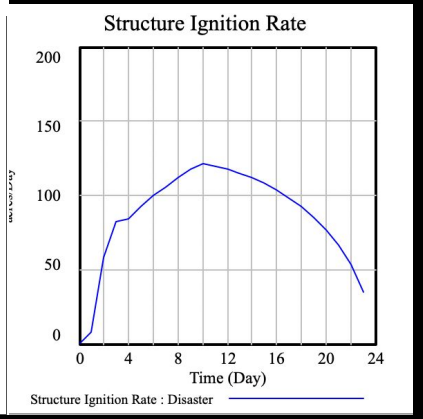


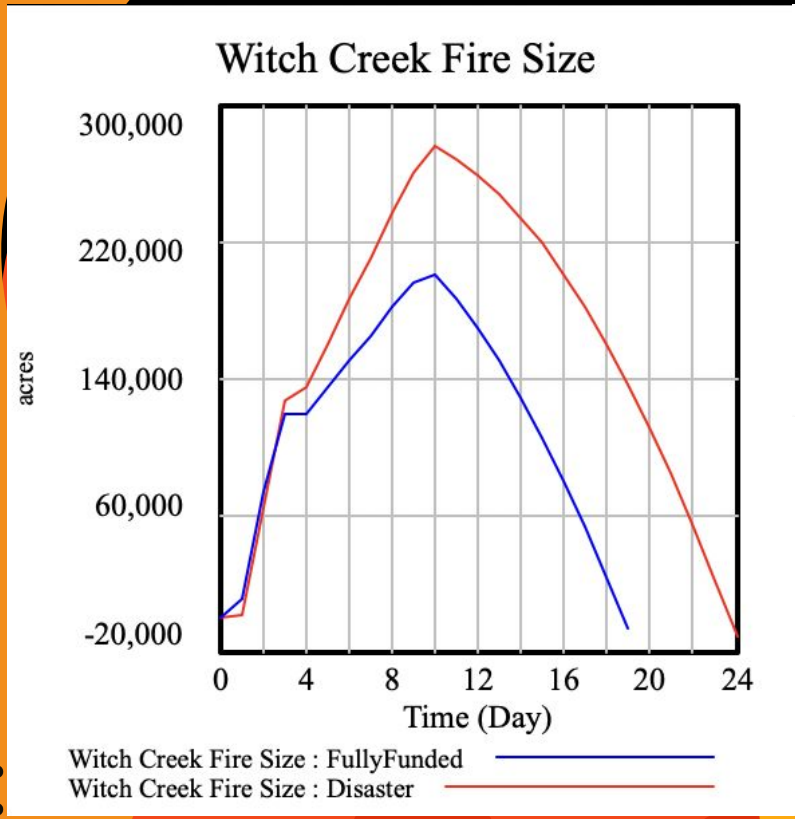


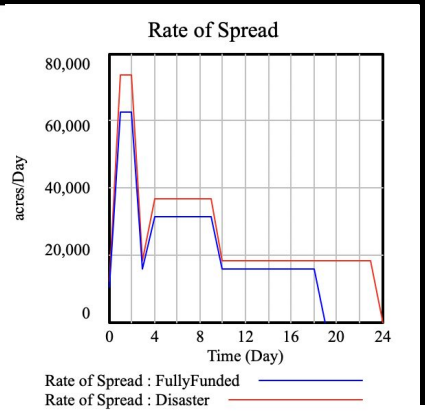


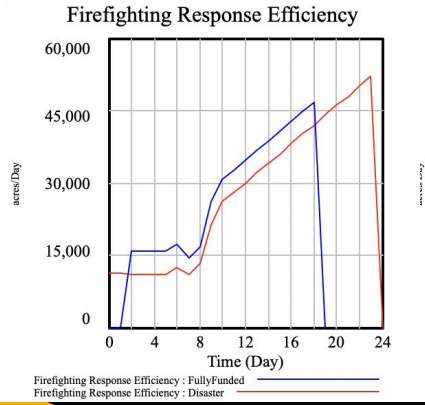
DISASTER SCENARIO

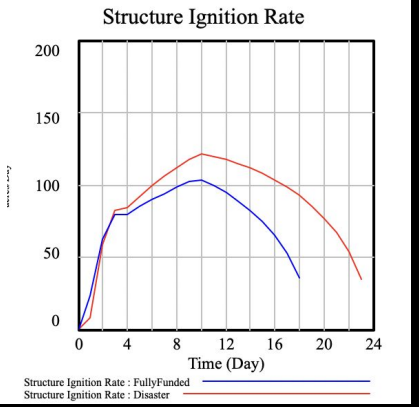






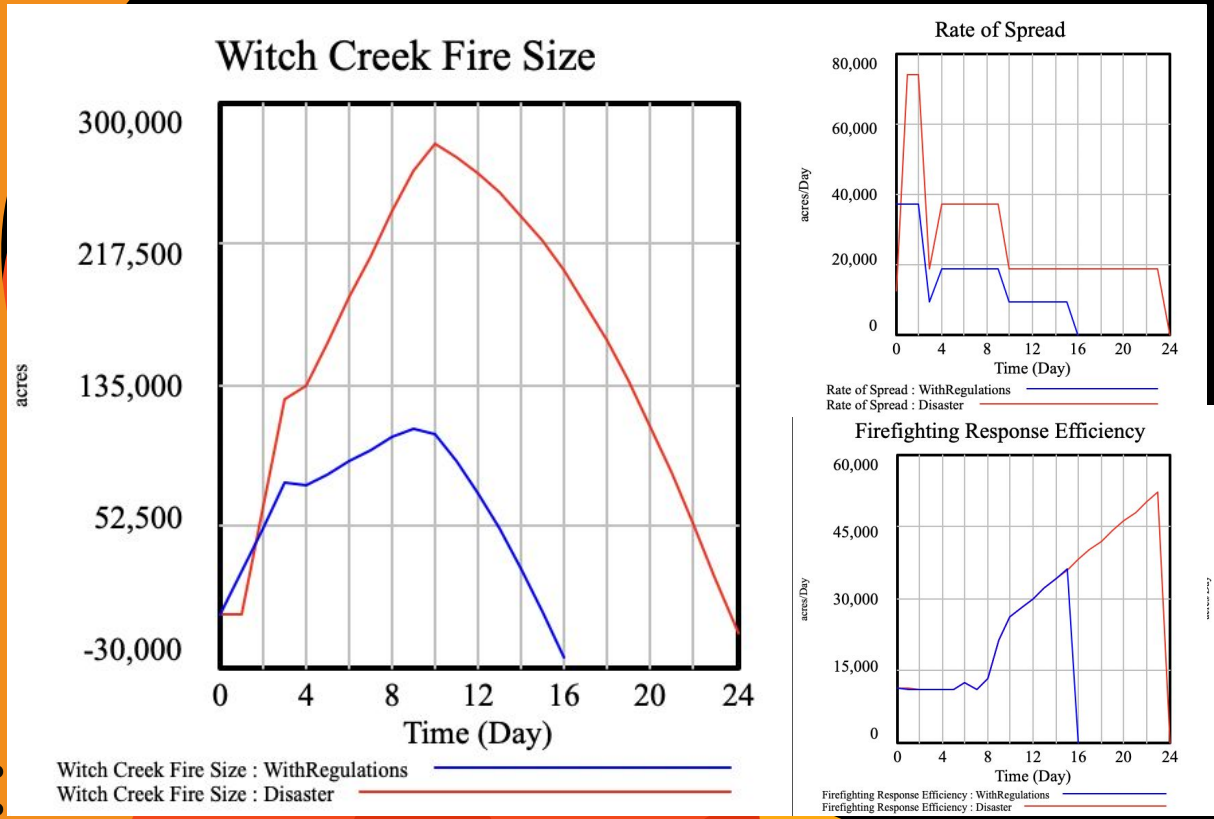


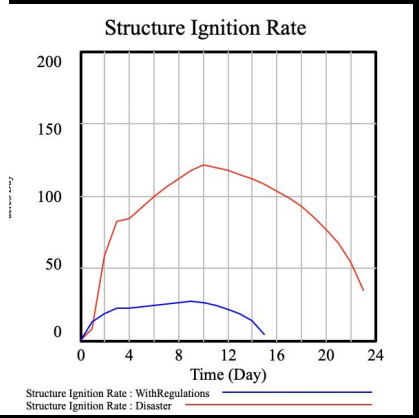




WHAT IF 1:

Departments are adequately funded & there are no resource shortages





WHAT IF 2:

Fire-proofing regulations are imposed and followed

07
Conclusion

IMPLICATIONS

- Fireproofing homes results in a massive reduction in home ignition (est. 70-99%), which reduces insured damages
- Removing brush (controlled burns, trimming back from wires) can prevent initial ignition and significantly hamper, even block, fire spread
- Fully funding departments with personnel, trucks, and helicopters gives them resources they need to adequately respond to large wildfires
- Prepare with backup generators for water pumps (water is crucial to fire response)

Thank You!

Any Questions?