

SESSION 3

Evacuations: Laws, Practices & Technology

Exploration of new evacuation laws (SB 99, AB 747), OPR updates, and approaches to modeling.



Purpose

Join city/county planners with wildfire professionals and experts to proactively protect and preserve housing from wildfires.

Learn from state and national experts that outline current science, technology, programs and best practices.

● Expectations Overall

- The Bay Area has overlapping crises. We need to solve for multiple complicated and connected crises.
 - Housing affordability, climate change, and inequity are all pressing challenges. We can't solve just one crisis.
- Get grounded with current experts to frame issues and ideas more comprehensively with staff.
- Need holistic and integrated policies and programs. Solutions exist - focus on what local government can do to have an impact.

● Expectations of the Session

- Seeking active conversations and the wisdom in the room.
- Turn on camera and participate during discussion portion.

WORK GROUP MEETINGS

WILDFIRES - PRESERVATION & PROTECTION OF HOMES

9/30

COMPLETED

Wildfires & Housing 101

Overview of fire evolution, fire science, intro to home hardening & defensible space, plus introduction of Marin Wildfire Prevention Authority.

10/14

COMPLETED

Defensible Space & Home Hardening + CAL FIRE Update

Deep dive into defensible space & home hardening with updates from CAL FIRE plus practical resident guidance.

11/4

Evacuations: Laws, Practices & Technology

Exploration of new evacuation laws (SB 99, AB 747), OPR updates, and approaches to modeling.

12/2

Land Use Planning in the WUI + ADUS

Outline planning & risk mitigation initiatives for wildfires. Explore how to add ADUs and housing in the WUI.



Technical Assistance
for Local Planning

HOUSING

Agenda

01

OVERVIEW

Welcome, introductions, and overview of Session 3 “Evacuations: Laws, Practices & Technology.”

02

SPEAKERS

Speakers to ground us in the current practices of evacuation modeling including new State laws. Brief early Q&A after State OPR presentation.

03

PRACTITIONER PANEL

Some brief snapshots of local agencies roads forward on various approaches to evacuation planning. After presentations, we will pause for Q&A.

04

CONCLUSION

Review upcoming sessions and review Resource Guides.

SESSION 3

Evacuations: Laws, Practices & Technology

Exploration of new evacuation laws (SB 99, AB 747), OPR updates, and approaches to modeling.



Photo Credit: Zonehaven

Today's Speakers

ERIK DE KOK

Deputy Director
Planning & Community Development
State Governor's
Office of Planning and Research



*Overview of recent
state evacuation laws.*

BINGYU ZHAO

Post Doctorate Researcher
UC Berkeley

Joined by:

KENICHI SOGA, Ph.D.

University of California Berkeley, Civil Engineering

LOUISE COMFORT, Ph.D.

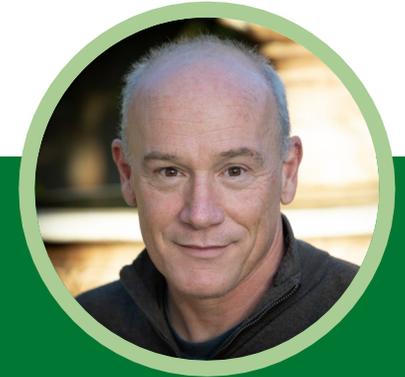
University of Pittsburg, Public and Urban Affairs



*Evacuation modeling framework with
illustrations from Paradise, Berkeley, Marin & Bolinas.
Approaches and strategies for local government.*

CHARLIE CROCKER

Founder &
General Manager
Zonehaven



*Live demo of Zonehaven's
platform focusing on planning
tools and collaboration.*



Technical Assistance
for Local Planning

HOUSING

Practitioner's Panel

CHIEF KEITH MAY

Assistant Fire Chief
City of Berkeley



Berkeley's multi-year evacuation journey with learning, drills and collaborations.

JUSTIN MEEK

Principal Planner
City of Watsonville



Watsonville's emergency evacuation route analysis reviewing vulnerability, capacity and proximity culminating as an addendum to 2020 LHMP.

MARK BROWN

Executive Officer
Marin Wildfire Prevention Authority



Marin's RFP on road risk assessment for evacuation planning and wildfire mitigation priorities plus integration into Zonehaven.

Speaker Introductions



Photo Credit: Zonehaven





Overview of recent state evacuation laws.

ERIK DE KOK

Deputy Director of Planning and Community Development,
Governor's Office of Planning and Research

- Erik leads, coordinates, and supports efforts on policy development and developing local and regional planning guidance in furtherance of the State's planning priorities and climate goals. Key focus areas include sustainable land use, housing, transportation, and infrastructure; infill development and finance; climate action, adaptation and resilience planning; community-based investment; and social equity, public health and environmental justice.
- Prior to joining OPR, he worked as a senior project manager for seven years with Ascent Environmental Inc., and he served as a public-sector planner for nine years at the City of Sacramento.

Evacuation Planning

New General Plan Requirements

AB 747

AB 1409

SB 99

AB 747 (2019) and AB 1409 (2021)

*“the safety element adopted pursuant to subdivision (g) of Section 65302 shall be reviewed and updated as necessary to **identify evacuation routes and their capacity, safety, and viability and evacuation locations under a range of emergency scenarios**. A county or city that has adopted a local hazard mitigation plan, emergency operations plan, or other document that fulfills commensurate goals and objectives may use that information in the safety element to comply with this section and, in that event, shall summarize and incorporate into the safety element that other plan or document.”*

Gov Code § 65302.15

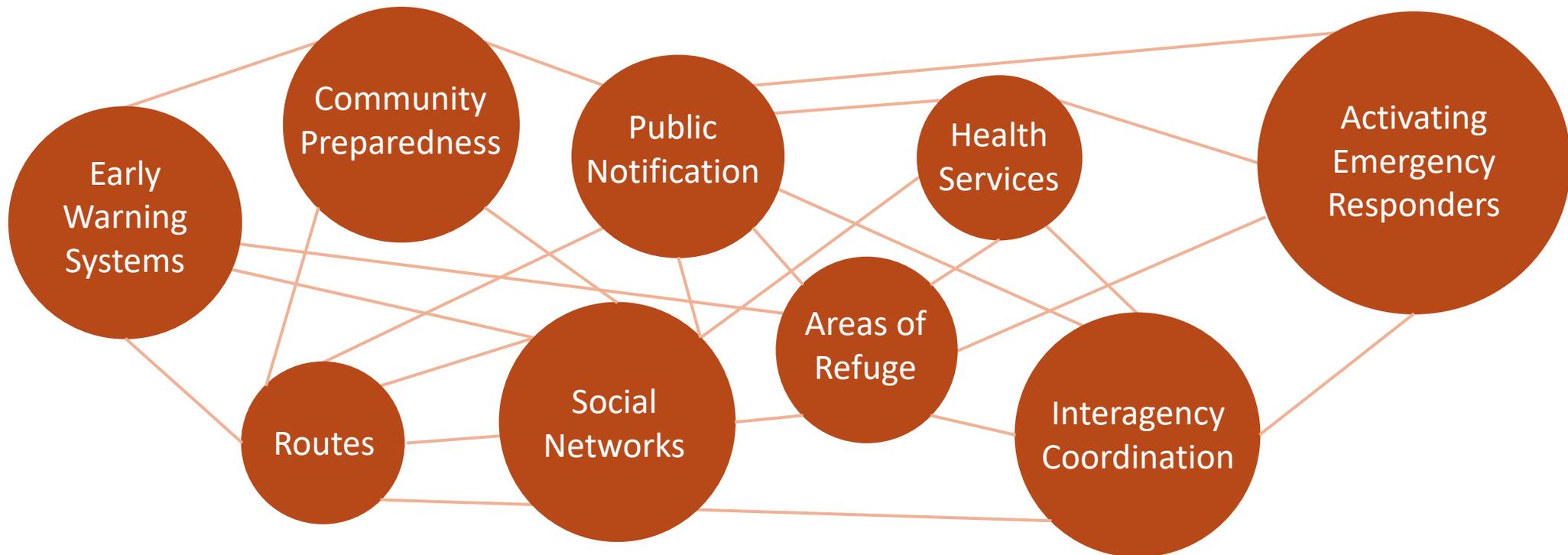
SB 99 (2019)

*“Upon the next revision of the housing element on or after January 1, 2020, the safety element shall be reviewed and updated as necessary to **identify residential developments in any hazard area identified in the safety element that do not have at least two emergency evacuation routes.**”*

Gov Code § 65302(g)(5)

It's not just about the routes...

Evacuation routes are just one piece of an effective emergency management process.



Interrelated Planning Activities

Local Hazard Mitigation Plans

Help communities prevent or minimize potential risks.

Recovery Plans

Help communities build back better post-disaster.



Emergency Operations Plans

Help communities be better prepared for hazards and to respond effectively during emergencies.

State & National Frameworks

- National Response Framework
- NIMS & SEMS
- State Emergency Plan
- State Hazard Mitigation Plan
- Disaster Recovery Framework

Considerations for Other GP Elements

General Plan Element	Potential Relationship to SB 99, AB 747, & AB 1409
Land Use	Planning future land uses should balance safety with other community goals
Circulation	Designing routes that can be utilized and/or adapted in emergency scenarios
Housing	Promoting safe ingress and egress in new and existing housing developments
Conservation	--
Open Space	Mitigating risks in open space areas to promote safe evacuations
Noise	--
Safety	Adapting to future climate-related hazards and increasing resilience per SB 379
Environmental Justice	Reducing risk in disadvantaged communities and protecting vulnerable populations
Air Quality	--

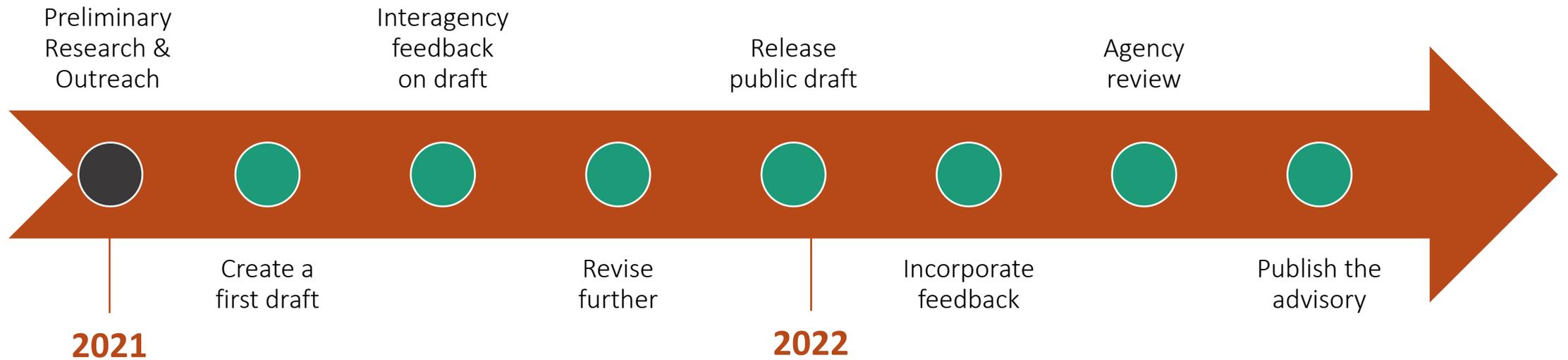
Goals for Evacuation GP Technical Advisory

1. Provide guidance on how to address AB 747, AB 1409, & SB 99
2. Ground this topic within the larger planning/policy framework
3. Provide resources and highlight potential resilience strategies

Please Note:

- TA serves as guidance, not regulations
- The primary focus will be on evacuation routes and locations
- This TA cannot address all evacuation issues

Technical Advisory Process



Preliminary Feedback

Consider population behavior in addition to infrastructure

Consider access and functional needs

- Analyze all travel modes including driving, walking, biking, transit, etc.
- Engage communities to combine quantitative with qualitative data

Consider future hazard and development scenarios

- Climate change could exacerbate hazards within a jurisdiction
- Consider effects of new housing and future land use scenarios

Consider evacuation impacts on regional networks

- Hazards may span jurisdictional boundaries, need for regional coordination
- Bottlenecks, pinch points, and evacuation locations may span boundaries



Questions?

erik.dekok@opr.ca.gov

WILDFIRE/HOUSING SERIES

Resource Guides

Completed

- ✓ 1 Wildfires - Research, Science & Key Organizations
- ✓ 2 Marin Wildfire Prevention Authority (MWPA)
- ✓ 3 Home Hardening and Defensible Space Resources for Residents
- ✓ 4 Fire Safe Marin's Collaborative Wildfire Public Education and Programs
- ✓ 5 New Evacuation Laws, Key Considerations and Planning Resources

Under development

- ❑ 6 Integrating Lessons into Land Use and Housing Element Planning



Technical Assistance
for Local Planning
HOUSING

RESOURCE GUIDE #5

Draft 11/02/2021

RESOURCE GUIDE #5

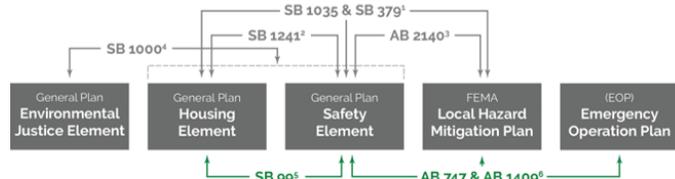
New Evacuation Laws, Key Considerations, and Planning Resources

With an increase in the frequency and severity of wildfires and other hazards, the State has developed new requirements for evacuation planning. Below is information to assist communities navigate three recent laws SB 99, AB 747, and AB 1409 as well as ways California jurisdictions are approaching the new requirements. Existing grant programs and an ABAG consulting bench may provide resources are also described. The guide includes five sections:

- (1) overview of California evacuation planning legislation,
- (2) key considerations for approaching evacuation planning requirements,
- (3) ways jurisdictions are integrating evacuation planning,
- (4) possible grant sources for evacuation planning, and
- (5) how a jurisdiction can use the Regional Planning Consultant Bench.

SECTION 1: Overview of California Evacuation Planning Legislation

In May, [ABAG posted a briefer describing SB 1035, SB 379, SB 1241, AB 2140, and SB 1000 and opportunities for plan integration](#). This resource guide focuses narrowly on three evacuation planning bills, that like the others, create linkages, triggers, and opportunities for plan alignment. The new evacuation laws shift the arena of evacuation planning to include more traditional land use planning documents (Safety Element of a General Plan) and create linkage opportunities to the Local Hazard Mitigation Plans. The Governor's Office of Planning and Research (OPR) is drafting administrative guidelines for these new laws which will be available in 2022.



- ¹ Required in all jurisdictions. Safety Element must address climate change adaptation.
- ² Required in 44 Bay Area jurisdictions. Safety Element must address wildfire risk.
- ³ Not required but incentivizes the incorporation of the LHMP in the Safety Element.
- ⁴ Required in at least 70 Bay Area jurisdictions. EJ element is triggered when any 2 other elements are concurrently updated.
- ⁵ Required in all jurisdictions. Housing Element triggers Safety Element to identify areas with fewer than 2 evacuation routes.
- ⁶ Required in all jurisdictions. LHMP update triggers Safety Element to identify and study evacuation routes against scenarios.

SB 99 ([Gov. Code § 65302](#)) requires city or county governments to identify in their Safety Element residential developments that do not have at least two emergency evacuation routes.
Timing Trigger: Housing Element Update

AB 747 and **AB 1409** ([Gov. Code § 65302.15](#)) require jurisdictions to identify evacuation routes and their capacity, safety, and viability under various emergency scenarios as well as identify evacuation locations in the jurisdiction's safety element. The jurisdiction may use its [LHMP](#) or emergency operations plan to comply with



Association of Bay Area Governments

1

WORK GROUP: Wildfires – How to Preserve and Protect Housing

WILDFIRE/HOUSING SERIES Resource Guide #5

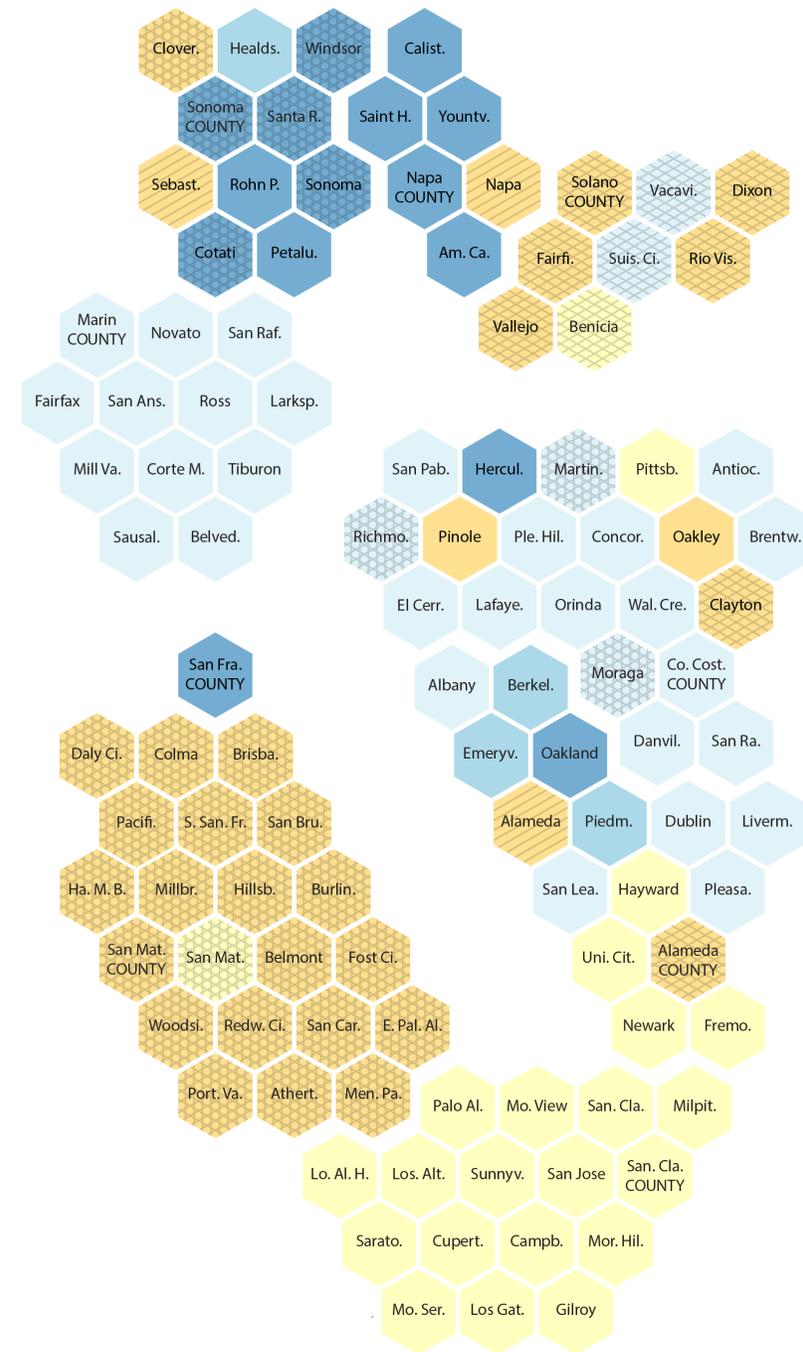
Framing timing of SB 99 and AB 747 requirements

The **SB 99** Trigger is the Housing Element Update.
January 2023 is the Housing Element deadline for all 109 Bay Area Jurisdictions

The **AB 747** Trigger is the next LHMP Update*.
LHMP Expiration Date

- 2021 or Lapsed
- 2022
- 2023
- 2024
- 2025 or 2026

*for communities without an LHMP, the next Safety Element Update is the trigger.



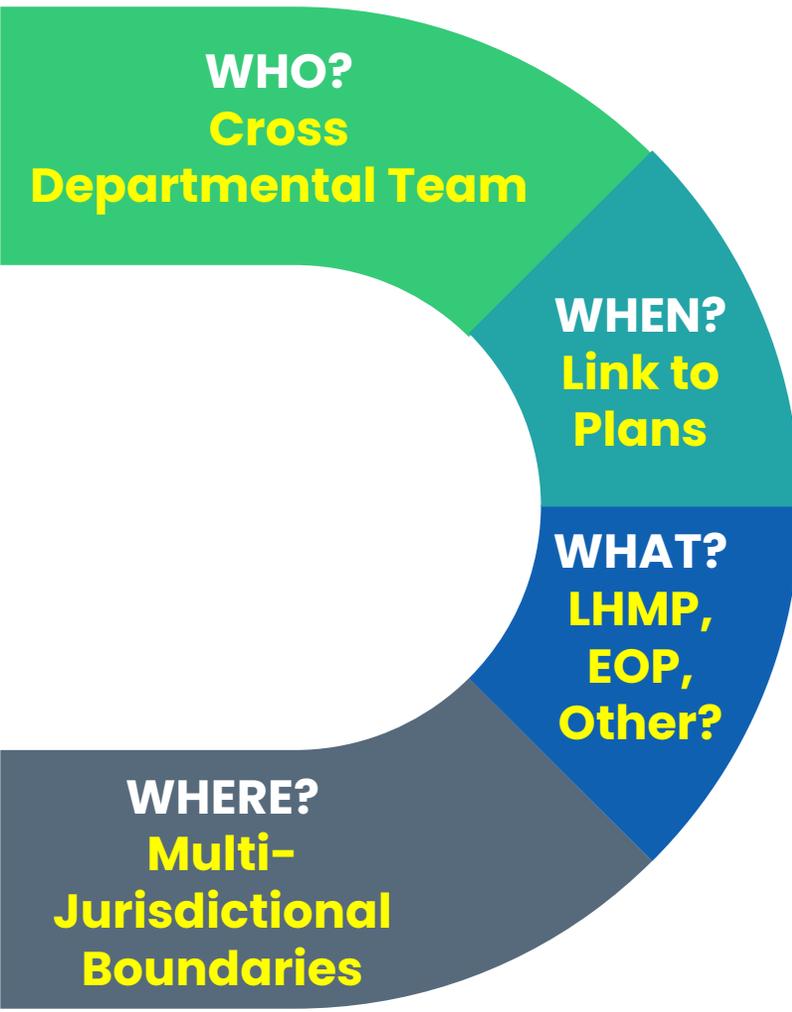
Sources
LHMP expiration date is determined using a FEMA Region IX database (updated October 2021). Update status may be less certain.



WILDFIRE/HOUSING SERIES

Resource Guide #5

Considerations for Approaching Evacuation Planning



- **WHO** -- Hold a cross-department meeting to discuss status and approach to evacuation efforts.
- **WHEN** -- Determine a timeline for meeting new planning requirements.
- **WHERE** -- Consider multi-jurisdiction approaches to evacuation planning.
- **WHAT** -- Identify which city plans will be updated and how they will relate.

“When thinking about your evacuation planning documents, it is important to reflect on what is policy, what is programmatic, what is operations, and what is tactical. Based on this, different levels of information should be considered in different documents so that an agency doesn’t find itself hindered and unable to be nimble.”

WILDFIRE/HOUSING SERIES

Resource Guide #5

Data Inputs for Evacuation Analyses

Static

Infrastructure

Critical Locations

(schools, hospitals, etc.)

Roads

Hazard

Wildfire

Seismic

Other...

Populations

Parcels

People

Vehicles

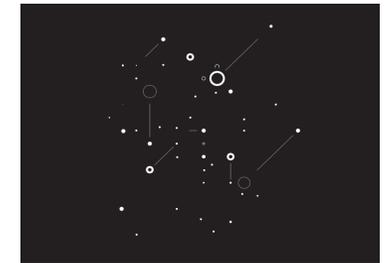
Dynamic



Traffic



Hazard Evolution



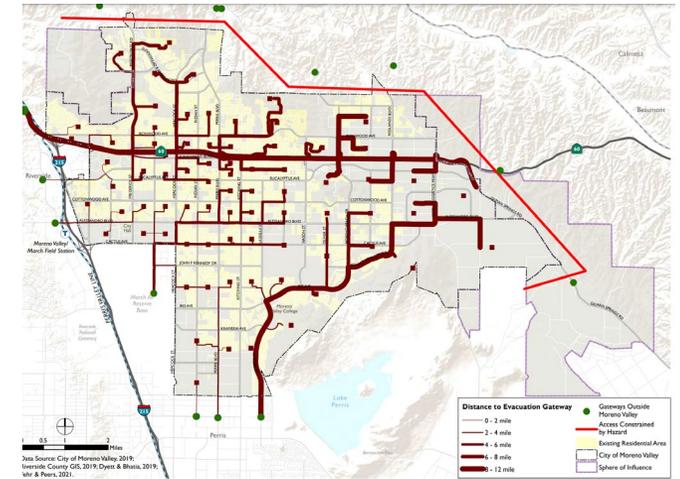
Communications

WILDFIRE/HOUSING SERIES

Resource Guide #5

Grant Sources and the Regional Planning Consulting Bench

- Examples of cities who have conducted an evacuation analysis or have issued an RFP to conduct evacuation analysis with a consultant;
- Funding sources that could be used to develop evacuation analyses, models, and plans;
- A guide to using MTC/ABAG's Regional Planning Consulting Bench for evacuation planning.





BINGYU ZHAO, Ph.D.

University of California Berkeley, Post Doctoral Researcher

- Post doctorate researcher at the Department of Civil and Environmental Engineering at UC Berkeley.
- Develops and applies large-scale traffic simulations to answer questions involving complex system interactions at a city or regional scale.
- PhD from University of Cambridge

Evacuation modeling framework with illustrations from Paradise, Berkeley, Marin & Bolinas. Approaches and strategies for local government.

KENICHI SOGA, Ph.D.

University of California Berkeley, Civil Engineering

LOUISE COMFORT, Ph.D.

University of Pittsburg, Public and Urban Affairs

An integrated fire-communications-traffic simulation framework for wildfire evacuation planning in Bay Area cities

Bingyu Zhao, University of California, Berkeley

Kenichi Soga, University of California, Berkeley

Louise Comfort, CITRIS, Berkeley

Content

- Background
- Introduction to the wildfire-communication-traffic simulation framework
 - Case study of **Camp Fire** evacuation
- Honoring local perspectives in simulation models
 - Incorporating survey data: case study of **Berkeley Hills**
 - Community engagement: case study of **Bolinas**
- Summary

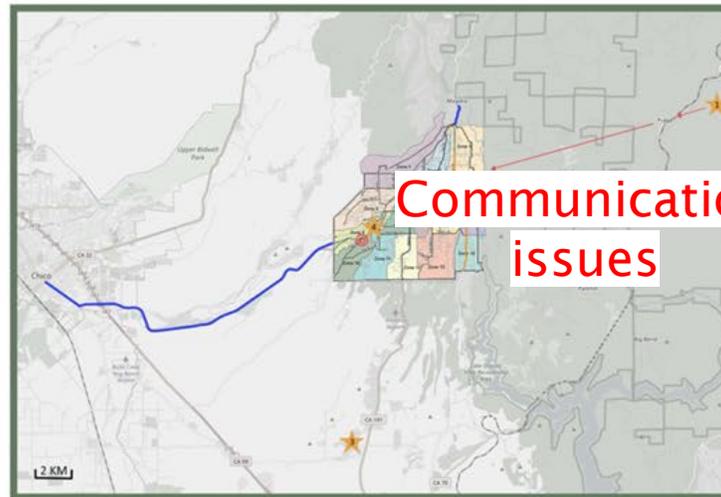
Camp Fire, 2018



Fire too fast

Camp Fire Evacuation

TIMELINE NOVEMBER, 8TH 2018



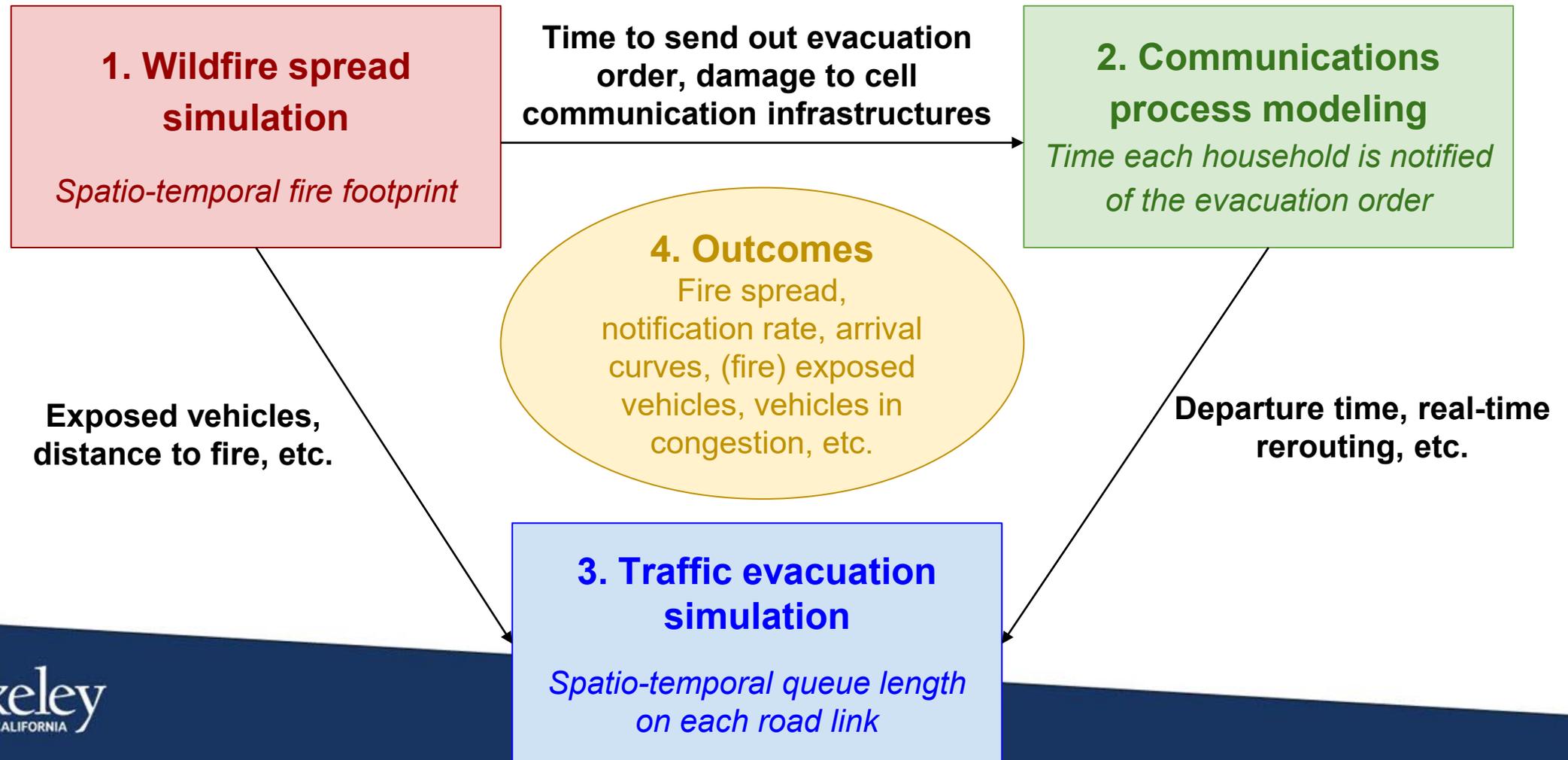
Communication issues

- THE MAIN EVACUATION ROUTE FROM PARADISE
- FIRE DIRECTION
- CAR INCIDENT

6:15 FIRE STARTED IN PULGA, TRIGGERED BY A FAILURE IN PG&E TRANSMISSION TOWER.	
7:00 FIRE IS ALREADY BURNING IN PULGA. SET UP ICP (INCIDENT COMMAND POST) AT WEST BRANCH.	
7:05 ICP FIRE CHIEF ORDERED 500 FIRE ENGINES AND 100 STRIKE TEAM.	
7:15 BUTTE COUNTY DISPATCH LEARNED OF THE FIRE.	
7:23 SHERIFF ORDERED TO EVACUATE PULGA.	
7:30 PARADISE'S MAYOR LEARNED OF THE FIRE IN PULGA.	
7:45 BUTTE COUNTY DISPATCH INCREASED STAFF FROM 3 TO 5 TO RESPOND TO 911 CALLS.	
8:00 TOWN ENGINEER ARRIVED AT TOWN HALL.	
8:05 SHERIFF ORDERED TO EVACUATE PARADISE.	
8:15 EVACUATION STARTED FROM ZONES 7 AND 2.	
8:20 EMERGENCY CALLS DIVERTED TO CHICO.	

8:30 EMERGENCY PLAN UNWORKABLE. ALL ZONES MUST BE EVACUATED AT ONCE.	
8:40 PENTZ ROAD NOT ACCESSIBLE. TOWN ENGINEER LEFT HIS OFFICE TO MONITOR TRAFFIC.	
8:44 PARADISE POLICE SENT FIRST CODE RED MESSAGE.	
9:00 SENT SECOND CODE RED MESSAGE. ICP MOVED TO BUTTE COLLEGE AND THE EMERGENCY CREW TO PARADISE.	
10:00 CHICO POLICE DISPATCH PERSONNEL TO PARADISE	
10:15 NO COMMUNICATION LEFT IN PARADISE	
10:20 PARADISE'S DISPATCHERS ARRIVED IN CHICO.	
10:30 CAL FIRE MOVED RESIDENTS TO COMMERCIAL BUILDINGS AS SHELTER IN PLACE.	
11:00 TRAFFIC JAM ON SKYWAY BLOCKED BY TRAFFIC LIGHTS IN CHICO.	
11:30 ALL CELL PHONES STOPPED WORKING EVEN IN CHICO.	
14:00 ROADS OPENED UP.	
15:00 SHELTERS EMPTY. FIRE REACHED POLICE DEPARTMENT.	

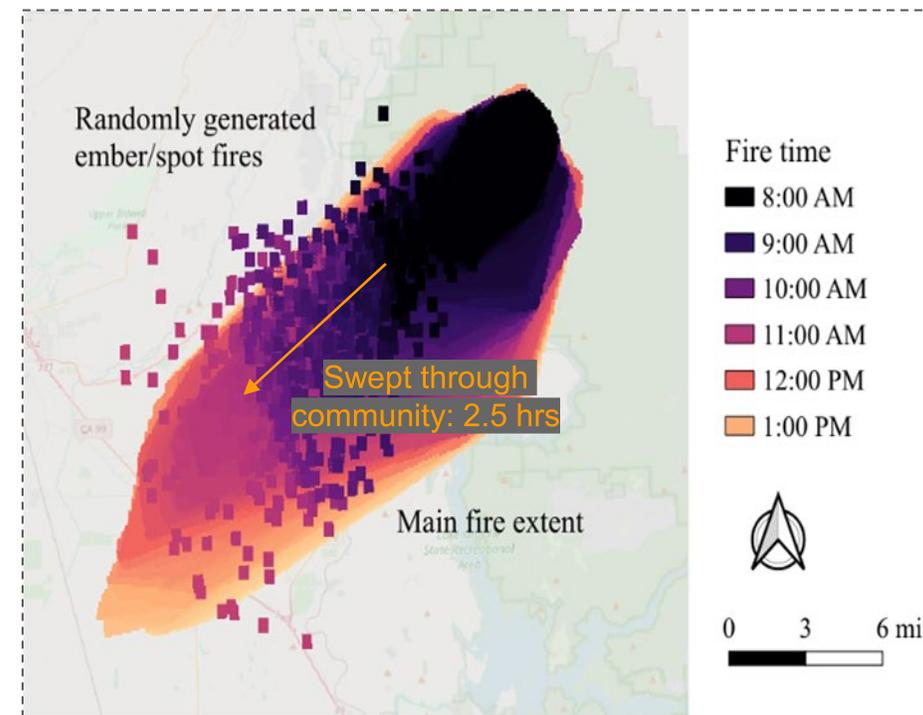
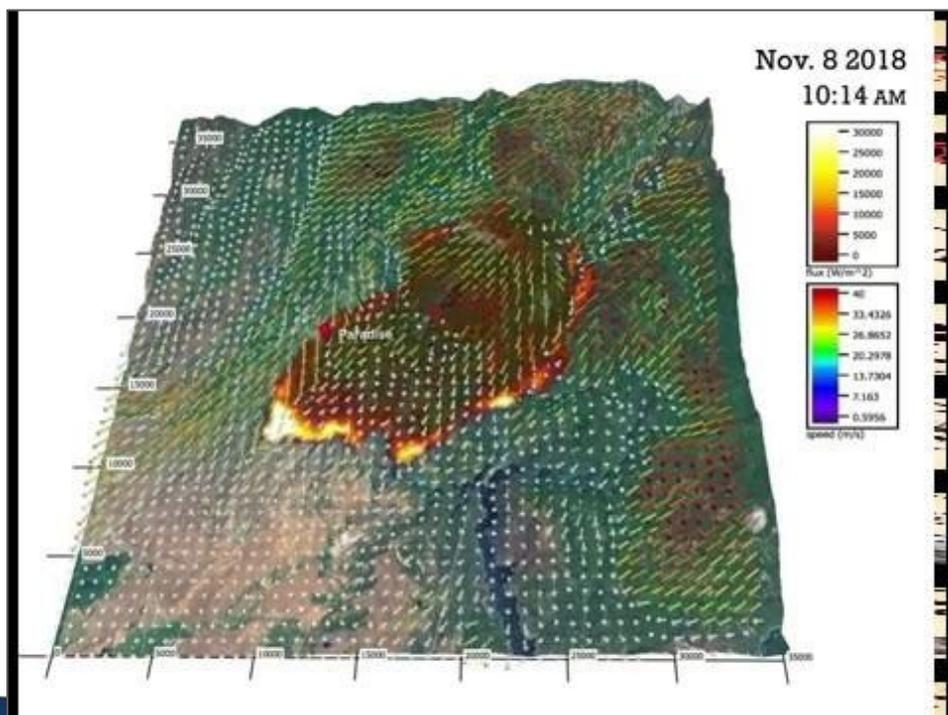
4-step modeling framework for wildfire evacuation case studies



Step 1. Fire propagation model

Using a range of methods, a fire perimeter, or other hazard perimeter is developed.

Alternative methods: historical fire perimeter; FlamMap (free), etc.



Camp Fire
(UCAR, 2020)

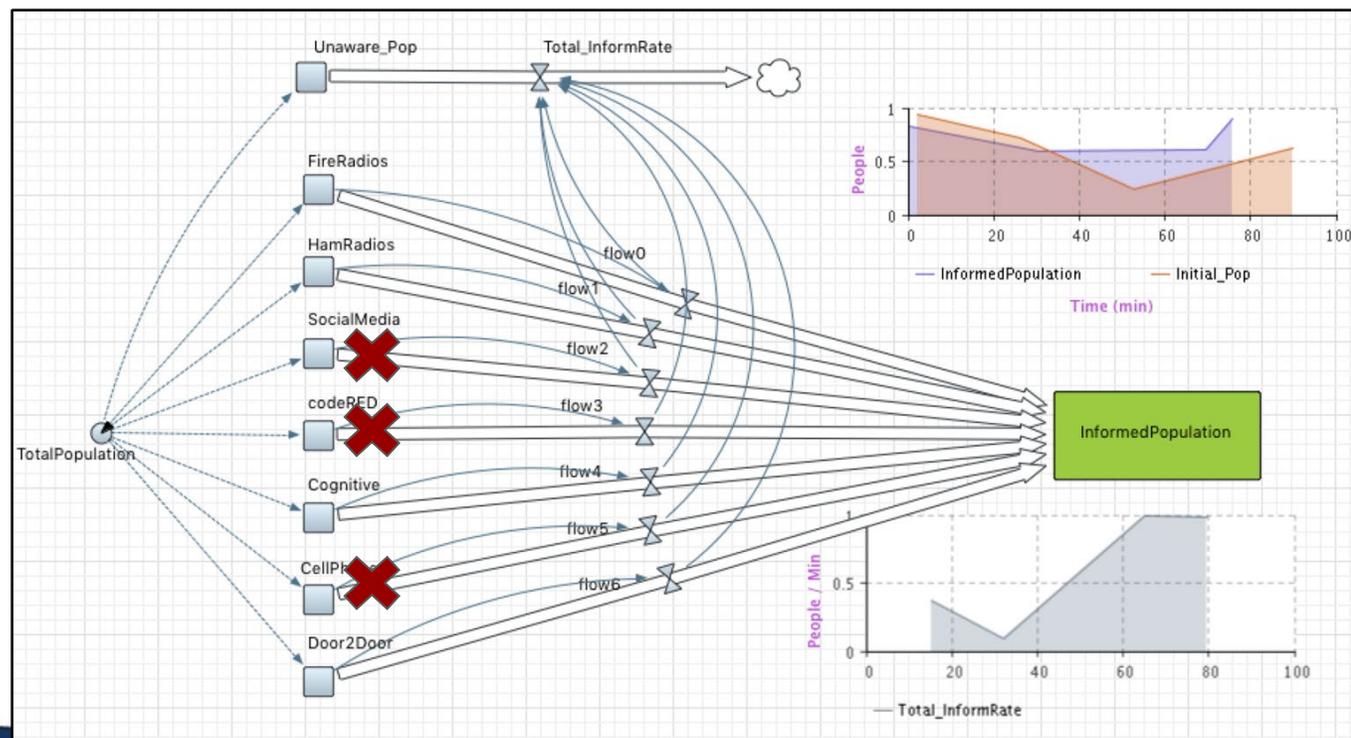
Step 2. Notification/Communications model

Modeling the share of residents that receive the evacuation notification from various sources across various times.

Communication options:

- Fire radios
- Ham radios
- CodeRED
- Social media
- Cell phones
- Cognitive
- Door-to-door

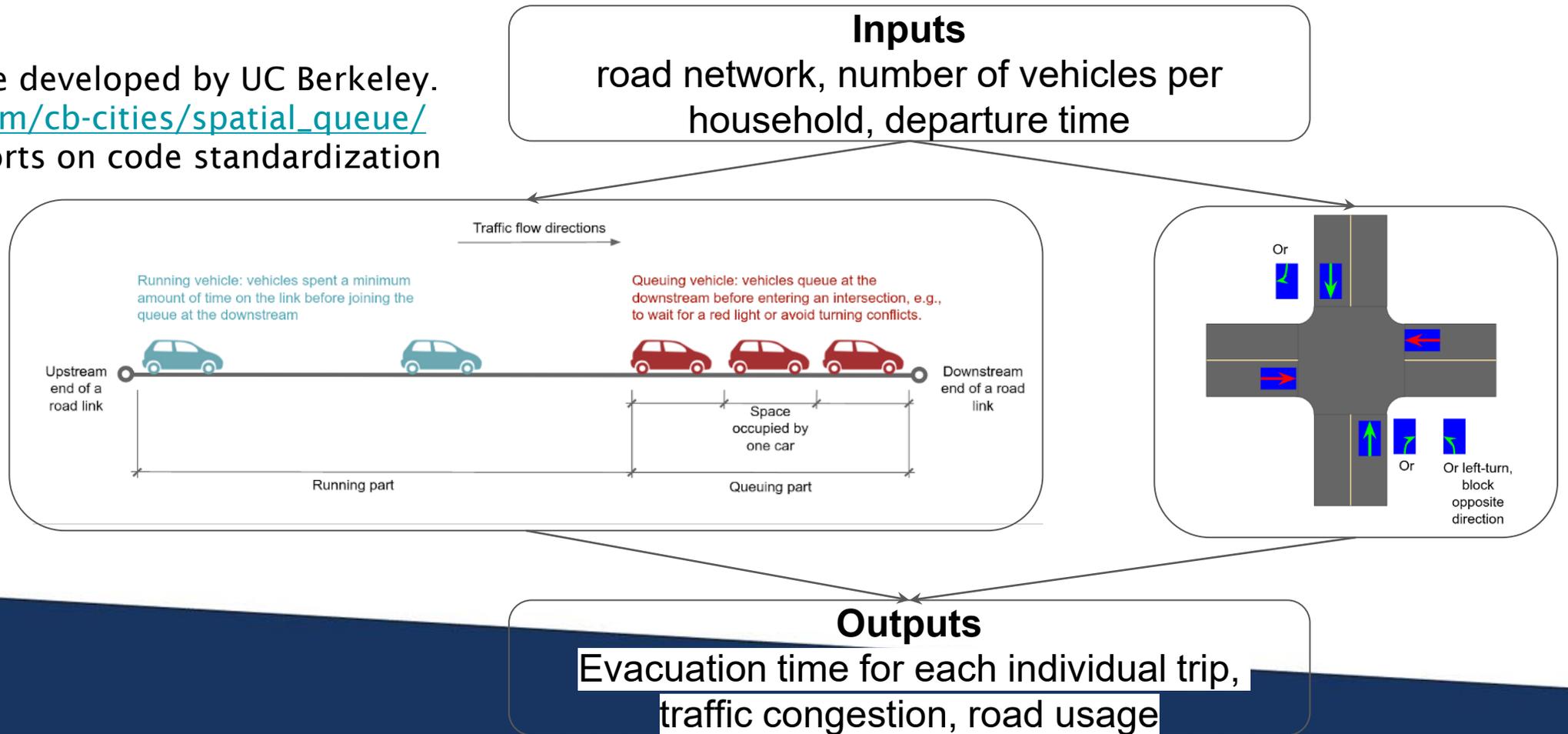
Depend on cell communication functioning



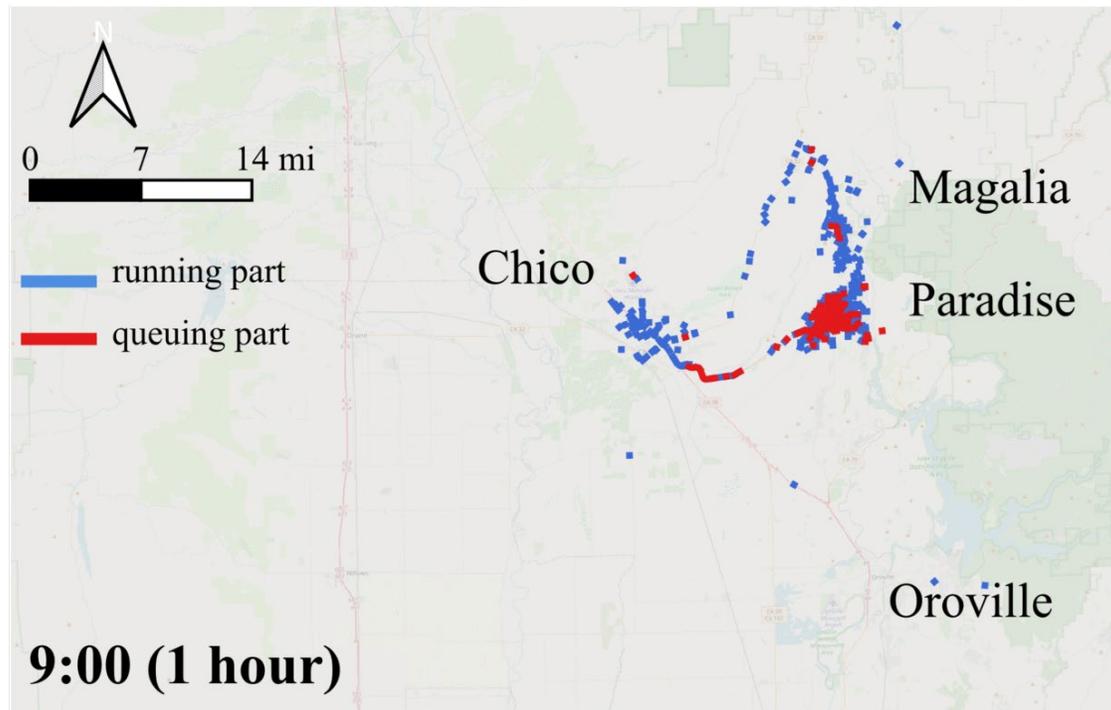
Step 3. Traffic model

Using outputs from steps 1 & 2 and data on the local circulation network to analyze evacuation trips.

Open source code developed by UC Berkeley.
https://github.com/cb-cities/spatial_queue/
with ongoing efforts on code standardization
and scalability.

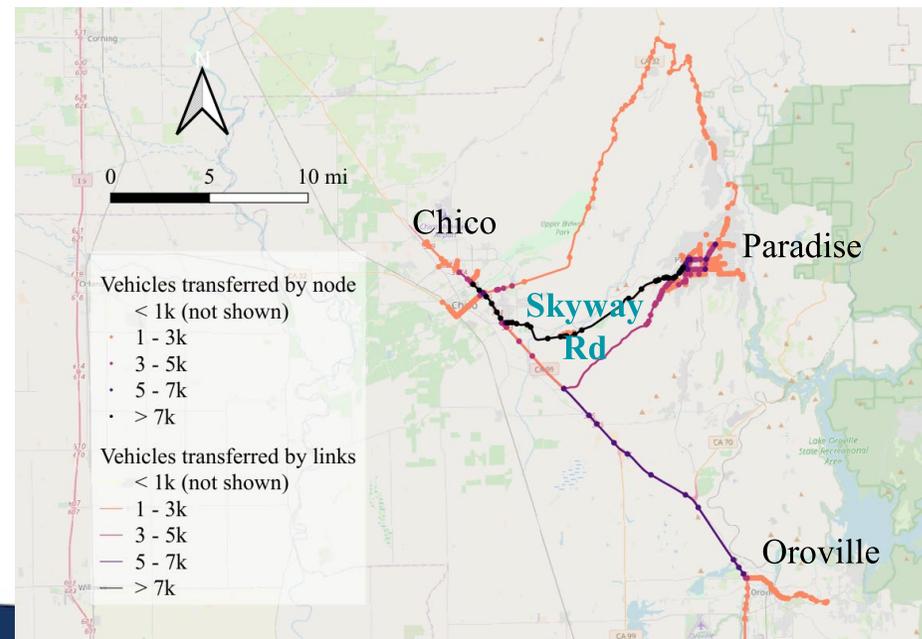
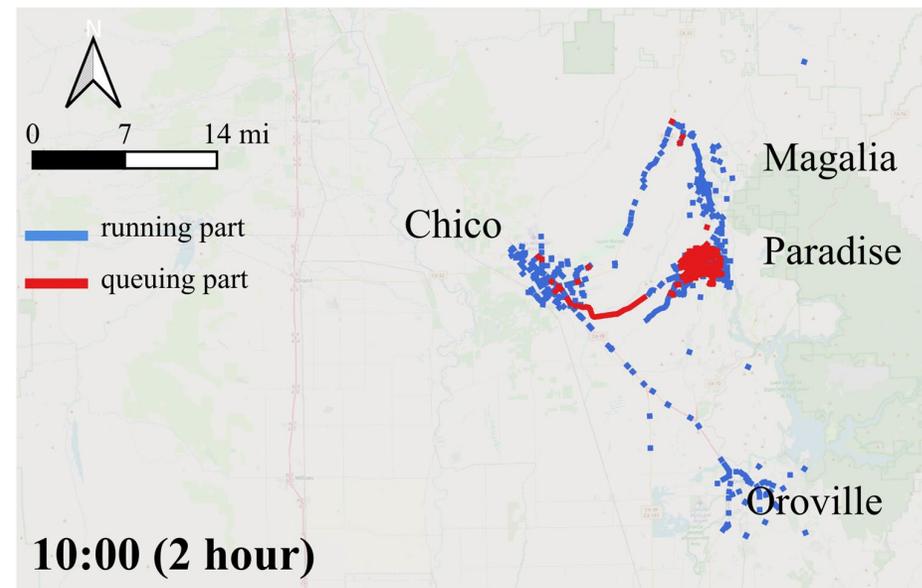


Step 4a. Visualize outputs



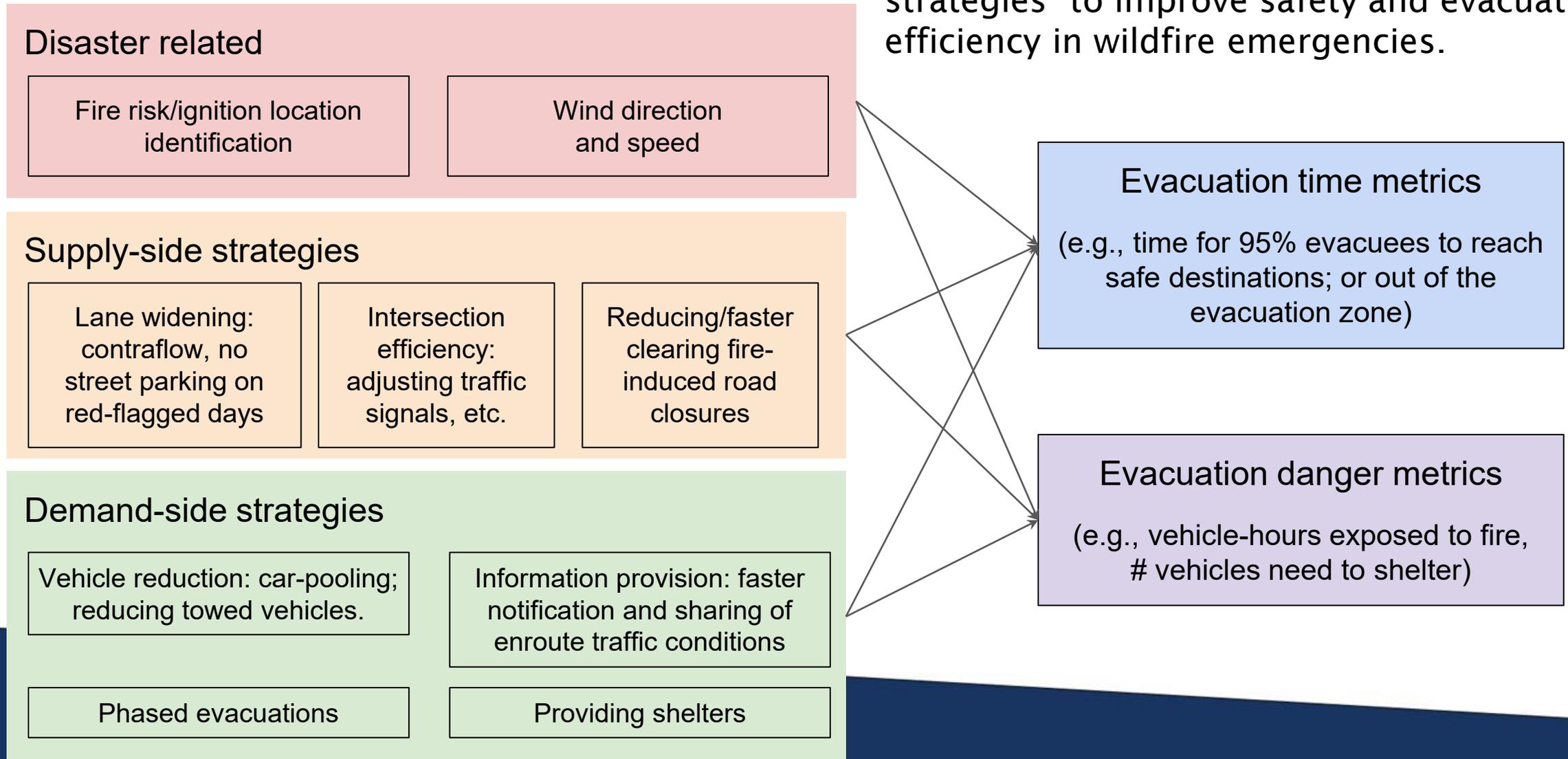
Worst hour

Overall efficiency



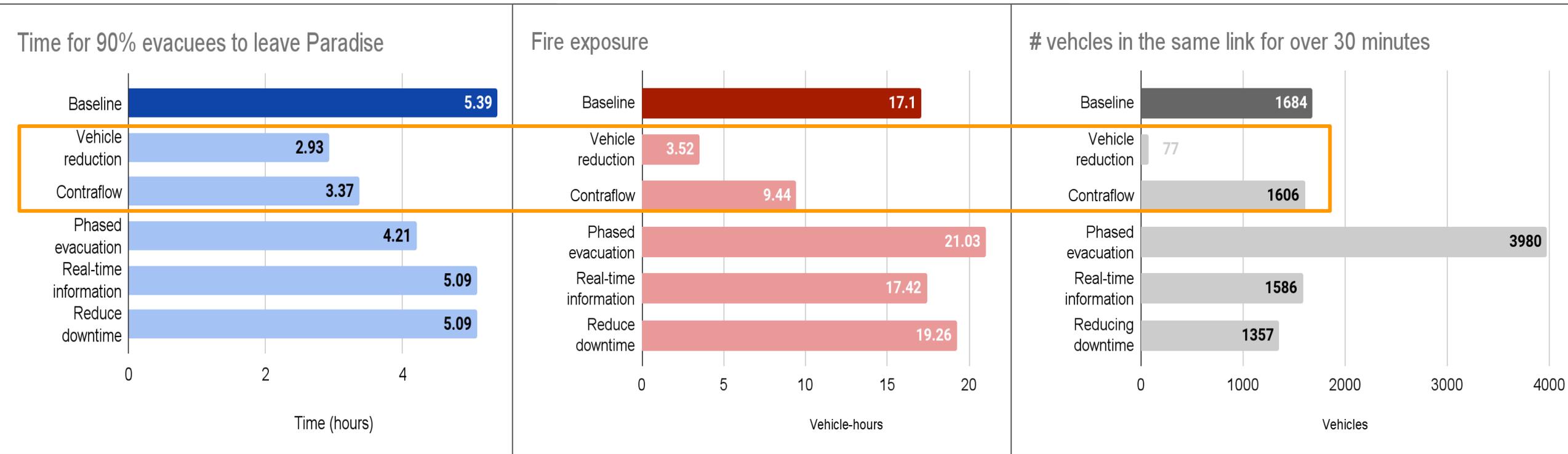
Step 4b. Study possible solutions against the baseline scenario

Using simulation as a tool to find the “best strategies” to improve safety and evacuation efficiency in wildfire emergencies.

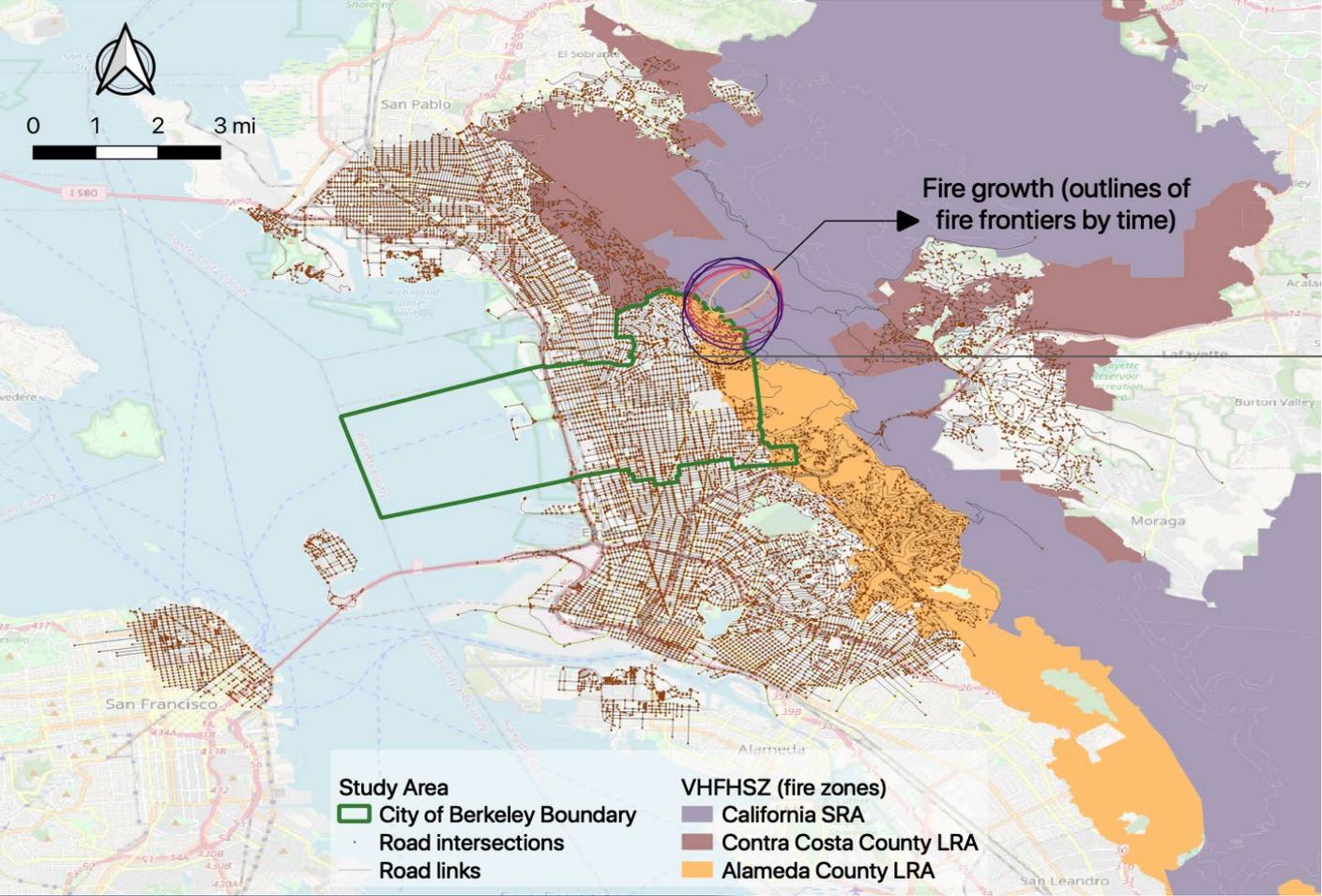


Step 4c. Evaluate strategies

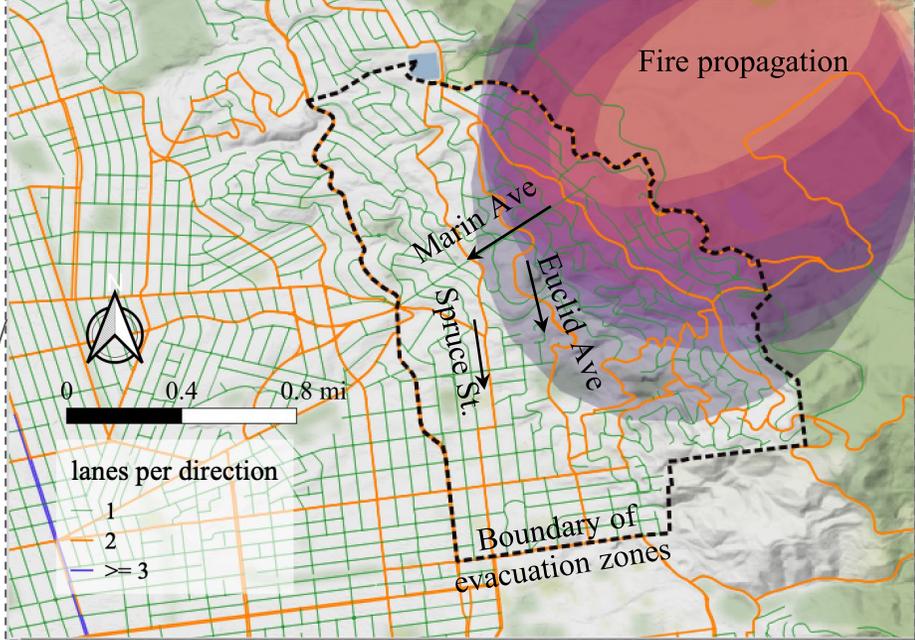
Consider various outcome metrics like, evacuation time estimate, cumulative exposed individuals to fire, average distance to fire front, and others.



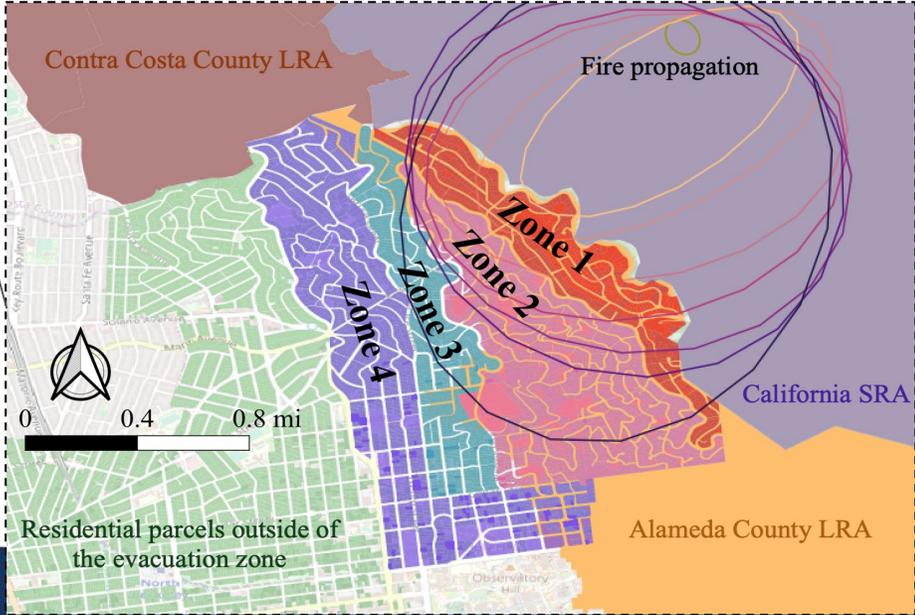
Berkeley Case Study



(a) Study area

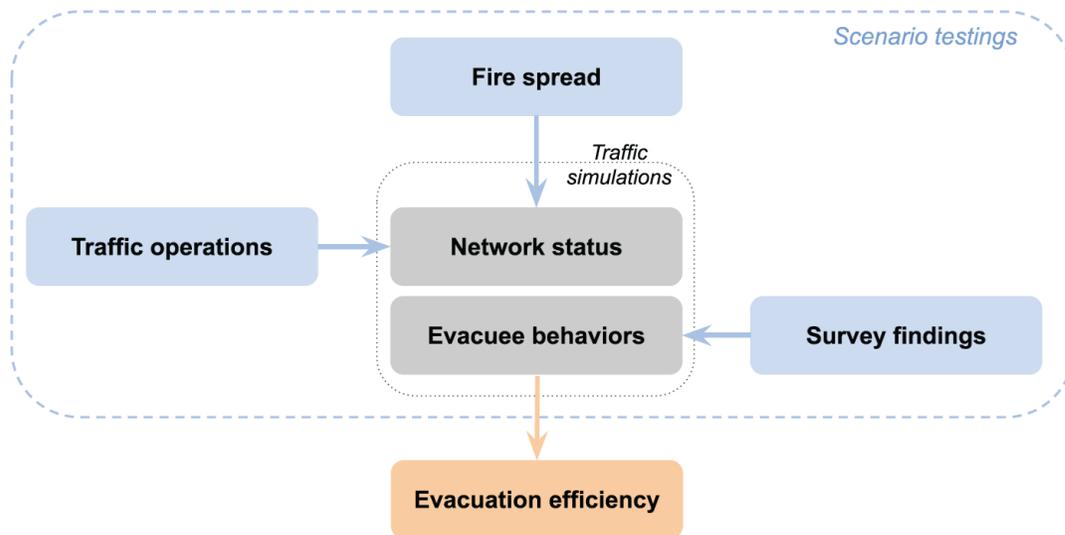


(b) Lanes per road, terrain & a few downhill routes

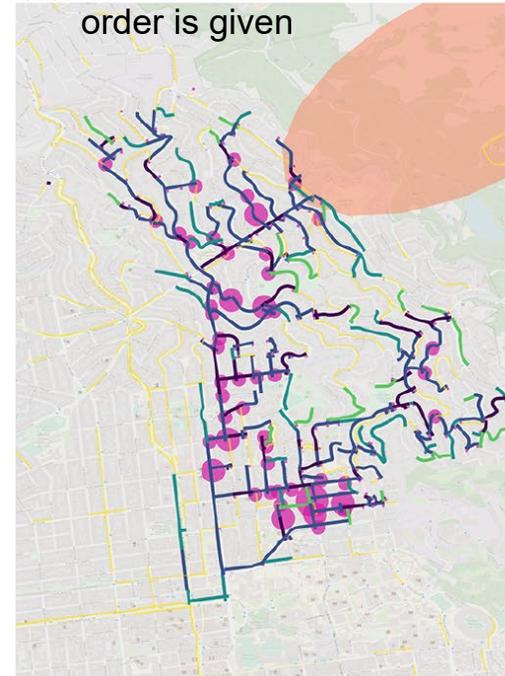


(c) Evacuation zones

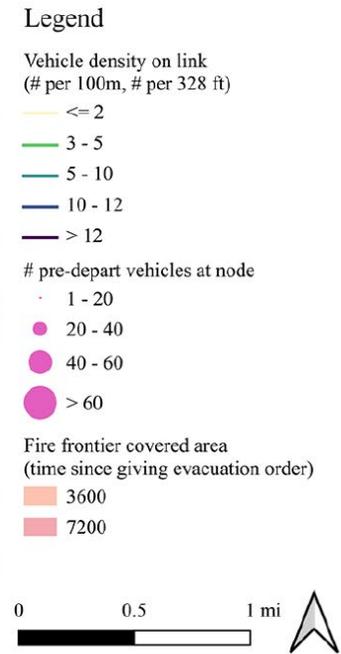
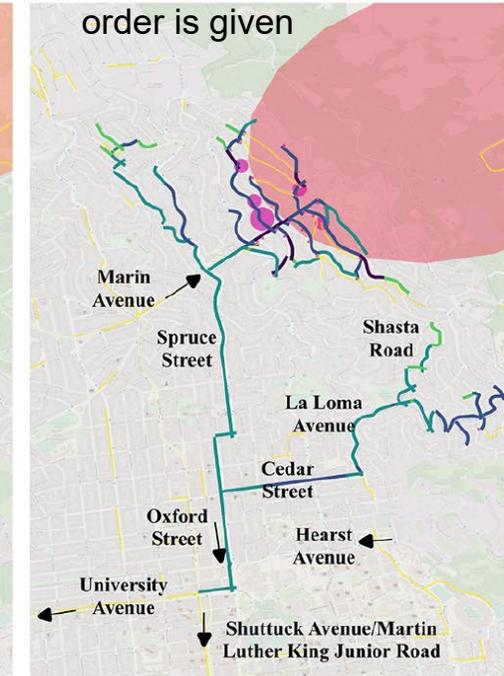
Survey-informed dynamic simulation



(a) 45 min after evacuation order is given

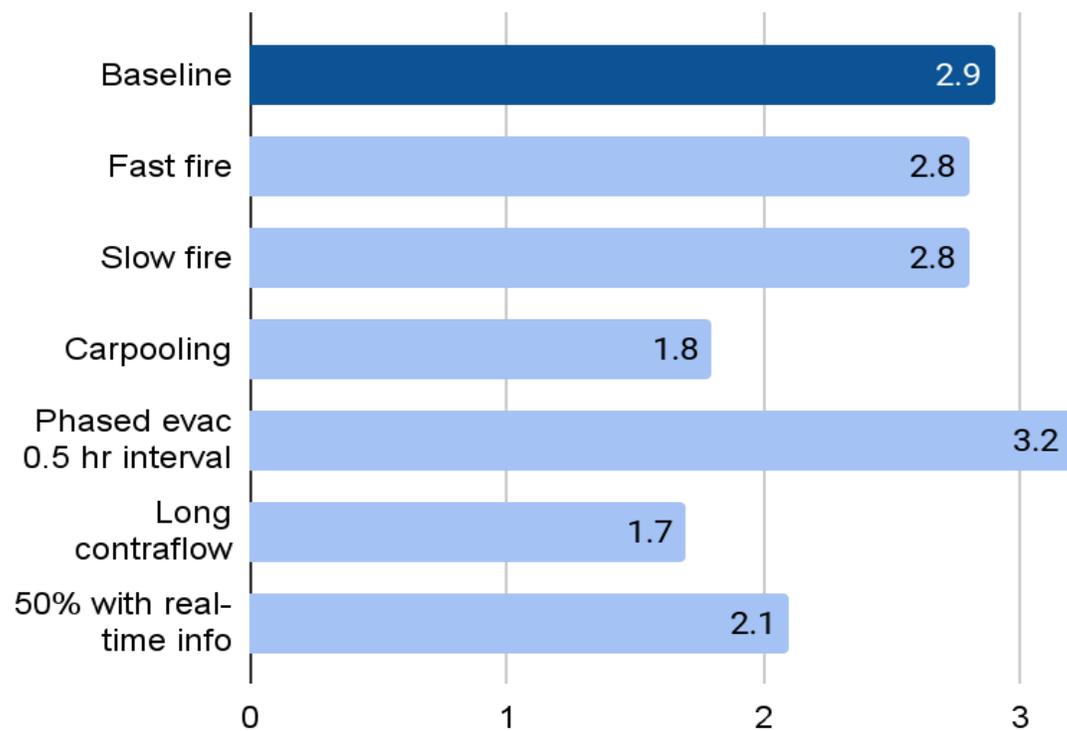


(b) 1 hr 45 min after evacuation order is given

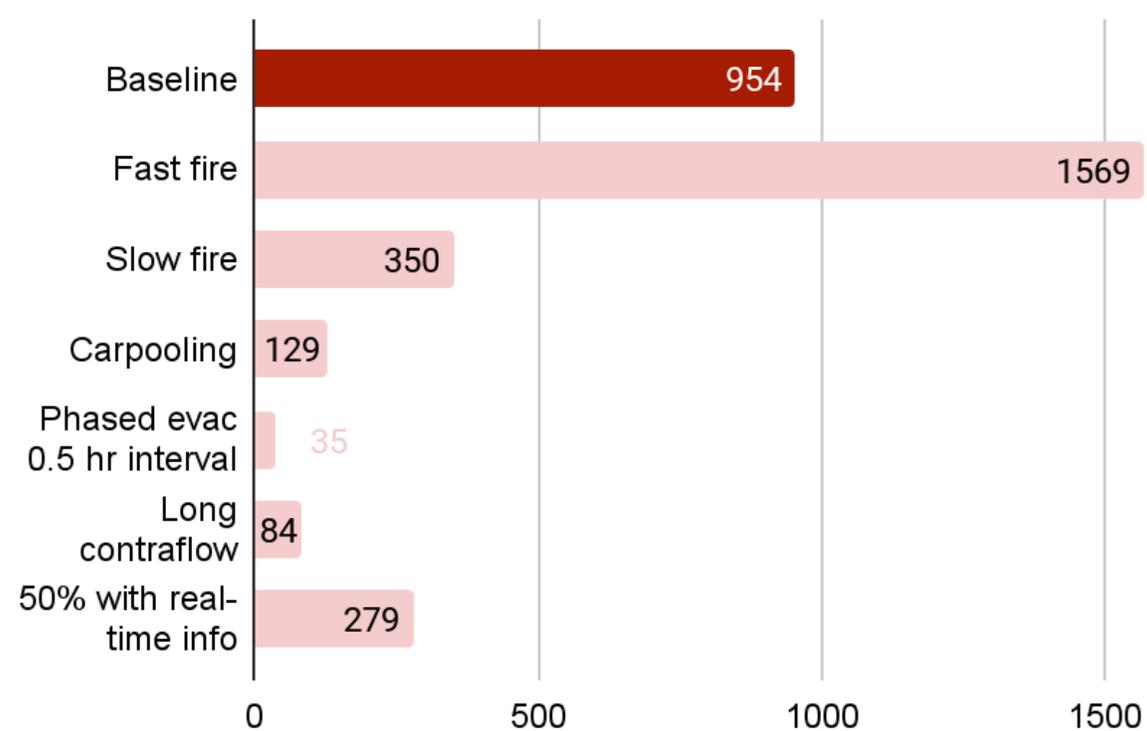


Scenario analysis: strategy selection

Evacuation time estimate (hr)



Fire exposure (veh-hr)



Bolinas Case Study: Working with local communities



Preparing for wildfire evacuation in Bolinas

HOW LONG DOES IT TAKE TO EVACUATE?

What is the Best Scenario?

- Good communication
- 2** Vehicles per household
- 1400** Residents vehicles
- 500** Tourists vehicles
- NO** Road closure
- NO** Need to shelter

What happens if

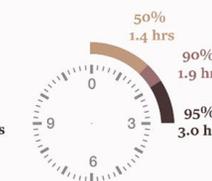
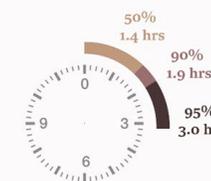
- fire starts from the different sides of the town?
- cell communication breaks down?
- there are unexpected road closures?
- road is congested due to high evacuation demand?

Disclaimer: the data presented was generated from an integrated fire-communication-traffic simulation. The project was funded by UC Berkeley's Institute of Transportation Studies and CITRS, in collaboration with the Bolinas Fire Department.

CONTACT:
<https://www.bolinasfire.org>
gkrakauer@bolinasfire.org

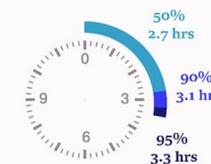
BEST SCENARIO

- Good communication
- 2** Vehicles per household
- 400** Residents vehicles
- 500** Tourists vehicles
- NO** Road closure
- NO** Need to shelter



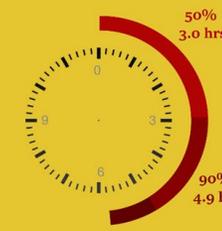
What if

- 2 hrs** Road closure
2 hrs to clear utility lines



What if the WORST happens?

- 2 hrs** Road closure
- NO** Cell communication



* % means the percentage of arrived residents / informed residents
 Good communication 10% informed by visually seeing the fire
 No cell communication 30%

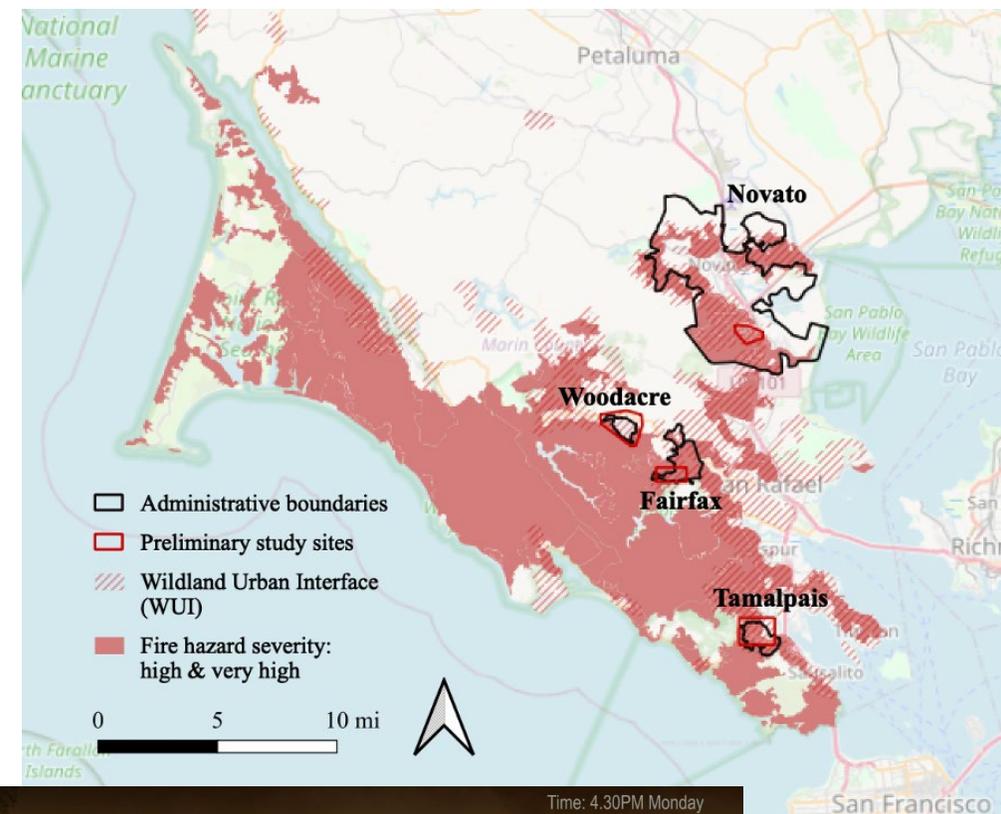


Summary

- Integrated wildfire-communication-traffic simulation framework
 - Open data: OpenStreetMap, census & community surveys
 - Free or open-source software: FlamMap (wildfire), AnyLogic (communications, free and paid versions), spatial-queue (traffic; developed by UC Berkeley)
- Strategies and performance evaluation metrics
 - Demand side strategies (e.g., vehicle reduction, phased evacuation)
 - Supply side strategies (e.g., contraflow, reducing road closures)
 - Metrics (evacuation time; fire exposure risks)
- Local perspective
 - What should the model capture? E.g., a dangerous roundabouts, Eucalyptus grove, people with mobility constraints?
 - What strategies should be explored? E.g., creating more shelter locations, strengthening communications, raising community awareness?
 - Does the above framework address the local-specific concerns?

Upcoming efforts

- Collaboration with MWPA and Zonehaven to test the generalizability of evacuation strategies under diverse environments, road networks, and demographic factors.
- Develop standardized and open-source tools for easy deployment and customization in new case studies.
- Advanced visualization to raise community awareness.



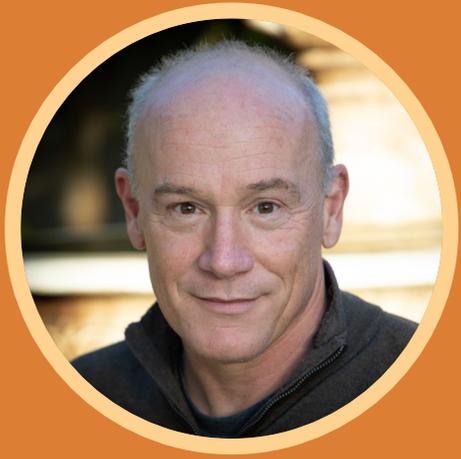
Thank you for your attention!

Contacts:

- Dr. Bingyu Zhao bz247@berkeley.edu
- Prof. Kenichi Soga soga@berkeley.edu
- Prof. Louise Comfort lcomfort@berkeley.edu

Case Study publications:

- Paradise & Bolinas: <https://doi.org/10.7922/G21G0JJ7>
- Berkeley: <https://journals.sagepub.com/doi/abs/10.1177/03611981211030271>



Live demo of Zonehaven's platform focusing on planning tools and collaboration.

CHARLIE CROCKER

Co-Founder and General Manager, Zonehaven

- Co-Founder and now General Manager of Zonehaven which was recently acquired by Genasys Inc.
- Self proclaimed data geek and entrepreneur with 25 years of experience building teams to bring data out of the shadows and drive business value. Built the team to implement Autodesk's first big data platform to support migration to subscription and the cloud and led product management for Autodesk's flagship billion dollar AutoCAD product line.
- Prior to Autodesk he was co-founder in a company focused on spatial databases and web-based tools for state and local government agencies and utility companies.
- Passion for growing young leaders, he mentors MBA and MSBA students at UC Davis and California College of the Arts.

The presenter shared a live demonstration of evacuation software via web browser.

See session recording for details (video 55:32 - 1:10:38).

Practitioners Panel



Photo Credit: Zonehaven





CHIEF KEITH MAY

City of Berkeley Fire Department

- Assistant Fire Chief, Public Information Officer and Office of Emergency Services Division Manager for the Berkeley Fire Department.
- 35 years of experience in Public Service including working in the Pre-hospital sector as an Emergency Medical Technician, Paramedic, Quality Assurance Coordinator, Paramedic Supervisor, and as the Director of Operations for a 9-1-1 ambulance provider.
- Switched over to the fire service in 2000 working up the ranks.
- Bachelor of Arts degree in Broadcast Journalism, a Bachelor of Science degree in Fire and Emergency Management.

Berkeley's multi-year evacuation journey with learning, drills and collaborations.

CITY OF BERKELEY

Evacuation Planning Journey

EMERGENCY OPERATIONS PLAN

Created Wildfire Evacuation Annex into the Emergency Operations Plan Evacuation ESF #16

INTER-DEPARTMENTAL RESEARCH TEAM

Met and learned from Sonoma, Napa, Paradise, Laguna Beach, Santa Barbara.

2017 FIRES

The August 2017 Berkeley fire and 2017 North Bay Fires elevated focus and priorities.



DRILLS

Began to conduct drills focused in Berkeley hills. During the drills, identified the need for evacuation time study analysis to develop next steps to improve preparedness.

INTER-AGENCY PLANNING

2019 began inter-agencies effort with Alameda County and CAL FIRE and leveraged Zonehaven as a planning tool.

SAFE PASSAGE INITIATIVE

2021 Developing Community Wildfire Protection Plan & integrating Firewise Standards, Zonehaven, Outdoor Warning System, plus increase Defensible Space Awareness. Learning more from researchers on time modeling and RFP for Evacuation Time Estimate Study.



JUSTIN MEEK

City of Watsonville

- 20 years of professional experience on planning and environmental projects in both the public and private sectors.
- Work has included a wide array of public experience, from long range planning to all types of current planning projects.
- Currently serves as the APA California - Northern Section Monterey Bay RAC Co-chair and is a member of the American Institute of Certified Planners.
- Masters in Urban & Regional Planning from San Jose State University & BA/BS in Environmental Studies and Earth Sciences from UC Santa Cruz.

Watsonville's emergency evacuation route analysis reviewing vulnerability, capacity and proximity culminating as an addendum to 2020 LHMP.

CITY OF WATSONVILLE

Evacuation Planning Journey

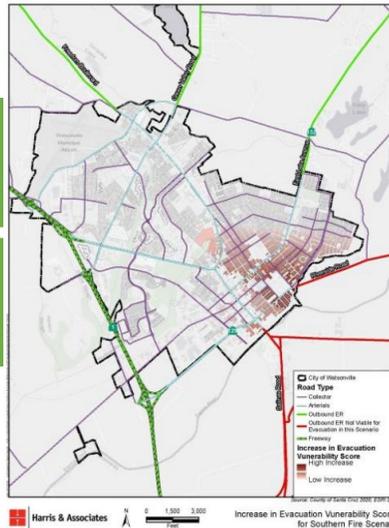
HAZARD SCENARIOS

- Baseline (no hazard location specified)
- Wildfire
 - Origin North, East, South of City
- Flood
- Earthquake



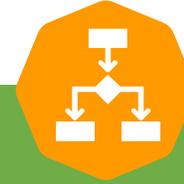
ANALYSIS

- Map distance from each parcel to nearest evacuation route.
- Weight each distance by “vulnerability score.” For example, local roads with bridges had a worse score than a freeway).
- Run hazard scenarios and compare parcels against baseline.



OUTCOMES

- Prepared supplemental evacuation analysis as addendum to 2020 Local Hazard Mitigation Plan.
- Included in 2020 Safety Element via reference to addendum.



FINDINGS & NEXT STEPS

- Identified areas and vulnerable residents that require early evacuation.
- Identified key intersections to consider traffic management (contra flow).
- Importance of bridge inspections prior & post hazards.
- More analysis – actual timelines to evacuate and social vulnerability indicators are needed.



Marin's RFP on road risk assessment for evacuation planning and wildfire mitigation priorities plus integration into Zonehaven.

MARK BROWN

Marin Wildfire Protection Authority

- Started as a volunteer firefighter in 1986 in Sonoma County; hired by Marin County Fire Department as a Firefighter/Paramedic in 1991 and retired as the Deputy Fire Chief. Now Executive Officer for the Marin Wildfire Prevention Authority.
- Mark served on a CAL FIRE Incident Management Team for 15 years as a Type I Operations Section Chief and was qualified as a Type II Incident Commander. Founding member & Program Manager of the North Bay Incident Management Team, a Type III All-Hazards IMT in the SF Bay Area.
- Bachelor of Arts in Applied Studies - Organizational Leadership.

MARIN WILDFIRE PREVENTION AUTHORITY

Evacuation Planning Journey

EVACUATION SOFTWARE

Procured and implemented Zonehaven as the primary evacuation notification software to inform future add on evacuation planning efforts.

RFP EVACUATION RISK ASSESSMENT

Will study ingress & egress risk; map and quantify risk factors¹ for all roads to identify high priority actions to systematically improve evacuation routes.

INTEGRATE ASSESSMENT INTO PRODUCTS

- Integrate information into Zonehaven to improve real world notification decisions.
- Use findings to inform work plans, capital improvement plans, vegetation management along routes

RISK ASSESSMENT FACTORS¹

Risk Factors include road conditions, capacity, intersection functionality, observed traffic behavior, constraints and impediments, access from fire response, vulnerable populations, vegetation impacts to roadways, defensible space conditions, structural vulnerability, locations and capacity of temporary refuge areas, etc.

Questions & Answers

- ✓ Use the **Chat** feature to share specific questions.
- ✓ Use the **Raise Hand** feature to verbally share ideas from your community or raise more difficult questions.

Be considerate of others - keep your comments and questions focused.



WILDFIRE/HOUSING SERIES Resource Guides

Completed

- ✓ 1 Wildfires - Research, Science & Key Organizations
- ✓ 2 Marin Wildfire Prevention Authority (MWPA)
- ✓ 3 Home Hardening and Defensible Space Resources for Residents
- ✓ 4 Fire Safe Marin’s Collaborative Wildfire Public Education and Programs
- ✓ 5 New Evacuation Laws, Key Considerations and Planning Resources

Under development

- ❑ 6 Integrating Lessons into Land Use and Housing Element Planning





Technical Assistance
for Local Planning
HOUSING

RESOURCE GUIDE #5

Draft 11/02/2021

RESOURCE GUIDE #5

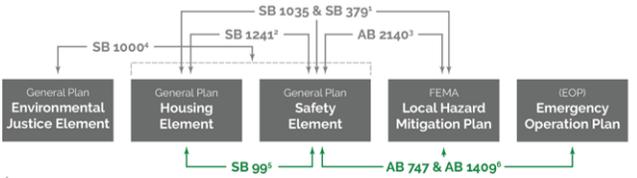
New Evacuation Laws, Key Considerations, and Planning Resources

With an increase in the frequency and severity of wildfires and other hazards, the State has developed new requirements for evacuation planning. Below is information to assist communities navigate three recent laws SB 99, AB 747, and AB 1409 as well as ways California jurisdictions are approaching the new requirements. Existing grant programs and an ABAG consulting bench may provide resources are also described. The guide includes five sections:

- (1) overview of California evacuation planning legislation,
- (2) key considerations for approaching evacuation planning requirements,
- (3) ways jurisdictions are integrating evacuation planning,
- (4) possible grant sources for evacuation planning, and
- (5) how a jurisdiction can use the Regional Planning Consultant Bench.

SECTION 1: Overview of California Evacuation Planning Legislation

In May, [ABAG posted a briefer describing SB 1035, SB 379, SB 1241, AB 2140, and SB 1000 and opportunities for plan integration](#). This resource guide focuses narrowly on three evacuation planning bills, that like the others, create linkages, triggers, and opportunities for plan alignment. The new evacuation laws shift the arena of evacuation planning to include more traditional land use planning documents (Safety Element of a General Plan) and create linkage opportunities to the Local Hazard Mitigation Plans. The Governor’s Office of Planning and Research (OPR) is drafting administrative guidelines for these new laws which will be available in 2022.



- 1 Required in all jurisdictions. Safety Element must address climate change adaptation.
- 2 Required in 44 Bay Area jurisdictions. Safety Element must address wildfire risk.
- 3 Not required but incentivizes the incorporation of the LHMP in the Safety Element.
- 4 Required in at least 70 Bay Area jurisdictions. EJ element is triggered when any 2 other elements are concurrently updated.
- 5 Required in all jurisdictions. Housing Element triggers Safety Element to identify areas with fewer than 2 evacuation routes.
- 6 Required in all jurisdictions. LHMP update triggers Safety Element to identify and study evacuation routes against scenarios.

SB 99 ([Gov. Code § 65302](#)) requires city or county governments to identify in their Safety Element residential developments that do not have at least two emergency evacuation routes.
Timing Trigger: Housing Element Update

AB 747 and AB1409 ([Gov. Code § 65302.15](#)) require jurisdictions to identify evacuation routes and their capacity, safety, and viability under various emergency scenarios as well as identify evacuation locations in the jurisdiction’s safety element. The jurisdiction may use its [LHMP](#) or emergency operations plan to comply with



Association of Bay Area Governments

1

WORK GROUP: Wildfires – How to Preserve and Protect Housing



SESSION 4

December 2, **2:30-5:00**

LAND USE PLANNING & WILDFIRES

- ✓ In the **Chat**, share what topics you'd like to discuss in the next workshop. For example:
 - What wildfire policies should accompany land use decisions that lead to narrow building spacing?
 - What approach should be taken for ADUs in areas with the highest fire hazard severity or evacuation constraint?

Thank you for joining today!

Check out the new Portal
<https://abag.ca.gov/technical-assistance/wildfires-how-preserve-and-protect-housing>

Remember the Resource Guides

See you on 12/2 @ 2:30!

Wildfires – How to Preserve and Protect Housing



Session 1: Wildfires & Housing 101

Session 2: Defensible Space & Home Hardening with CAL FIRE Updates

Session 3: Evacuations – The Law, Practical Approaches & Technology Tools

Session 4: Land Use Planning in the WUI, Including ADUs