California Wildfire Safety Advisory Board

Wildfire Safety Advisory Board Quarterly Meeting

April 19, 2023, 9:30 a.m. PST

Zoom Online Meeting

Participation Information

Using more than one participation option may create feedback.

Please begin your comment by stating your name and organization

- **Zoom:** https://us06web.zoom.us/j/81707934982 **Passcode:** 688773
- **Phone:** 404-433-6397 US Toll | 877-336-1831 US Toll-free | Conference code: 167251
- Participants are placed in "listen/watch only" mode until the public comment portion of the meeting. During the public comment portions, participants may use the raise hand function on the Zoom videoconference or may dial #2 (pound/hashtag two) to be placed in a queue when they wish to speak. The hosting team will unmute callers in order of request.
- **Email:** Written comments may be emailed to WSAB@energysafety.ca.gov.
- **Tech Issues:** For technical issues, please e-mail WSAB@energysafety.ca.gov or call Mary Ann Aguayo at 279-336-1731.

Locating Meeting Materials

California Wildfire Safety Advisory Board

Meeting Materials Available at:

https://energysafety.ca.gov/what-we-do/wildfire-safety-advisory-board/wsab-events-and-meetings/

Public Comments Available at:

https://energysafety.ca.gov/what-we-do/wildfire-safety-advisory-board/public-comments-received-by-the-wildfire-safety-advisory-board/

About the Wildfire Safety Board

Members:

- **Jessica Block, Chair**
- **Diane Fellman, Vice Chair**
- **Ralph M. Armstrong Jr., Board Member**
- **John Mader, Board Member**
- **Christopher Porter, Board Member**
- **Alexandra Syphard, Board Member**

Information about the Board and its Members available at: energysafety.ca.gov/WSAB.

California Wildfire Safety Advisory Board

Pledge of Allegiance

Agenda

1) Public Comments
2) Discussion/Vote on February 22, 2023 Meeting Minutes
3) Opening Comments from the Board
4) Overview of the ratemaking process and a closer look at the impact of wildfire mitigation plan spending on rates and bills
5) Concept Development for White Paper: Wildfire Regimes in California and Implications for Vegetation Management
6) Adjournment

1 - Public Comments

Please begin your comments by stating your name and organization (if applicable).

a. On Zoom
b. On the Phone
c. Via Email

2 - Minutes from February 22, 2023 Meetings

Discussion

&

Vote

3 - Energy Safety Update (item 5.c. on posted agenda)

4 – Overview of the ratemaking process and a closer look at the impact of wildfire mitigation plan spending on rates and bills

California Public Utilities Commission:

- Paul Phillips
- Bridget Sieren-Smith

California Public Utilities Commission

California Electric Rate Trends & Rates 101 Briefing

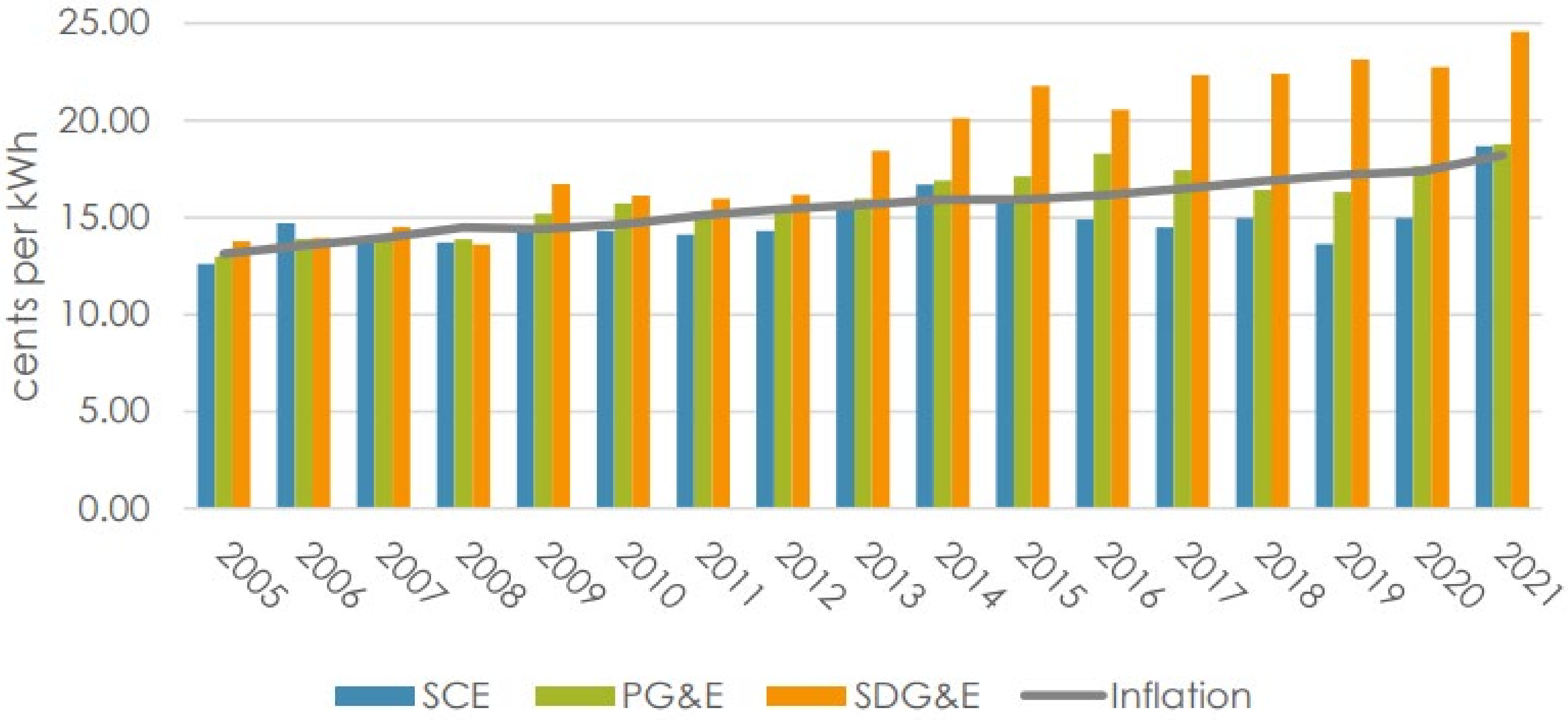
Paul S. Phillips | Energy Division, CPUC

April 19, 2023

Overview of Rates and Affordability: A Tale of Two States

- **Household energy costs and rates are rising and disproportionately impacting affordability** for low- to moderate-income Californians, particularly in hotter climate zones.
- **Bundled residential rates have long outstripped inflation**: our IOUs are gradually climbing the national rankings as their average residential bills increase year over year.
- **NEM and DER customers tend to be disproportionately wealthier homeowners** that can arbitrage advanced rate offerings and reduce bill impacts by investing in the DER trifecta: EVs, solar PV, storage technologies.
- **Conversely, lower-income customers may experience higher cost of service without the benefits**: they're less likely to participate in such BTM offerings and yet more likely to pay for incremental costs displaced by BTM customers.
- **Electrification should lead to lower household energy costs:** *however*, up-front investments in EVs and other DERs for lower-income Californians can be a barrier to participation.

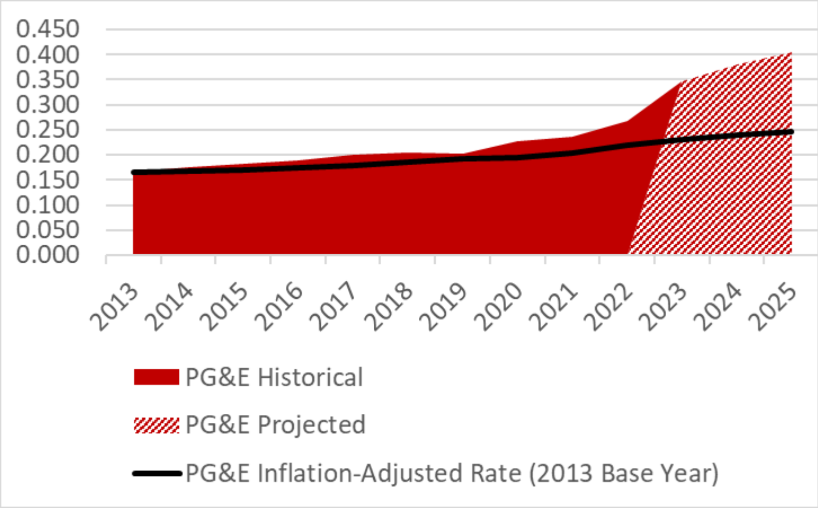
System Average Electric IOU Customer Rate Trends

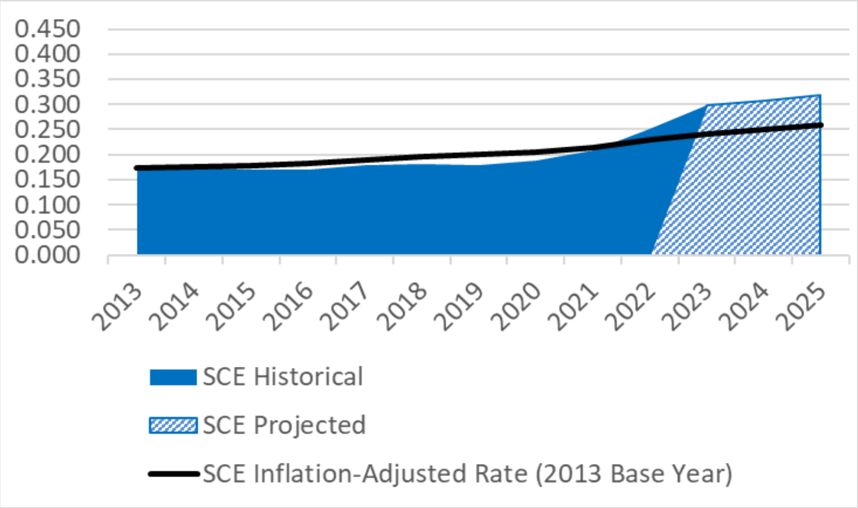


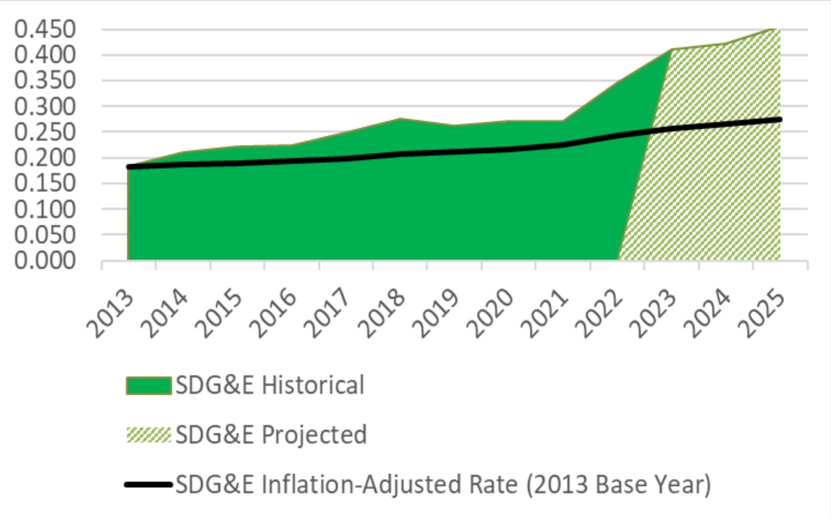
Forecasted Rate Trends - *Bundled Electric IOU Residential Customers*

- Between the third quarter of 2022 and year-end 2025, bundled residential customer average electric rates are expected to rise:
  - **PG&E** – 11.8% annually
  - **SCE** – 6.8% annually
  - **SDG&E** – 10.4% annually

	Current	Year-End			
	Q3-2022	2022	2023	2024	2025
PG&E Nominal Rate	$ 0.293	$ 0.293	$ 0.347	$ 0.380	$ 0.405
SCE Nominal Rate	$ 0.261	$ 0.291	$ 0.298	$ 0.307	$ 0.319
SDG&E Nominal Rate	$ 0.340	$ 0.340	$ 0.410	$ 0.421	$ 0.455







Big Picture: Household Energy Costs Are Projected to Increasingly Exceed Inflation Over the Next Decade

- **Main drivers:**
  - kWh sales decline, behind-the-meter resources; load departure.
  - Wildfire related and transportation electrification capital expenses are the current primary drivers of revenue requirement and rates.
  - Rate sensitivity to large capital investments due to smaller customer base and lower economies of scale.

- However, increased electrification and decreasing reliance on natural gas and gasoline should eventually help to stabilize this trend to some degree.
- Current CPI trends are higher than normal, but these energy cost forecasts are trending ever higher.

Recent IRP* Reference System Plan Implications

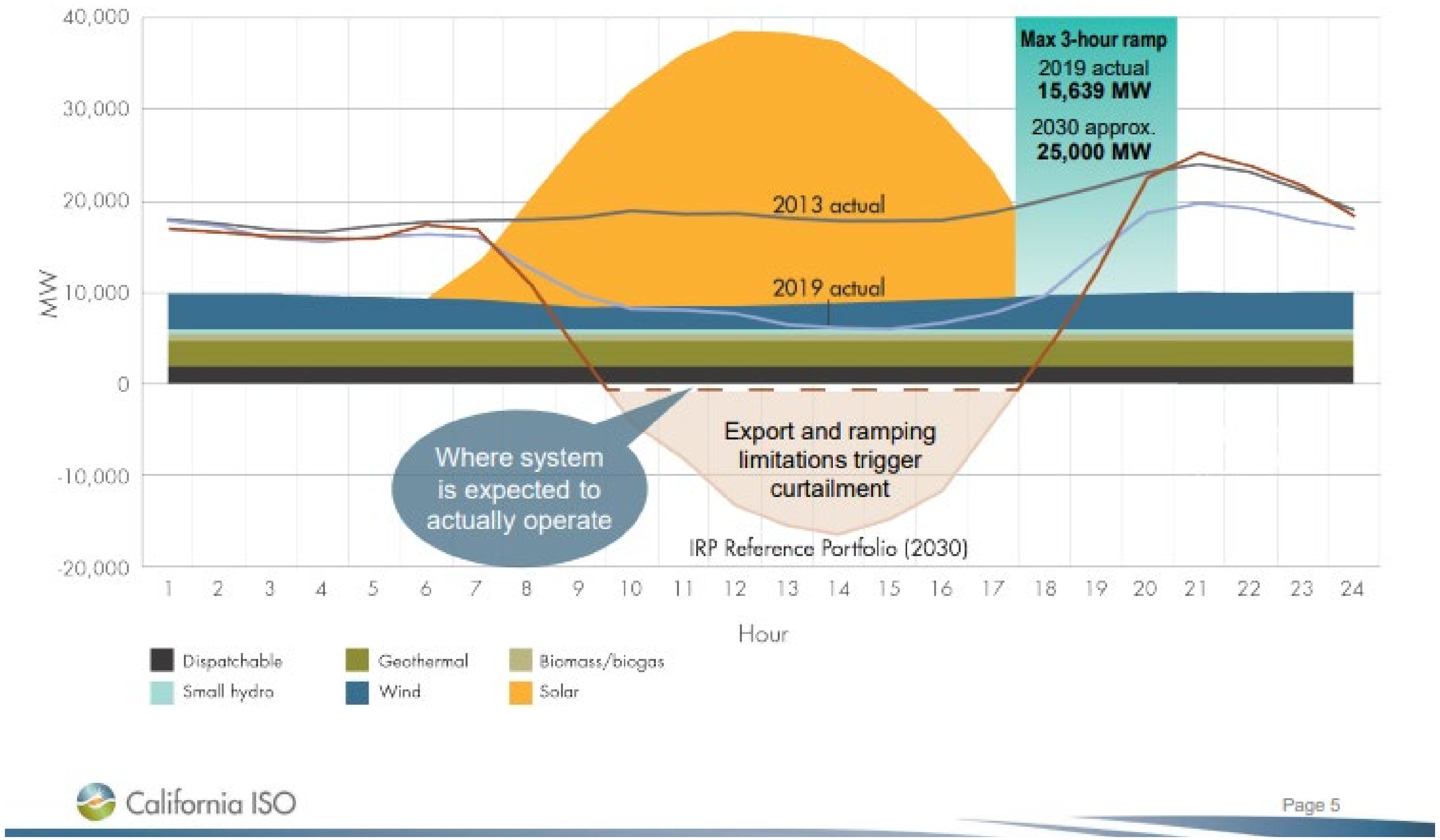
System trends by 2030:

- 60% increase in evening ramp
- 15x increase in renewables curtailment

IRP Analysis:

- Demand Response and strategic rate design can be cost-effective alternatives.
- <u>But</u> *highly scalable, integrated low-cost deployment strategies* are needed

▪ We are facing increasing reliability and stability challenges in terms of resource management and IOU revenue stability



Graphic from CAISO "*Briefing on Post 2020 Grid Operational Outlook,*" Mark Rothleder, VP, @ CAISO BOG, December 19, 2019

General Rate Case Phase I (Revenue Requirement) Overview

GRC Settlements vs. Litigation

- GRCs can be resolved by the CPUC adopting a multi-party motion for settlement.
- Parties can start settlement conferences at anytime, which are generally confidential.
- Settlements can delay or eliminate hearings and/or briefs.

- **GRC phase I resolution via settlement typically provides less detail than a fully litigated case:**
  - ➢ SCE 2018 GRC: D.19-05-020 was 442 pages, electric only
  - ➢ Sempra 2019 GRC: D.19-09-051 was 784 pages, SDG&E and SoCalGas
  - ➢ PG&E 2020 GRC: D.20-12-005 was 416 pages, **settlemen**t, G&E
  - ➢ SCE 2021 GRC: D.21-08-036 was 685 pages, electric only

- The CPUC has generally been moving away from adopting **“Black Box” settlement agreements** in the GRC phase I and more recently in the phase II (rate design).

Key Ratemaking Concept: Utility Decoupling

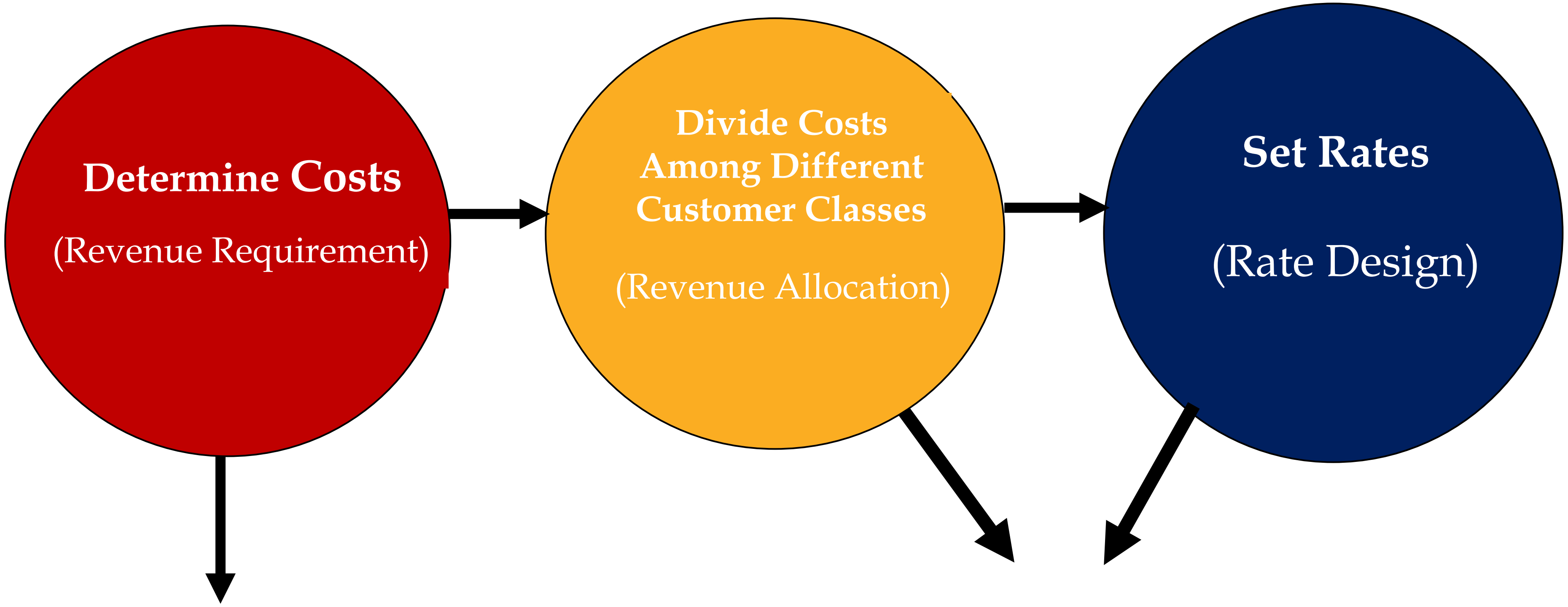
- The CPUC sets rates and applies adjustments to ensure that utilities collect no more or no less than necessary to recover costs and earn a fair rate of return.

- Decoupling mechanisms allow utilities to recover authorized revenues between rate cases **while breaking the link between revenue and sales.**

  - Decoupling began in 1978 in CA for the natural gas industry, 1982 for the electric sector.

- **Benefits of Decoupling**:
  - Removes the disincentive for utilities to encourage energy conservation;
  - Aligns shareholder and customer interests to provide for economically efficient and environmentally sustainable decisions in resource procurement.

The Electricity Ratemaking Process



Proceedings:

- General Rate Cases ("GRC"), Phase I
- Energy Resource Recovery Account (ERRA)
- Other Cost Recovery Applications, e.g. Public Purpose Programs (CARE, FERA, etc.), Transportation Electrification

Proceedings:

- General Rate Cases, Phase II
- Rate Design Windows ("RDW")
- [FERC] Transmission Rate Cases

General Rate Case Phase 1: Revenue Requirement

Determine Costs

(Revenue Requirement)

- **Establishes Revenue Requirement for utility (typically for the next 3 years)**
  - Revenue requirement is the total amount of money the utility is allowed to collect to cover all costs.

- **Focuses on fixed or highly predictable operating costs:**
  - **Expenses**: Salaries, buildings, vehicles
  - **Capital investments** and **Return on Equity**

- **GRCs approve revenue requirement in broad categories and generally not for specific projects.**

- **GRCs are often "settled" as an overall agreement between advocacy groups and the utility.**
  - CPUC rules require CPUC to still determine the settlement agreement is "*reasonable in light of the whole record, consistent with the law, and in the public interest…*"

Energy Resource Recovery Account (ERRA) Proceedings

Determine Costs

(Revenue Requirement)

Scope:

Procurement related costs, including:

- Power Purchase Agreements
- CAISO market electric costs
- Payments to Qualifying Facilities (QFs)
- Greenhouse Gas (GHG) emission credit costs
- Natural gas costs for gas consuming generation plants

- ***ERRA costs are pass through expenses; the utility receives no mark up or profit on these.***

General Rate Case, Phase II

Divide Costs Among Different Customer Classes

(Revenue Allocation)

Allocating total revenue requirement to individual customer classes (residential, commercial, agricultural, industrial) based on the utility's cost to serve that class.

Set Rates

(Rate Design)

Designing rate schedules and further allocating revenues to individual customers within a customer class. Rate design is also used to promote conservation or other desired outcomes.

Summary of Overview: Utility Costs, Rates, and Bills

Cost of Service + **Rate of Return (Profit)** = **Revenue Requirement**

Revenue Requirement ÷ **kWh (Total Electric Demand)** = **Rates**

× **kWh (Customer Electric Demand)**

= **Bills**

- After an Electric IOU GRC Phase II or other rate-setting proceeding, the authorized revenue requirement and authorized forecasted sales are implemented in current rates.
- These rates, multiplied by a customer's kWh usage, determine a substantial part of the customer's bill.
- For Gas, substitute therms for kWh in gray Total Demand and Customer Demand boxes.

Rate Base and Return on Rate Base

- IOU rate base is the value of the company's undepreciated assets and provides a basis for computing rates of return, calculated as **capital additions (capex) net of accumulated depreciation**.

- Return on rate base, which primarily reflects the opportunity for the IOU to earn a profit, has **been increasing at an annual average rate of about 5% to 7% since 2016**, with larger increases for PG&E and SCE from 2019 to 2020 than seen in previous years.

- The ROR figures below are based on California and FERC jurisdictional rate base.

Return on Rate Base ($ billions)						
	PG&E	**Δ %**	**SCE**	**Δ %**	**SDG&E**	**Δ %**
2016	$1.95	-	$1.85	-	$0.55	-
2017	$2.00	2.6%	$1.99	7.6%	$0.60	9.1%
2018	$2.07	3.5%	$2.03	2.0%	$0.58	-3.3%
2019	$2.07	0.0%	$2.04	0.5%	$0.62	6.9%
2020	$2.37	14.5%	$2.44	19.6%	$0.66	6.5%
Annual Average Δ		**5.1%**	**-**	**7.4%**	**-**	**4.8%**

Current IOU Cost of Capital and Rate of Return

- The CPUC establishes weighted average cost of capital and **authorized ROR** for each utility by setting the percentages of long-term debt, preferred stock, and common stock to total capital that the utility should hold.
- **PG&E**: 0.12% increase in ROR = $46 million in 2020 dollars. A 1% increase in ROR = $383 million.

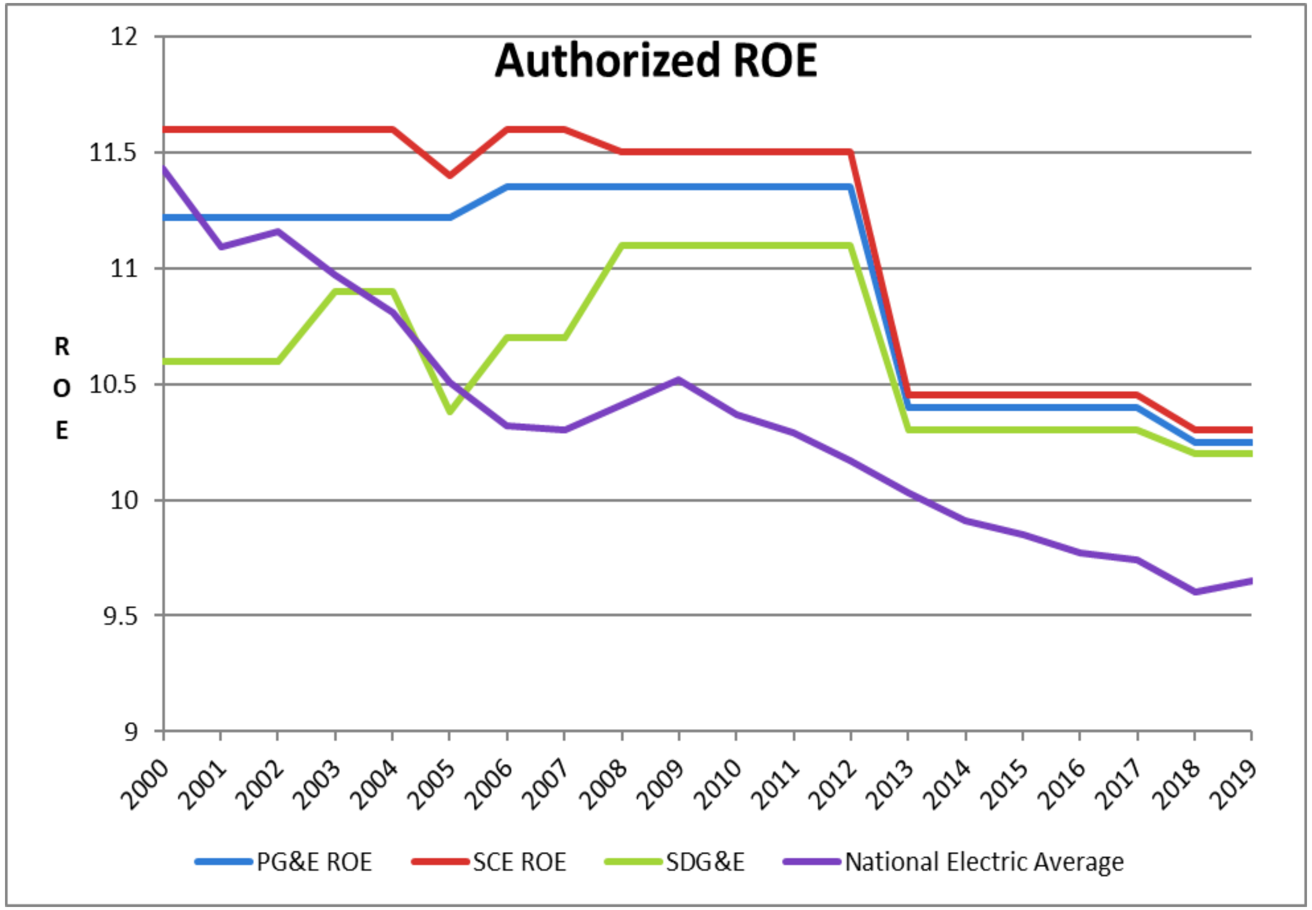
Utility	Cost of Common Stock (ROE)	Cost of Long-term Debt	Cost of Preferred Stock	Overall Cost of Capital (ROR)
SCE	10.30%	4.74%	5.70%	**7.68%**
PG&E	10.25%	5.16%	5.52%	**7.81%**
SDG&E	10.20%	4.59%	6.22%	**7.55%**
SoCalGas	10.05%	4.23%	6.00%	**7.30%**

California IOUs’ Authorized Return on Equity (ROE) Has Been Well Above the National Average

- **The CPUC sets return on equity (ROE)** by estimating expected return on alternative investments of comparable risk in capital markets using financial models.

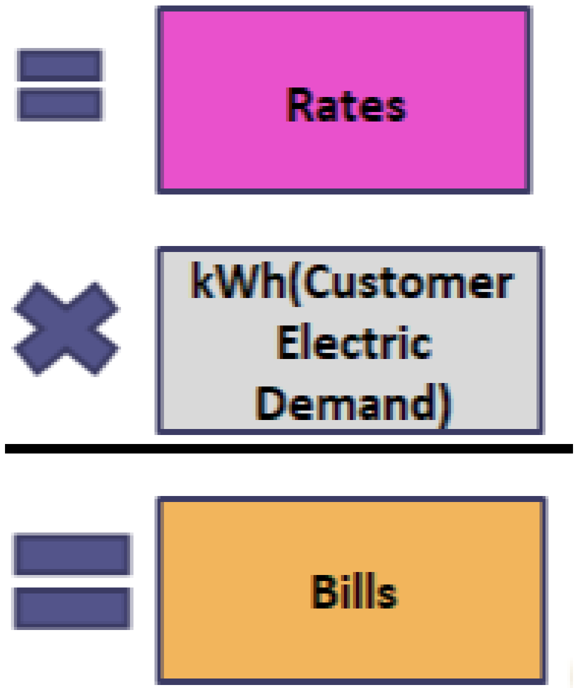
- IOUs have argued that a higher ROE in California is necessary due to the higher risk of investment and cost recovery. These ROE figures reflect California jurisdictional costs only.

Utility	% Difference in ROE b/w IOUs and Nat’l Average	Impact on Rev Req (million $)
SCE	0.65%	128.85
SDG&E	0.55%	22.49
PG&E	0.60%	125.22



Bundled Residential Average Rates and Customer Bills

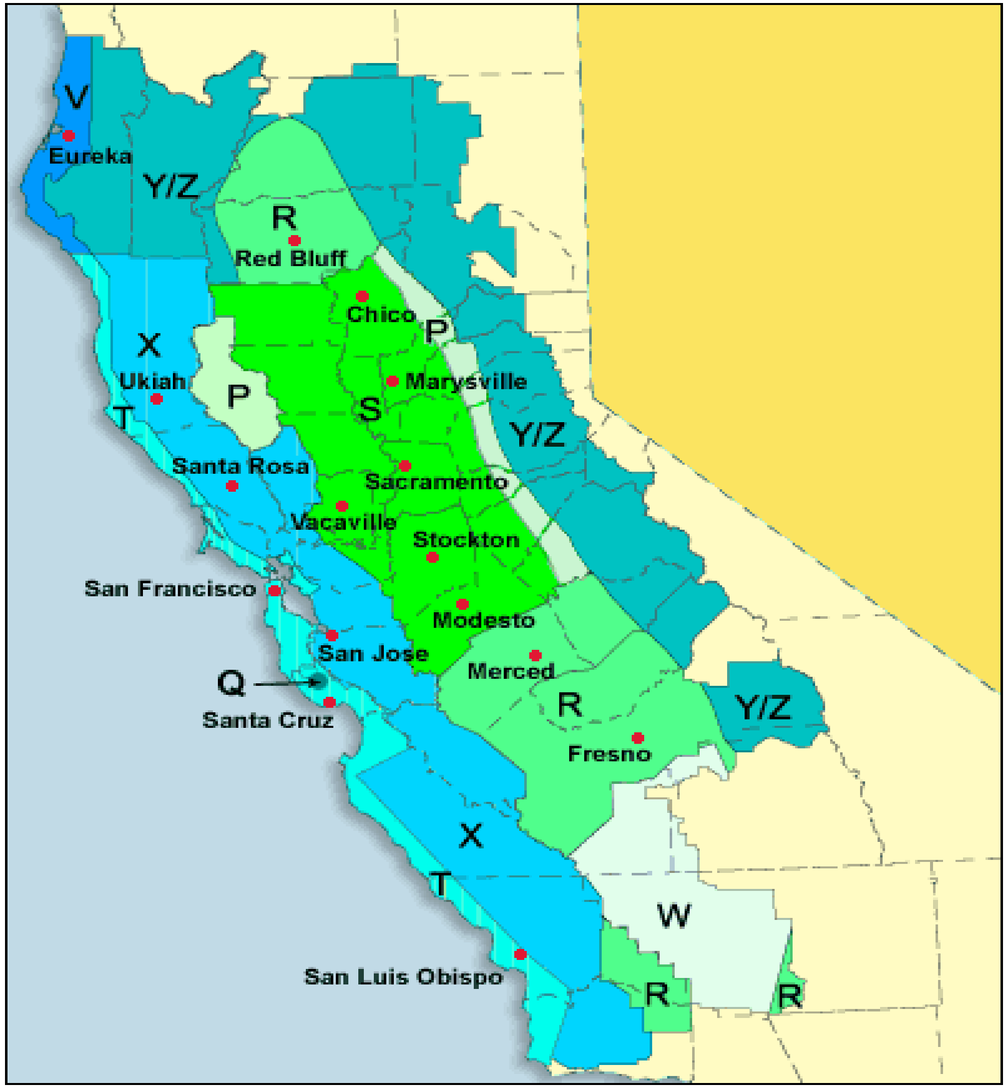
Customers pay bills, not rates



- **Electricity usage** is a major billing determinant in calculating supply and delivery bill impacts for bundled residential customers.
- **Historically, while California SARs have been higher than most of the nation, bills have been lower due to the fact that usage in California is low compared to most of the United States.**
- However, low usage is no longer be counteracting overall rate impacts, and bills are rising as a result of higher rate forecasts.

Tier 1 Electric Baseline Quantities

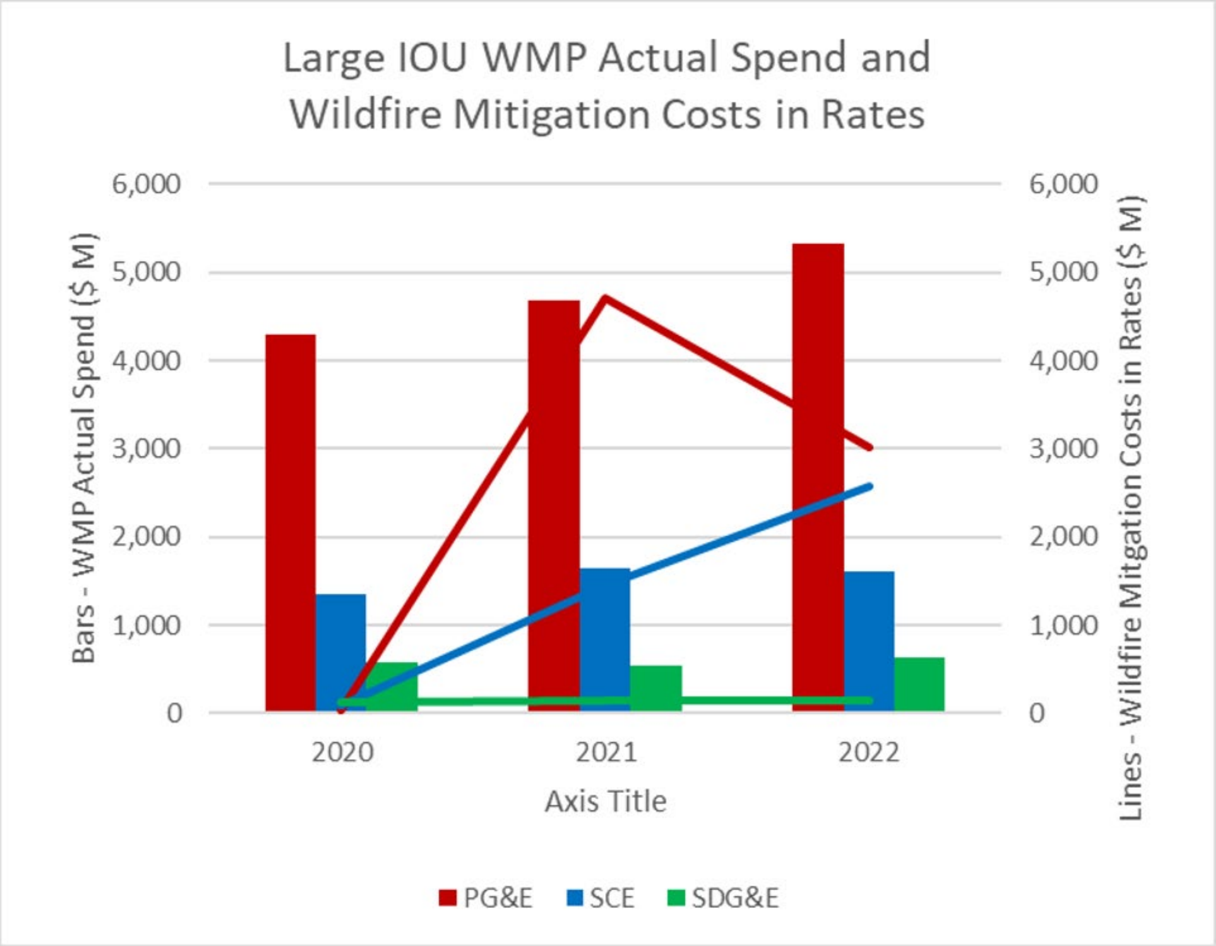
PG&E Baseline Territories



- Defined by statute as a quantity "necessary to supply a significant portion of the reasonable energy needs of the average residential customer."
  - ➢ Basic electric baseline quantity for residential customers, in kWh, is defined by statute as 50% to 60% of average residential consumption of electricity.
  - ➢ Hotter baseline territories are accorded a greater baseline quantity to reflect higher average usage, such as that arising from air conditioning use.
  - ➢ Baseline quantity usage is billed at the lower Tier 1 rate.
  - ➢ TOU rates can also have baseline quantities, resulting in a "baseline credit" for usage within the baseline quantity.

Wildfire Related Expenses and Rate Impacts

Wildfire Mitigation Plan Costs



Source: 2023 WMPs (bars) and SB 695 Report data responses (lines). SDG&E 2022 estimate held at 2021 value.

- Historical lag between time costs are incurred and when costs go in rates
- WMP Actual Costs (Bars in Chart)
  - It is unclear:
    - When actual spend approved costs would go into rates
    - When cost recovery would begin after approval
    - How long the recovery period will be
- Wildfire Mitigation Costs in Rates
  - In 2021, PG&E and SCE both implemented revenue requirements approved in General Rate Case proceedings
    - PG&E rates implementation included amortization of test year 2020 revenue requirements (may explain why line is not a straight trajectory, like the line for SCE)
  - In 2022, SCE not only implemented revenue requirements from its 2021GRC proceeding, but also had significant revenue requirements for costs recorded in memorandum accounts (a running balance of historical recorded costs)

Wildfire-Related Costs in Rates

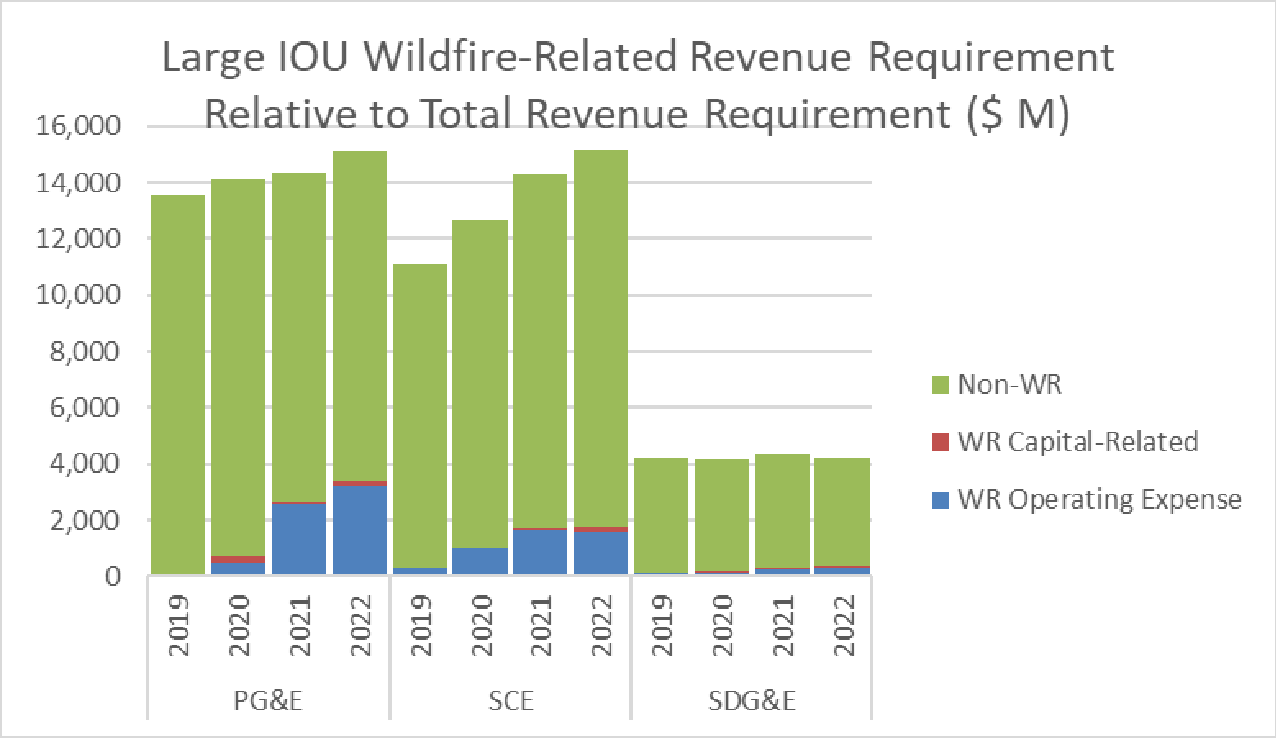
Total Wildfire-Related Costs in Rates
(2019 – 2022, Year-End, $ Billions)

Utility	Total Wildfire-Related Costs in 2019 – 2022 Rates (sum of columns to right)	Total Wildfire Mitigation Costs in 2019 - 2022 Rates	Total Wildfire Insurance / Catastrophic Events Costs in 2019 – 2022 Rates
PG&E	**$11.4**	$7.8	$3.6
SCE	**$7.5**	$4.2	$3.3
SDG&E	**$1.0**	$0.5	$0.5
Total	**$19.9**	$12.5	$7.4

Source: SB 695 Report data responses.
(1) Includes CPUC and FERC authorizations, except for PG&E which declined to provide FERC-related wildfire insurance and catastrophic events data and SDG&E which states it is not able to provide FERC-related wildfire mitigation data because WMP is a CPUC-jurisdictional balanced program.
(2) SDG&E data through 2021 only; SDG&E declined to provide 2022 data stating that the data will be available when its 2022 Risk Spending Accountability Report is filed.

- Wildfire Mitigation Costs (costs shown in previous slide)
  - IOUs now forecast the majority of their WMP costs in their General Rate Cases
  - IOUs also allowed to seek cost recovery, either in GRCs or through a separate application, of the incremental spending recorded in memorandum accounts e.g. WMPMA
  - For PG&E and SCE, costs include AB 1054 securitizations for equity rate base exclusions (CapEx excluded from earning a ROE)
- Wildfire Insurance/Catastrophic Events Costs
  - IOUs are allowed to recover certain wildfire-related costs that are external to the activities described in the WMP, e.g. wildfire insurance premiums and catastrophic events costs
  - AB 1054 also created a Wildfire Fund for excess liabilities resulting from utility-caused wildfires, funded equally by ratepayers and utility shareholders
- Total Wildfire Related Costs in Rates (2019 – 2022)
  - Additional costs may have been incurred during the 2019 – 2022 period but may not have yet been placed in rates e.g. recorded in memo accounts

Wildfire-Related Revenue Requirement in Rates



Source: SB 695 Report data responses.

- Operating expense and capital-related costs authorized for recovery during ratesetting proceedings must be converted to revenue requirement to be recovered in rates
  - Operating expenses generally convert to revenue requirement on a 1:1 basis
  - Only a fraction of capital-related costs convert to revenue requirement in any given year due to: (1) depreciating expense as the underlying asset depreciates over time and (2) the authorized profit on the net capital investment is paid during the same time period
- In 2021, significant wildfire-related operating expenses began to appear in rates, with this trend intensifying in 2022 and expected to continue. At year-end 2022, the percentage of wildfire-related revenue requirement to total revenue requirement for each utility is:
  - PG&E: $3.4 B / $15.1 B or about 23%
  - SCE: $1.8 B / $15.1 B or about 12%
  - SDG&E: $0.4 B / $4.2 B or about 9%
    - SDG&E has been revamping and enhancing its wildfire prevention and mitigation measures since 2007 and wildfire-related revenue requirements may reflect a mature wildfire safety program

Wildfire-Related Revenue Requirement Impact on Year-End 2022 Rates and Bill

PG&E, SCE, and SDG&E Wildfire-Related Portion of Year-End 2022 Residential Average Rate

	Bundled Residential Average Rate (cents/kWh)	Wildfire-Related Portion (cents/kWh)	Wildfire-Related Portion (%)
PG&E	29.3	5.1	17.4%
SCE	29.1	3.0	10.3%
SDG&E	34.0	2.9	8.5%

PG&E, SCE, and SDG&E Wildfire-Related Portion of Year-End 2022 Average Monthly Bill, Bundled Residential Non-CARE Customers

	Total Bill	Wildfire-Related Portion ($)	Wildfire-Related Portion (%)
PG&E	$167.14	$28.99	17.3%
SCE	$153.32	$15.36	10.0%
SDG&E	$159.15	$13.77	8.7%

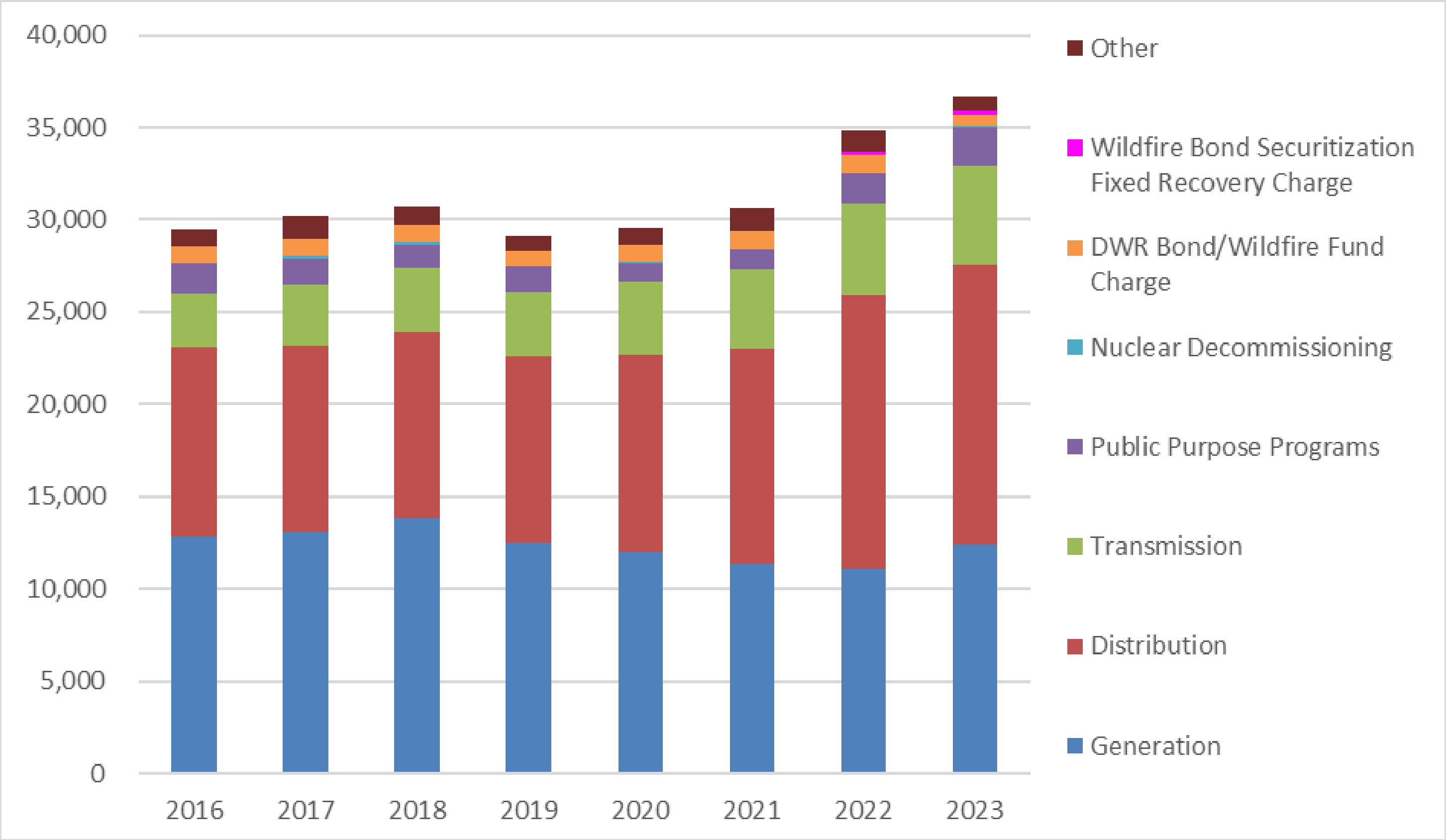
Source: SB 695 Report data responses.
Bills are for illustrative purposes only.

- The year-end 2022 wildfire-related revenue requirement amounts on the previous slide (PG&E $3.4, SCE $1.8 B, and SDG&E $0.4 B) are reflected in the wildfire-related portion embedded in the bundled residential average rates and the bundled residential Non-CARE customer bills shown to the left
  - Bundled customers take generation, distribution, and transmission services from an IOU i.e. does not include CCA customers receiving delivery services only
  - Bills are shown for customers not enrolled in the California Alternate Rates for Energy (CARE) program---lower-income residential customers enrolled in the CARE program receive up to a 35 percent discount on bills
  - Monthly usage data for bills is based on Bills calculated based on 500 kWh/month for PG&E climate zone X and SCE climate zone 9, and 400 kWh/month for SDG&E Inland climate zone.

General Rate Case Phase II: Rate Design Basics

How Utility Operating Costs or Revenue Requirement Impact Bills

PG&E, SCE and SDG&E Revenue Requirement ($000s) by Cost Category



PG&E, SCE, and SDG&E
January 1, 2023 Revenue Requirements

Revenue Requirement

- Utility-owned generation and purchased power sources, plus distribution, collectively account for approximately 80% of the utilities' revenue requirements.
- The transmission revenue requirement is set by the Federal Energy Regulatory Commission (FERC).
- Public Purpose Program revenue requirement collects the costs of certain public policy programs.

Revenue Allocation

The 4 major revenue requirement pieces that need to be allocated to customer classes:

1. **Generation:** Capital costs and fuel & operating expenses of utility-owned generation and purchased power costs.
2. **Transmission**: Costs determined and allocated by FERC.
3. **Distribution**: Capital and operating expense of utility distribution facilities, including customer access costs.
4. **Other:** Programs that have a Revenue Requirement not driven by customer demands such as Public Purpose Programs, CARE, SGIP, etc. These costs are allocated using methods other than marginal cost.

Marginal Cost Basics

- The cost of providing an additional unit of electricity to meet customer demand.
- Marginal Costs are used in both Revenue Allocation and Rate Design

Type of Marginal Cost	Units
Energy (Generation)	Cents per kWh or $ per MWh
Capacity (Generation, Distribution)	$ per kW or $ per kW-year
Customer (Final Line Transformer, Service Drops, Meters, Billing, Customer Service)	$ per customer-year (or month)

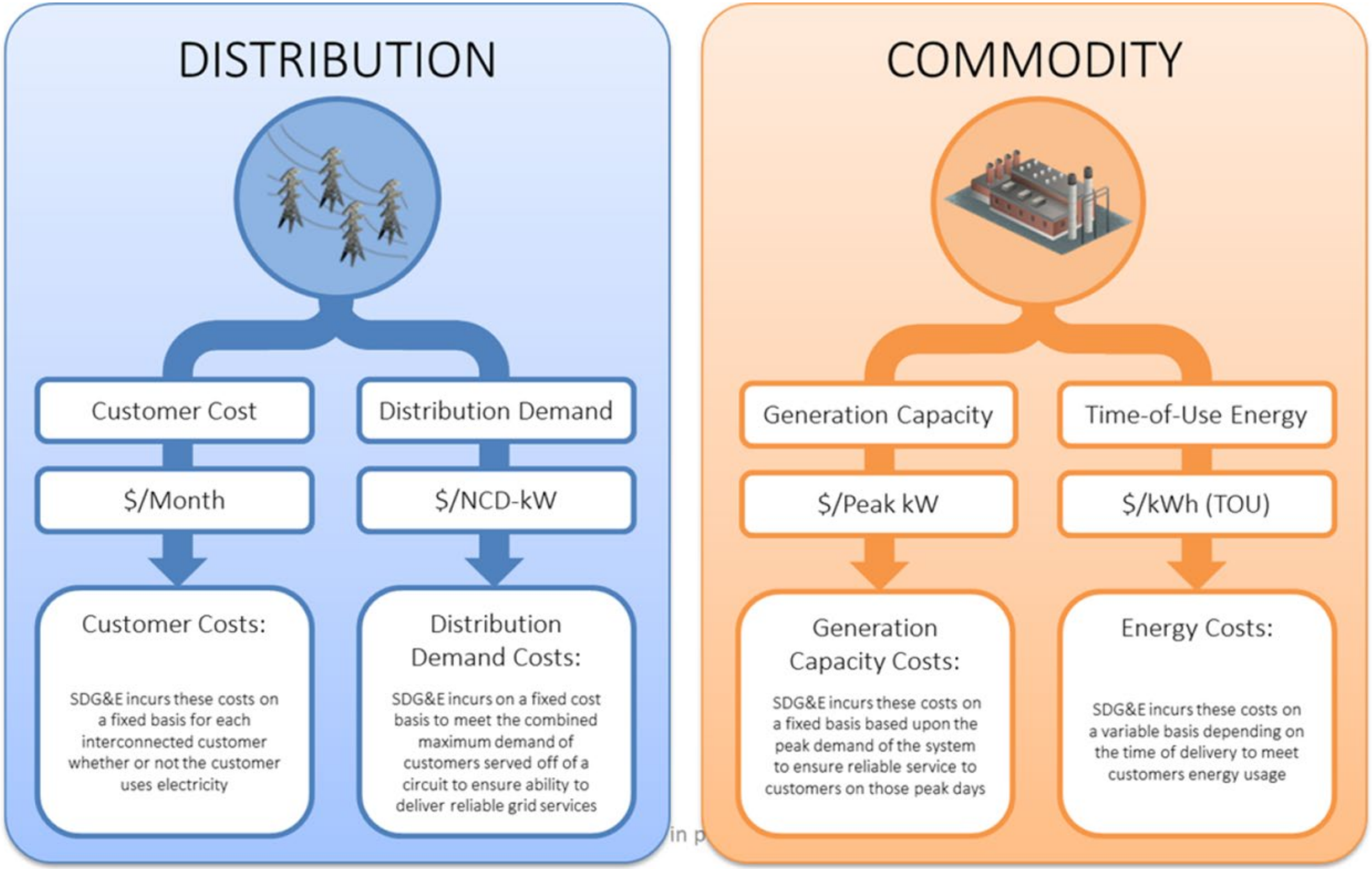
Marginal Energy and Marginal Generating Capacity Cost

Acronym	Cost Category	Explanation
MEC	**Marginal Energy Costs**	• Cost of procuring an additional megawatt-hour of load. • These costs are a function of forecasts based on CAISO markets and generation. • It is impacted by ramping costs and prosumer generation (e.g. NEM).
MGCC	**Marginal Generation Capacity Costs**	• Cost in generation capacity required to serve one additional MW of peak load. • It is typically thought of in terms of power plants such as combined cycle gas turbines but can also reflect energy storage, hydropower, etc. • Under current formulations for peak cost allocation (PCAF), the MGCC value acts as a coefficient that sets peak / off-peak price differentials.

Marginal Distribution and Transmission (Capacity) Cost

Acronym	Cost Category	Explanation
MDCC	**Marginal Distribution Capacity Costs**	• **This cost pertains to infrastructure between the transmission system and the service drop.** • It's typically a larger cost in urban areas. • Some commercial customers largely bypass it. • It can serve as a catch-all for local maintenance.
MTCC	**Marginal Transmission Capacity Costs**	• **Transmission cost of delivering new customer load.** • Under FERC rules, costs incurred to provide for new load are CPUC jurisdictional, while other transmission costs fall under FERC. • At the FERC level, costs are volumetric and non-coincident demand charge driven. **Demand charge studies have found this approach to not be aligned with cost causation.** • Marginal cost ratemaking is compromised by policies that ignore cost causation. • Aligning the CPUC's growing emphasis on temporally and locationally variant cost assessments with FERC's volumetric approach is increasingly challenging.

Distribution and Generation Costs Are Allocated Separately, Based on Marginal Cost



(NCD= Non-coincident demand)

GRC Revenue Allocation Outcomes: SCE Example

	Distribution		Generation		APS & Interruptible Surcharge[1]	SGIP[2]	PPP[3]	NDC/PUCRF[4]	NSGC[5]	Wildfire Special Allocator
	Uncollared	Collared	Uncollared	Collared						
Total Domestic	50.6%	51.3%	47.3%	46.6%	42.5%	23.0%	41.9%	35.3%	44.0%	44.9%
GS-1	7.3%	7.5%	7.1%	8.6%	6.4%	2.4%	7.9%	7.1%	7.3%	7.7%
TC-1	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%
GS-2	18.8%	17.1%	14.1%	14.7%	14.6%	12.9%	17.3%	15.8%	15.8%	17.8%
TOU-GS-3	7.4%	7.6%	6.6%	6.6%	8.1%	18.0%	8.4%	8.8%	8.2%	8.0%
Total LSMP	33.5%	32.3%	27.9%	30.0%	29.1%	33.3%	33.6%	31.8%	31.4%	33.6%
TOU-8-Sec	6.7%	7.0%	7.2%	7.1%	8.6%	13.6%	8.2%	9.7%	8.4%	7.8%
TOU-8-Pri	4.4%	4.3%	4.8%	4.6%	6.2%	10.9%	5.0%	6.5%	5.0%	5.1%
TOU-8-Sub	1.1%	1.4%	6.6%	6.3%	8.2%	0.0%	4.1%	7.7%	5.0%	3.9%
Total Large Power	12.3%	12.7%	18.6%	18.0%	23.0%	24.5%	17.3%	23.9%	18.4%	16.9%
TOU-PA-2	1.9%	2.0%	2.5%	2.6%	2.0%	6.9%	2.2%	2.3%	1.6%	2.1%
TOU-PA-3	1.1%	1.2%	2.0%	1.8%	1.7%	8.2%	1.5%	1.9%	1.3%	1.4%
Total Ag.&Pumping	3.0%	3.1%	4.4%	4.3%	3.7%	15.0%	3.6%	4.1%	2.9%	3.4%
Total Street Lighting	0.2%	0.2%	0.8%	0.5%	0.8%	0.0%	0.9%	0.7%	0.4%	0.6%
STANDBY/SEC	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.2%	0.2%	0.2%	0.1%
STANDBY/PRI	0.2%	0.2%	0.3%	0.2%	0.2%	3.0%	0.7%	0.8%	0.6%	0.2%
STANDBY/SUB	0.1%	0.0%	0.7%	0.2%	0.6%	1.2%	1.7%	3.2%	2.1%	0.3%
Total Standby	0.4%	0.3%	1.0%	0.6%	0.9%	4.2%	2.6%	4.2%	2.9%	0.6%
Total System	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

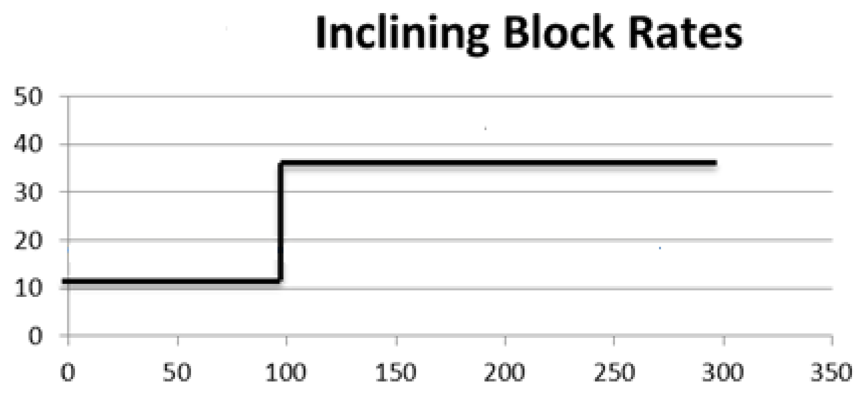
Illustrative Rates (SCE Example)

Bundled Service Rate Groups (without California Climate Credit and EITE Credits)
Illustrative Rates[1]

	October 2021	Uncapped Rates	Proposed Settlement Rates	Relative Percentage Change		Percent of System Average Rate	
	A	B	C	B/A	C/A	A	C
Total Domestic	25.4	25.3	25.4	-0.5%	0.0%	115%	115%
GS-1	23.8	21.6	23.5	-9.2%	-1.6%	108%	106%
TC-1	26.6	20.8	26.6	-21.7%	0.0%	121%	121%
GS-2	24.0	24.2	23.7	0.8%	-1.5%	109%	107%
TOU-GS-3	21.3	21.6	21.7	1.2%	1.5%	97%	98%
Total LSMP	23.4	22.9	23.2	-1.9%	-0.9%	106%	105%
TOU-8-Sec	18.5	18.5	18.6	0.1%	0.5%	84%	84%
TOU-8-Pri	16.7	17.6	16.9	5.8%	1.5%	75%	77%
TOU-8-Sub	11.2	11.8	11.3	5.7%	1.5%	51%	51%
Total Large Power	16.0	16.5	16.2	2.8%	1.0%	73%	73%
TOU-PA-2	20.1	19.2	19.8	-4.8%	-1.6%	91%	90%
TOU-PA-3	16.9	17.8	17.2	5.3%	1.5%	77%	78%
Total Ag.&Pumping	18.7	18.6	18.6	-0.8%	-0.4%	85%	85%
Total Street Lighting	24.6	28.3	24.9	15.0%	1.3%	111%	113%
STANDBY/SEC	18.2	18.3	18.2	0.7%	0.2%	82%	83%
STANDBY/PRI	18.8	18.6	18.7	-0.8%	-0.5%	85%	85%
STANDBY/SUB	11.3	12.4	11.4	9.5%	1.3%	51%	52%
Total Standby	13.0	13.8	13.1	6.2%	0.7%	59%	59%
Total System	22.1	22.1	22.1	-0.2%	-0.1%	100%	100%

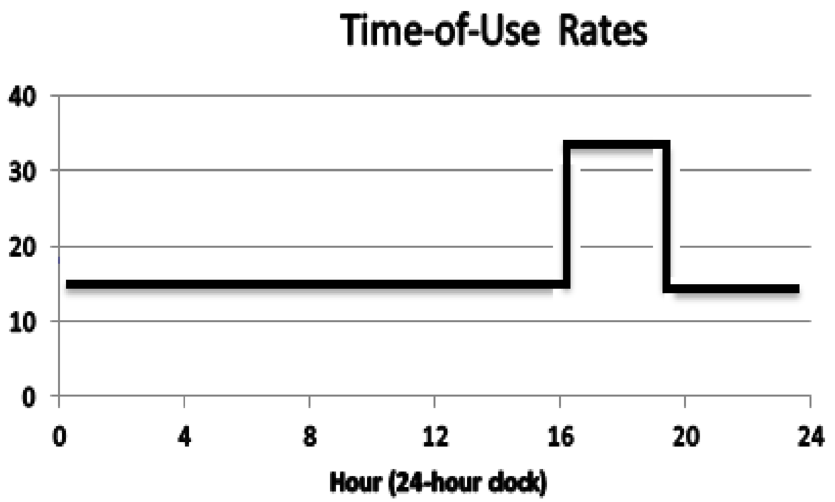
Core Elements of Electric Rate Structure

- **Volumetric Charge ($/kWh)**
  - Inclining block rates: Rate goes up for a higher block, or tier, of energy usage
  - Time-of use (TOU) rates: Rate goes up for peak hours and goes down for non-peak hours
  - Dynamic or real-time pricing rates: Rate may vary on an hourly or basis (or even shorter intervals).



❖ **Demand charge ($/kW maximum demand)**
  - Reflect capacity cost
  - Non-coincident (applies anytime or Coincident (only applies in peak or part-peak periods)

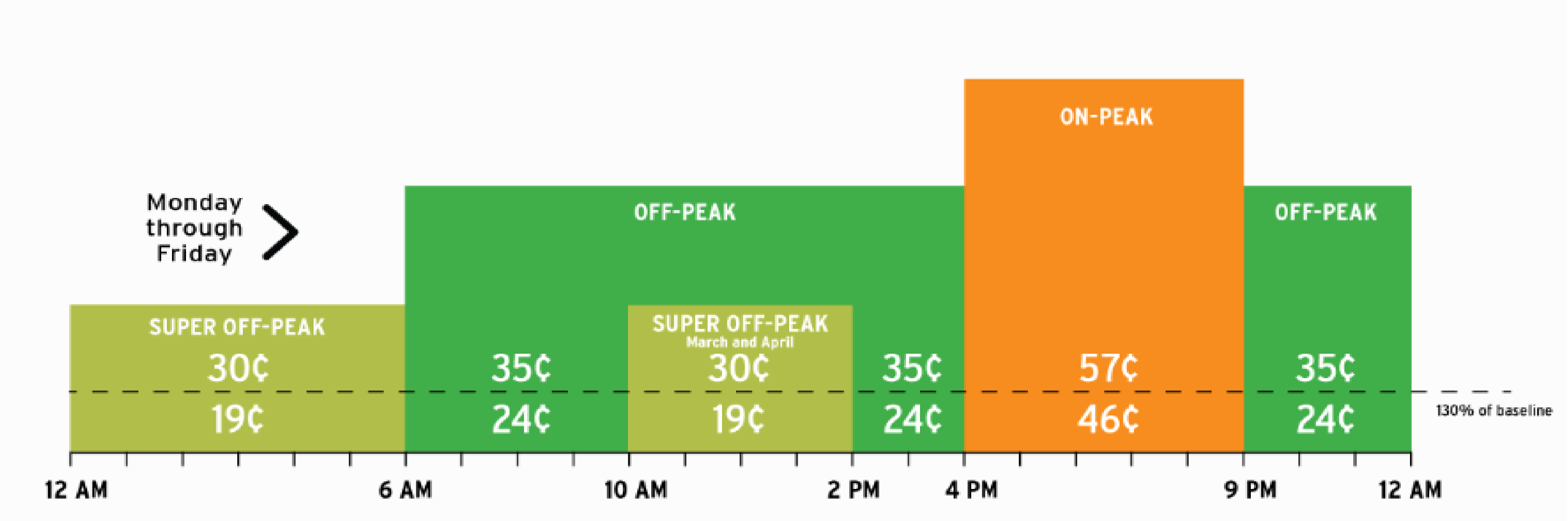
❖ **Fixed charge ($/month)**
  - Includes customer and other costs that don't vary with usage.



Electric TOU Rates

- A TOU Rate is a volumetric rate (in $/kWh) that varies by season, day-type, and time of day (usually 2 or 3 periods per day).
- Generally, TOU pricing is intended to reflect the tendency of certain groups of hours to be high- or low-cost hours, providing a price signal to shift load.
- The highest-priced summer season TOU period is known as "peak period."
- Presently, most TOU rates have peak periods from 4 pm – 9 pm or 5 pm - 8 pm.

SDG&E Past Illustrative Example: Summer Pricing* Weekdays, TOU-DR1 (these are



*Rates effective 6/1/19 – 10/31/19

Dynamic Rates and Real Time Pricing

Dynamic rates send price signals, sometimes at short notice, to reduce usage in response to grid conditions.

- **Critical Peak Pricing (CPP)** is a form of dynamic pricing.
  - Participating customers get discounted rates in exchange for shifting loads during critical peak hours.
  - Event hours called up to one day in advance.
  - "Critical Consumption Pricing" would incent consumption when overgeneration is high.

- **Real Time Pricing (RTP)** rates are price signals that reflect system conditions on an hourly (or less) basis.
  - RTP could be based on generation prices (temporal), transmission and distribution prices (locational), or other factors, such as the prior day's temperature.

Demand Charges

- **Demand Charges** are energy charges **based on a customer's highest demand during any 15 minute interval that is measured in a billing period**.
  - May be a fixed charge per kilowatt, and is reflective of the capacity costs caused by each customer.
  - A feature of non-residential rate design.

- The difference between **"demand"** (kW) and "**consumption"** (kWh):
  - ➢ **Kilowatt (kW) – A unit of electrical power equal to 1,000 watts.**
    - **Demand (Capacity)** – Average rate at which electricity is consumed during a 15-minute interval.
  - ➢ **Kilowatt-hour (KWh) – 1 kW used for one hour.**
    - **Consumption (Energy)** – Amount of electricity consumed over a period of time, i.e., a billing period.

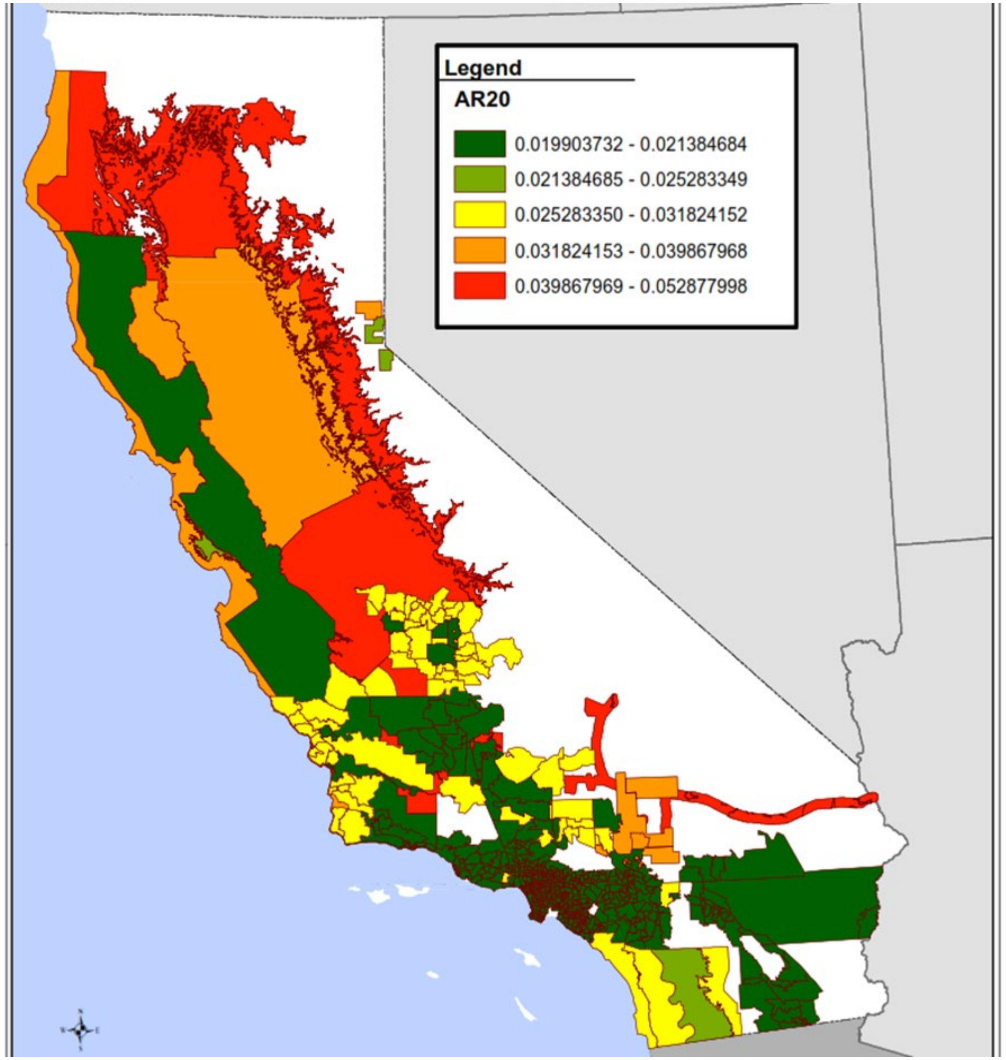
- **Coincident Demand Charge (CD)**: Customer charge assessed during the system peak.
- **Non-Coincident Demand Charge (NCD):** Customer charge reflecting the customer's highest 15 minute interval of kW demand in a monthly billing cycle.

Affordability Ratios and the Affordability Rulemaking Proceeding

- **<u>Electricity Burden</u>:** In and of itself, this does not comprehensively define affordability, as it can be affected by other factors such as customer behavioral patterns, housing stock, etc.

- **Affordability Ratio:** Currently being examined as part of the Affordability OIR proceeding (R.18-07-006).
  - An enhanced version of electricity burden - describes the impact a utility bill has on household budget.
  - **For example: the percent of income (after housing) that is spent on essential utility service.**

- The affordability framework being developed attempts to determine the degree to which utility services are more or less affordable in particular geographic regions, scaled at different levels of granularity.



Sample heatmap showing <u>preliminary</u> data for gas industry affordability ratios for household incomes at the 20th percentile of income distribution.

Thank You!

Paul Phillips

Paul has significant experience in California energy and communications policy matters. He oversees the Electric Rates section of the CPUC Energy Division, evaluating statewide pricing programs and strategies for an evolving grid, including the development of time of use, dynamic, and real time pricing to promote electrification and affordability. Earlier in his career, Paul focused on AB 32 implementation, energy procurement, wholesale communications market development, utility cost modeling, mergers & acquisitions, and academic consulting on electric market restructuring and the energy crisis. He later served as an energy advisor specializing in renewable procurement, net energy metering, and gas and electric rates. Paul holds an MPA in Business & Government Policy from the Harvard Kennedy School and a BA in Economics and English Literature from UCLA.

Bridget Sieren-Smith

Bridget has about eight years of experience in energy-related areas within the CPUC, first briefly as an energy utility program auditor, and currently as an Energy Division analyst. She focuses on electric rate forecasting and electric affordability policy. Bridget received a BS in Agricultural and Managerial Economics from UC Davis and is licensed in California as a Certified Public Accountant.

Appendix:
Additional Detail on Marginal Cost Ratemaking

Combined Generation Energy & Capacity

Customer Class	Season/Period	Marginal Energy Cost Revenue (Million $)	%		Generation Capacity Cost Revenue (Million $)	%	Total Generation Marginal Cost Revenue (Million $)	%
Residential	Summer on peak	$500			$800		$1,300	
	Summer off peak	$510			$50		$560	
	Winter On-peak	$350			$70		$420	
	Winter off peak	$375			$0		$375	
TOTAL RESIDENTIAL		**$1,735**	**48%**		**$920**	**55%**	**$2,655**	**51%**
Commercial	Summer on peak	$450			$640		$1,090	
	Summer off peak	$630			$60		$690	
	Winter On-peak	$245			$50		$295	
	Winter off peak	$525			$0		$525	
TOTAL COMMERCIAL		**$1,850**	**52%**		**$750**	**45%**	**$2,600**	**49%**
Grand Totals		**$3,585**			**1,670**		**$5,255**	

Combined Generation EPMC Allocation

Total Generation Revenue Requirement (From GRC 1 & ERRA)			$ 6,000.00	(2)					
Generation MC Revenue ($M)			$ 5,255.00	(1)					
EPMC Scaling Factor			1.142	(2) / (1)					
	MC Revenue ($M)			**EPMC**		**Scaled MC Revenue**		**% Allocation**	
Residential	$	2,655.00	X	1.142	=	$	3,031	51%	
Commercial	$	2,600.00	X	1.142	=	$	2,969	49%	
Total	$	5,255.00	X	1.142	=	$	6,000	100%	

Revenue Allocation – Total Distribution

Customer Class	Season/Period	Marginal Demand Related Revenue ($M)	% Allocation (By Class)	Customer Marginal Cost Revehue ($M)	% Allocation (By Class)	Total Distribution MC Revenue ($M)	% Allocation (By Class)
Residential	Summer on peak	$600				$600	
	Summer off peak	$75				$75	
	Winter On-peak	$105				$105	
	Winter off peak	$40				$40	
	Non-Seasonal			$600		$600	
TOTAL RESIDENTIAL		**$820**	**54%**	**$600**	**56%**	**$1,420**	**55%**
Commercial	Summer on peak	$480				$480	
	Summer off peak	$90				$90	
	Winter On-peak	$75				$75	
	Winter off peak	$40				$40	
	Non-Seasonal			$480		$480	
TOTAL COMMERCIAL		**$685**	**46%**	**$480**	**44%**	**$1,165**	**45%**
Grand Totals		$1,505		$1,080		$2,585	

Combined Distribution EPMC Allocation

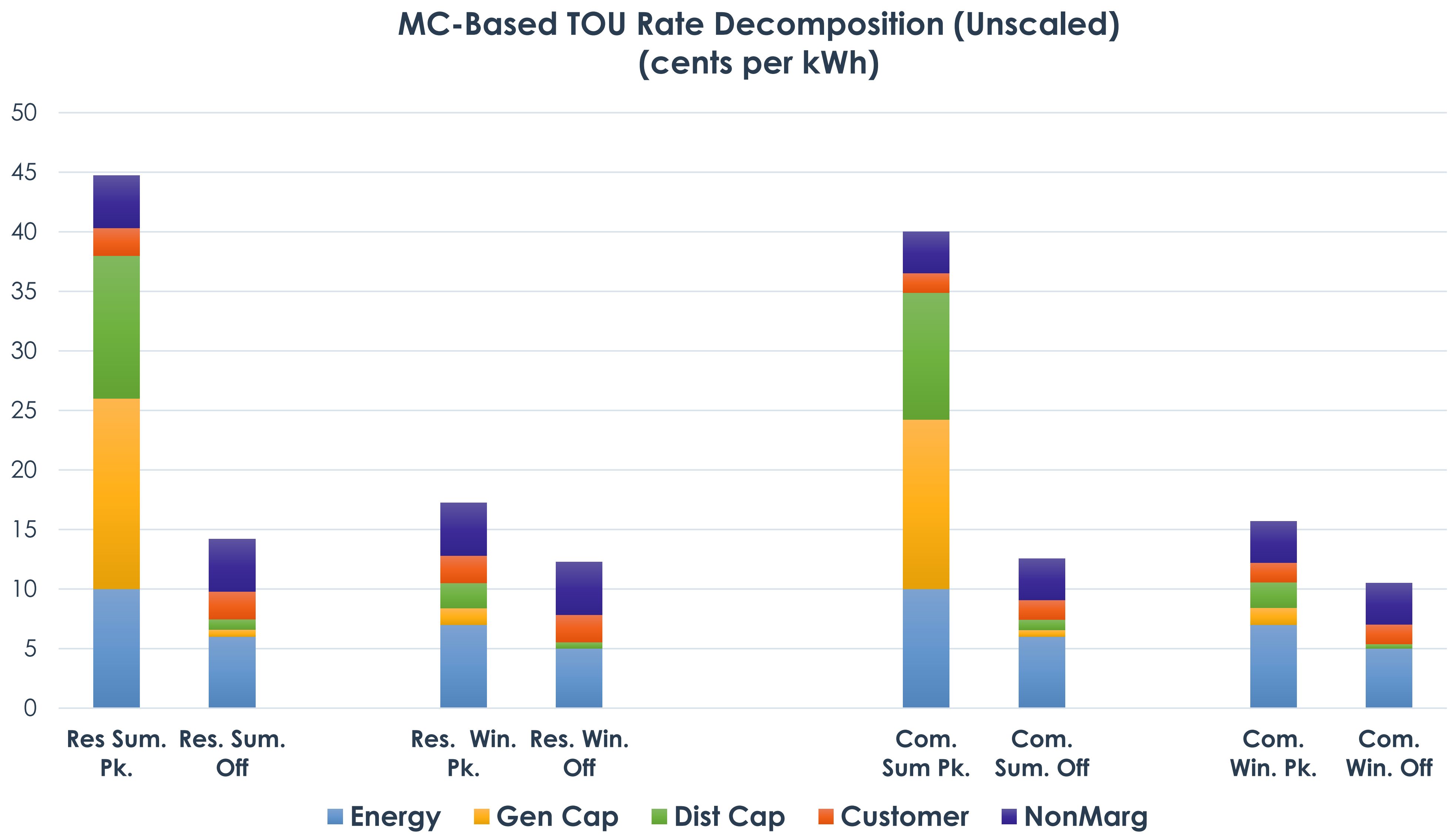
Total Distribution Revenue Requirement (From GRC 1)	$ 4,000.00	(2)
Distribution MC Revenue ($M)	$ 2,585.00	(1)
EPMC Scaling Factor	1.547	(2) / (1)

	MC Revenue ($M)		**EPMC**		**Scaled MC Revenue**	**% Allocation**
Residential	$ 1,420.00	X	1.547	=	$ 2,197	55%
Commercial	$ 1,165.00	X	1.547	=	$ 1,803	45%
Total	$ 2,585.00	X	1.547	=	$ 4,000	100%

Combined TOTAL EPMC Allocation: Generation and Distribution, Residential & Commercial

Customer Class	Usage (kWh)	% Total Usage by Class (lass	Scaled GEN MC Revenue	Scaled DIST EPMC Revenue	Total EPMC Revenue	%Allocation by Class	Average Rate ($/kWh)
Residential	26,000	47%	$ 3,031	$ 2,197	$ 5,228	52%	$ 0.201
Commercial	29,000	53%	$ 2,969	$ 1,803	$ 4,772	48%	$ 0.165
Total	55,000	100%	$ 6,000	$ 4,000	$ 10,000	100%	$ 0.182

Illustrative Fully Time-Differentiated TOU Rates




Break

WE ARE BACK!

5 – Concept Development for White Paper: Wildfire Regimes in California and Implications for Vegetation Management

a. Introduction

b. Presentation by Board Member Alexandra Syphard

c. Overview of Energy Safety working group and scoping meetings related to Vegetation Management: Lucy Morgans, Electric Safety Policy Division (Energy Safety)

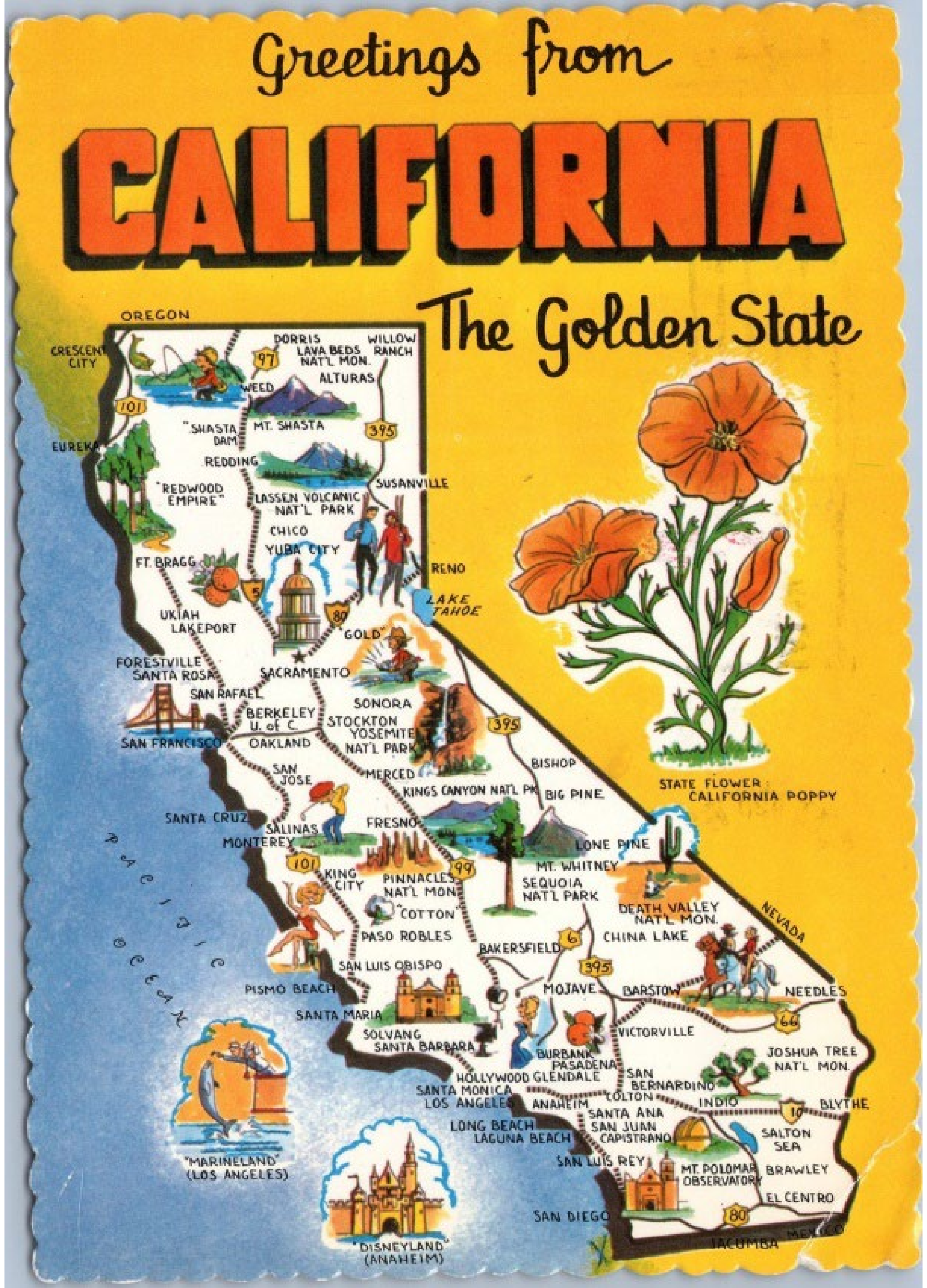
d. Board Discussion

e. Next Steps

Landscapes of Change and Wildfire in California: Lessons in Complexity

Alexandra D. Syphard

Conservation Biology Institute



Evokes strong images…..

Sun, sand, surf

Movie stars

National Parks

Traffic and Freeways

Earthquakes

Wildfire!


BEHAVE YOURSELF
SNAPS PROVOLONE PRESENTS:
SMOKE SIGNALS FROM BEYOND!
THE ROYAL
CBS ORIGINAL
FIRE COUNTRY
CBS

California Wildfire – It's A Good Thing

Bringing Good Fire Back to the Land

MICKKI GARRITY - POSTED ON AUGUST 4, 2021 - POSTED IN BLOGS, DISPLACED NATIVE

Grand Canyon prescribed pile burning, May 2019. Photo by Grand Canyon National Park, used under Creative Commons license 2.0

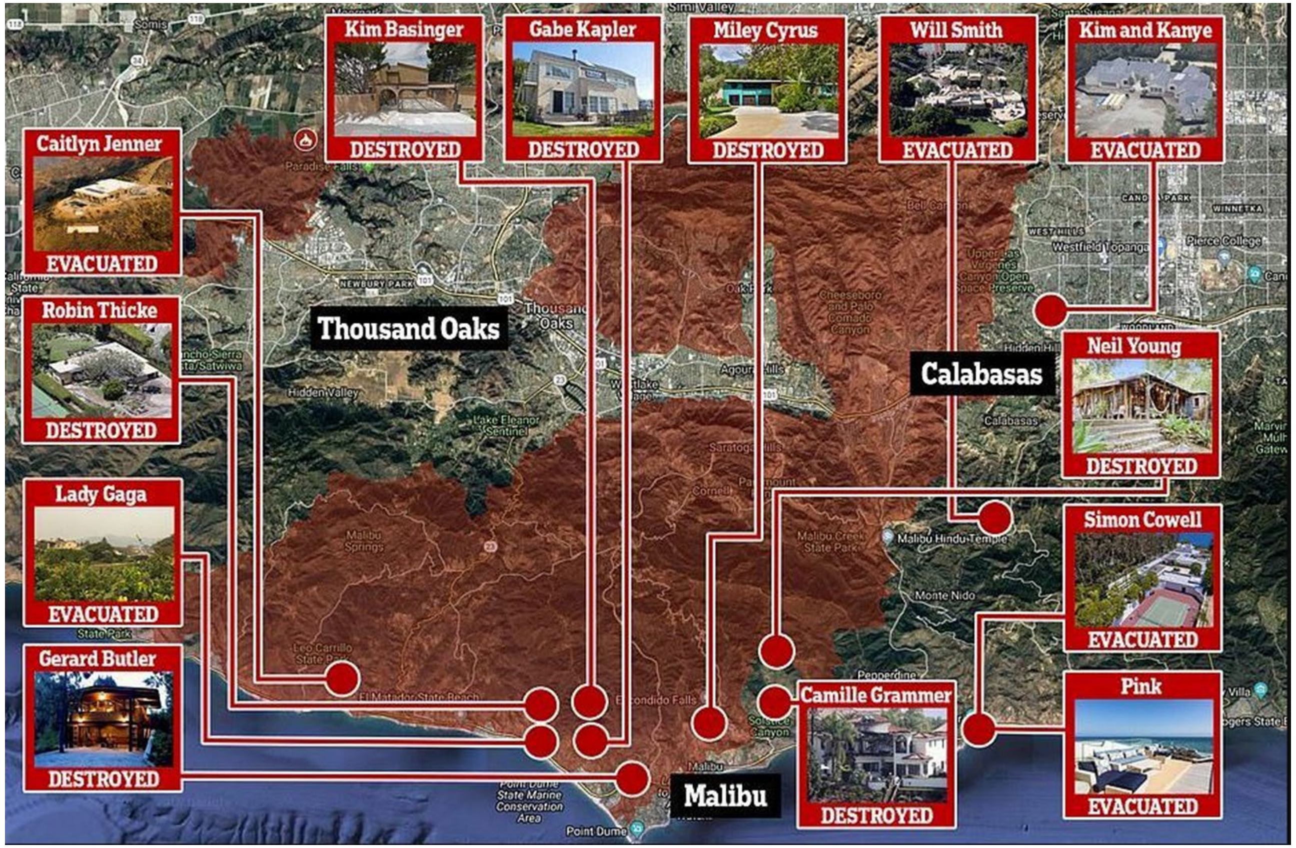
For tribes, 'good fire' a key to restoring nature and people

By JOHN FLESHER October 29, 2021

Click to copy

WEITCHPEC, Calif. (AP) — Elizabeth Azzuz stood in prayer on a Northern California mountainside, grasping a torch of wormwood branches, the fuel her Native American ancestors used to burn underbrush in thick forests.

California Wildfire – It's A Bad Thing



Has Been Getting Worse

Wine Cour

~15,000 stru
46 lives

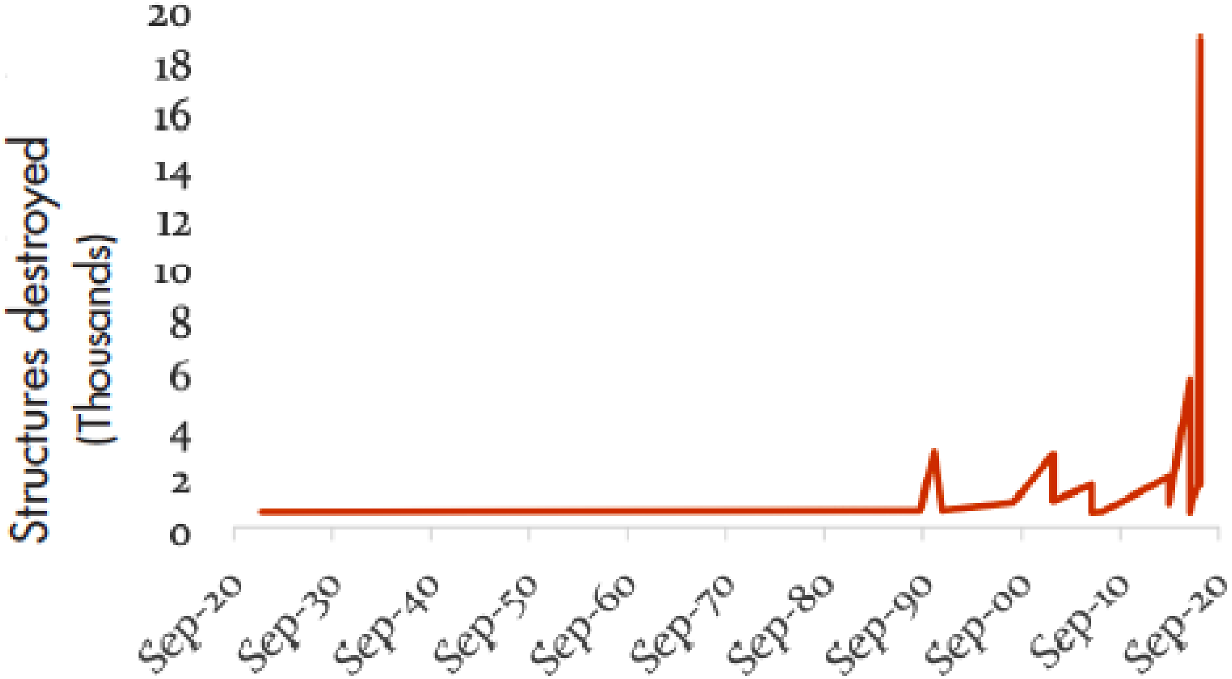
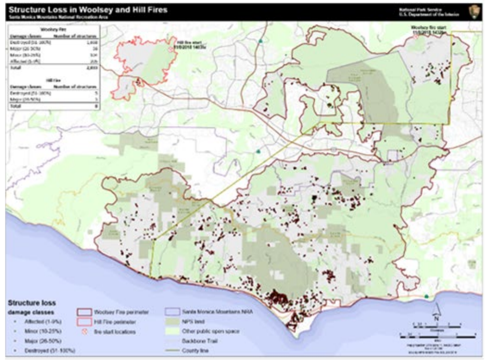


Figure 1. Annual number of structures destroyed in wildfires in California from 1920 to 2018. Source: California Department of Forestry & Fire Protection

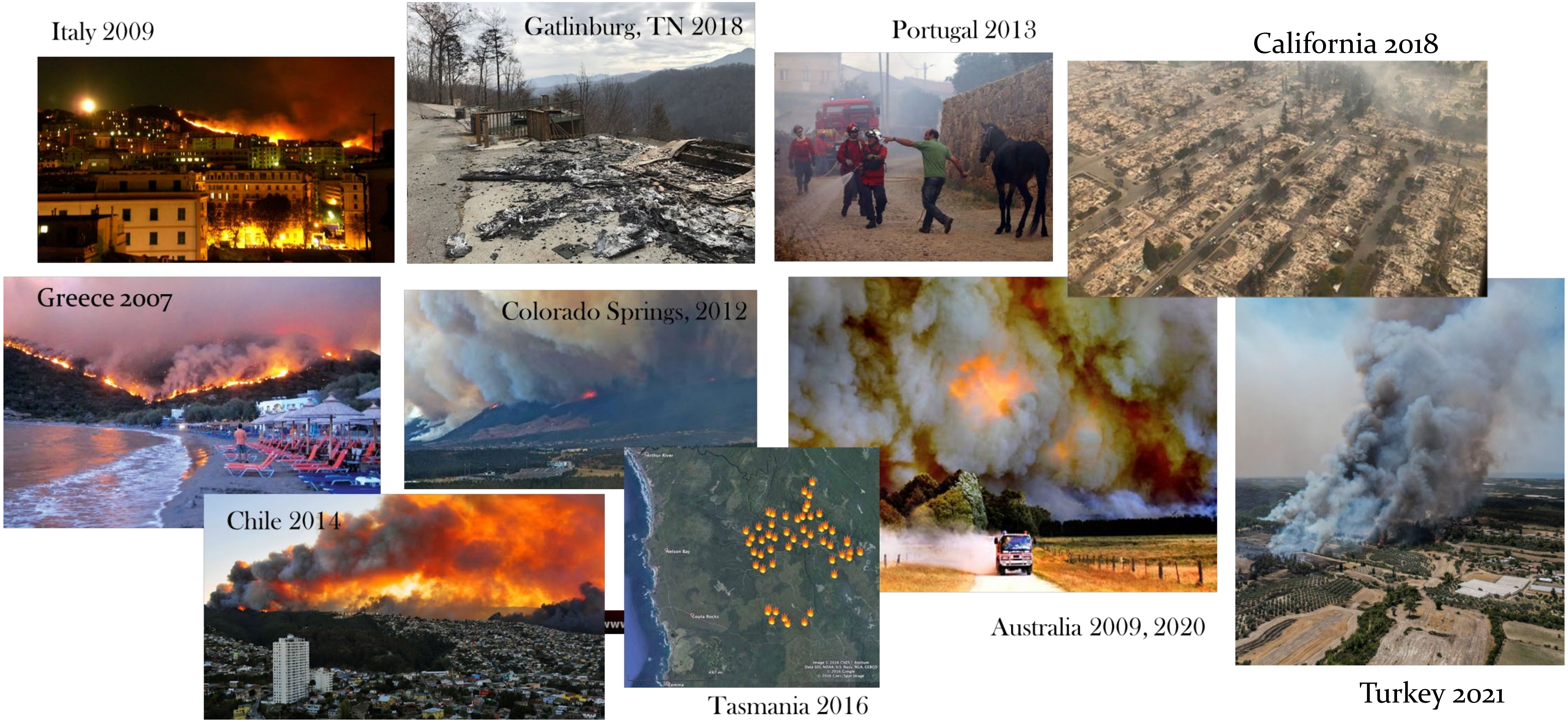
Woolsey Fire, November 2018



1643 structures
3 lives

~ 40,000 structures in two years

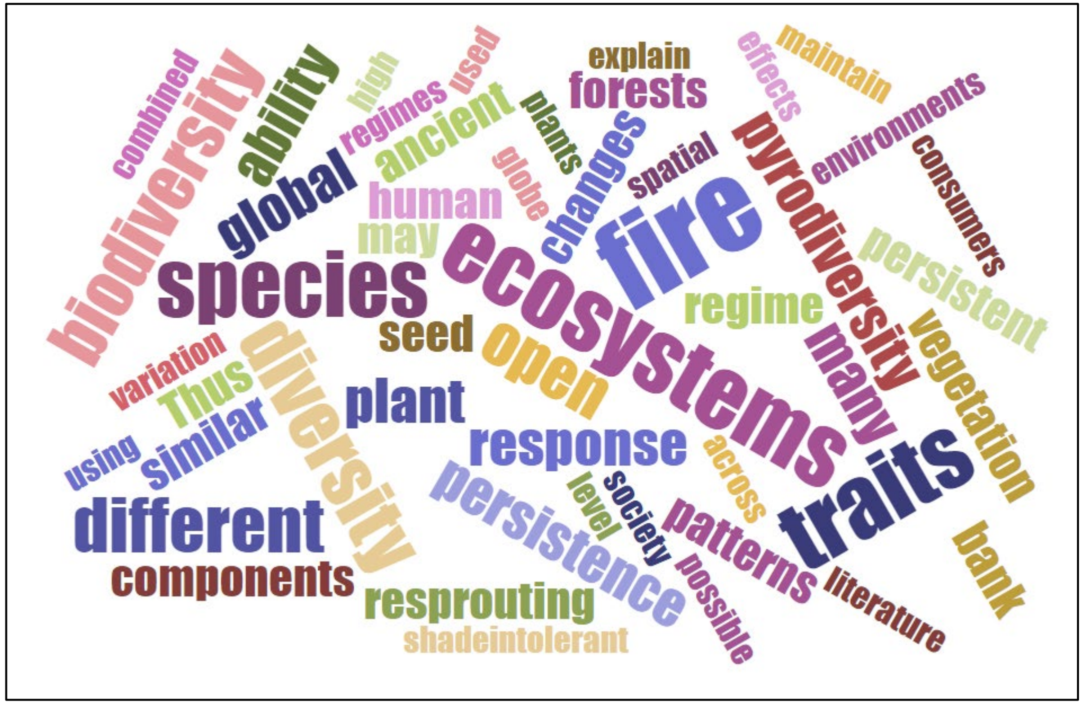
Poster Child for Global Wildfire Issues




Urgent Questioning:
What should we do about it?
Scientist: How do we understand it?
Photo by Malachi Brooks

Wildfire – It's Complex Thing

Fire ecology



Fire management

+ meteorology, climate science, economics,

sociology, public health, etc.

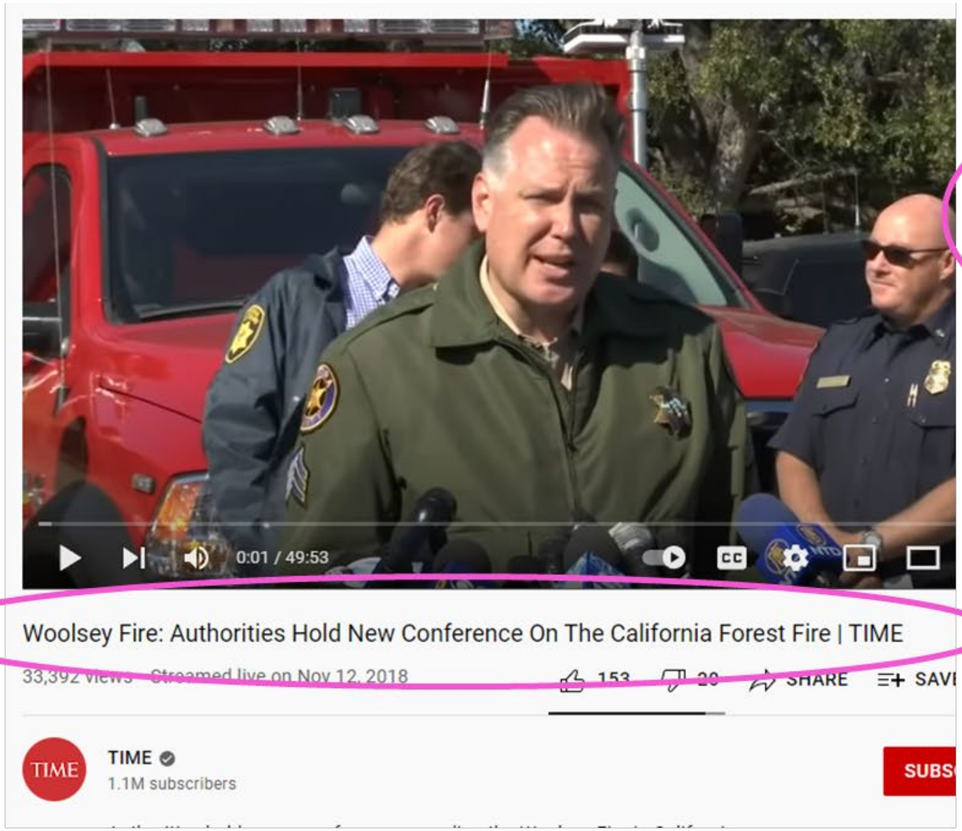
Lessons in Complexity

Drivers & impacts of altered fire regimes in California

Lesson 1) Wildfire is a geographical issue

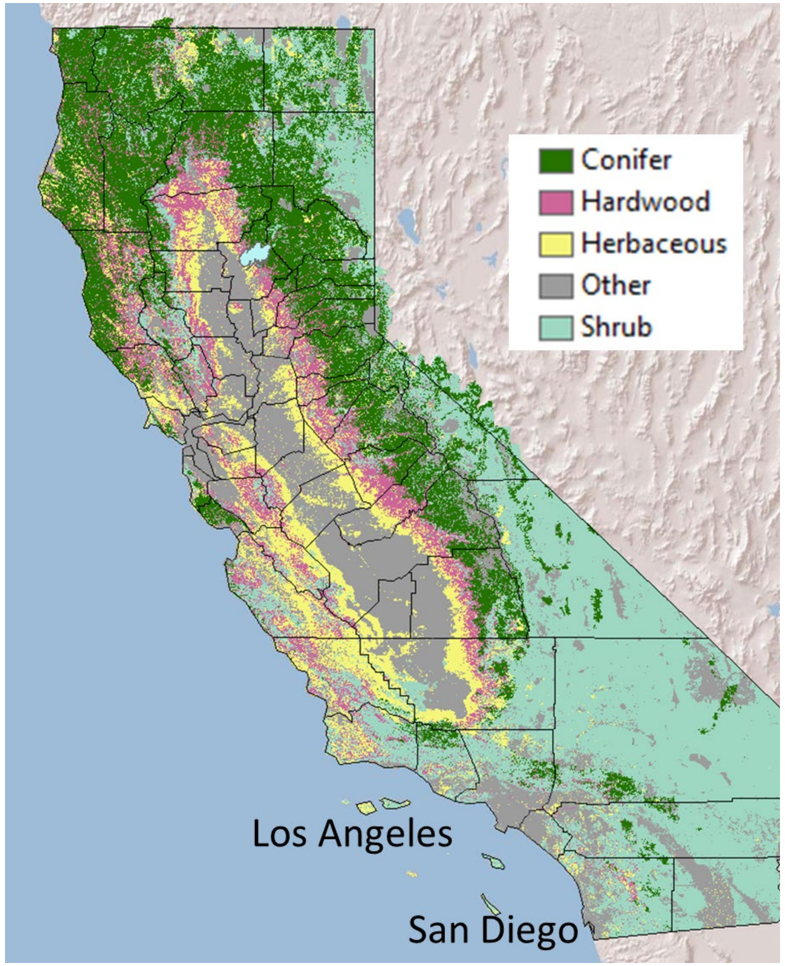
Photo by Malachi Brooks

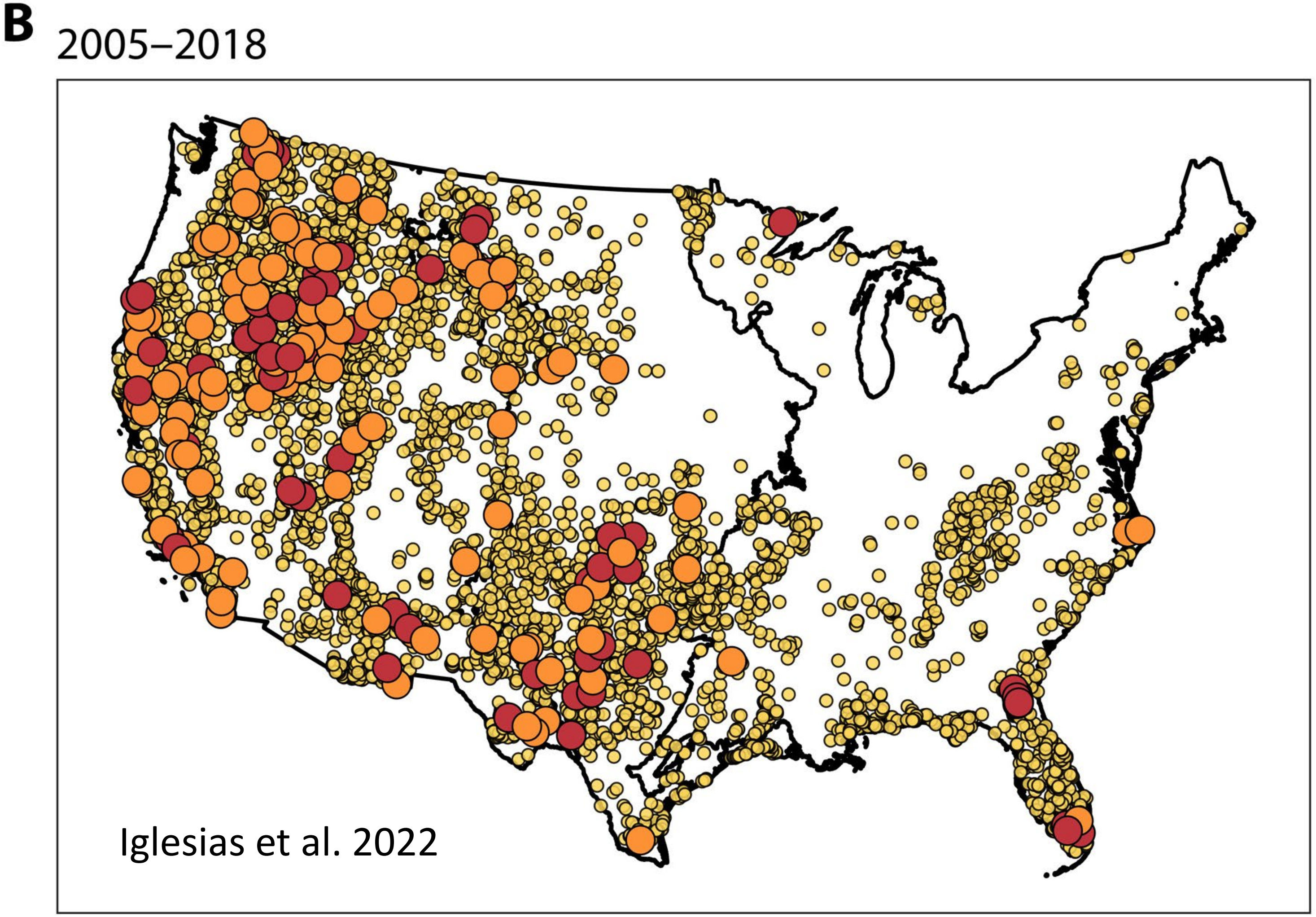
California has a Forest Fire Problem?



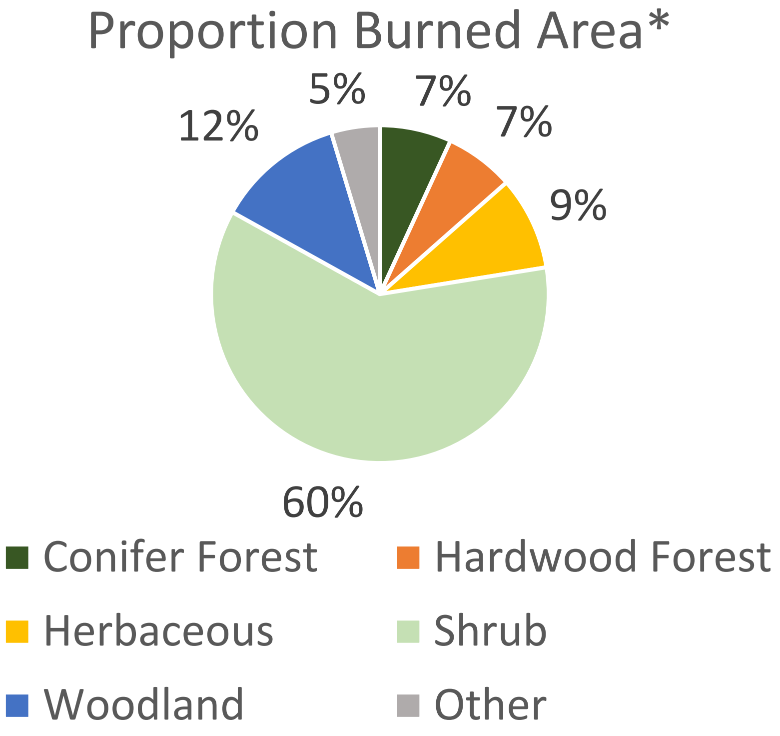
Not all Fires are Forest Fires

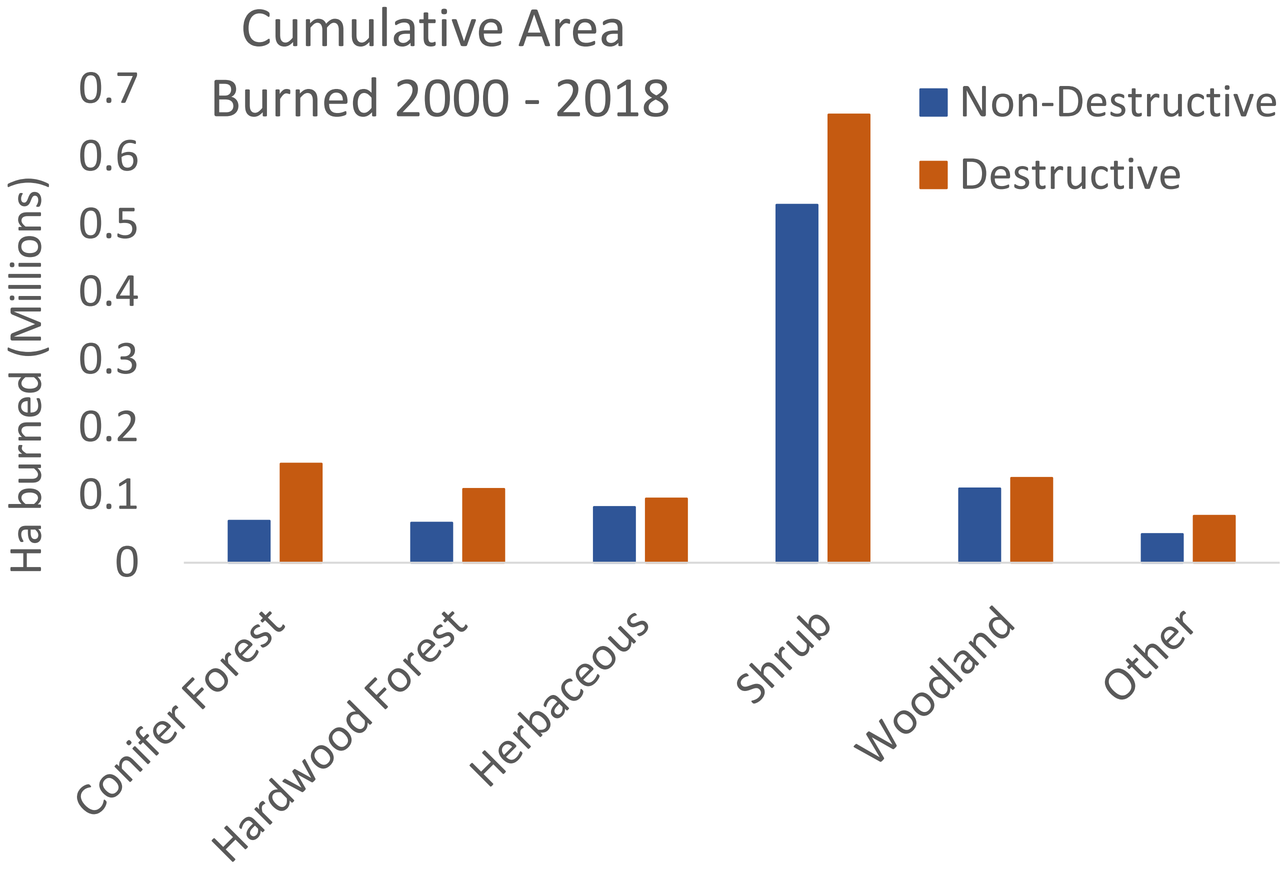
Chaparral - most extensive vegetation type in CA





CA: Most Fires/Losses Not in Forest





Schwartz and Syphard 2021

Wildfire is a Geographical Issue

Fire regime: frequency, severity, size, intensity, seasonality, type…

(characteristic range of variability)

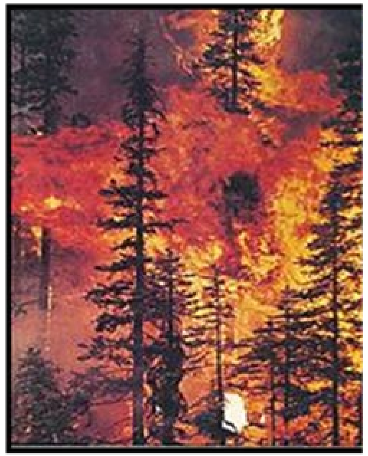
Frequent fire

Characteristic fire regimes

No fire

Dry mixed conifer
FRI < 20 years

Chaparral
FRI > 20 years



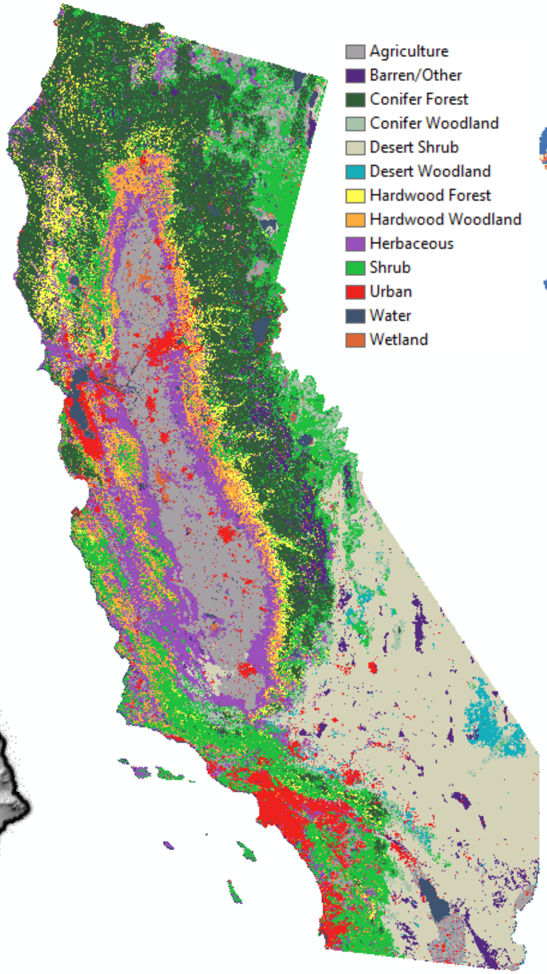
Interior sub-alpine
FRI > 100 years

Some deserts
Fire > 1000 years, small

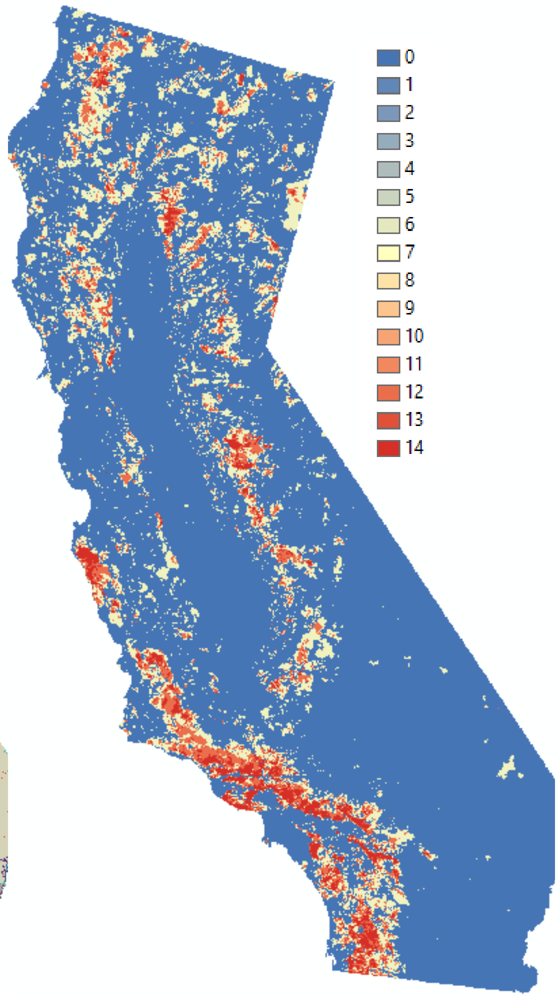
The Geography of CA Wildfire

Terrain

Land cover

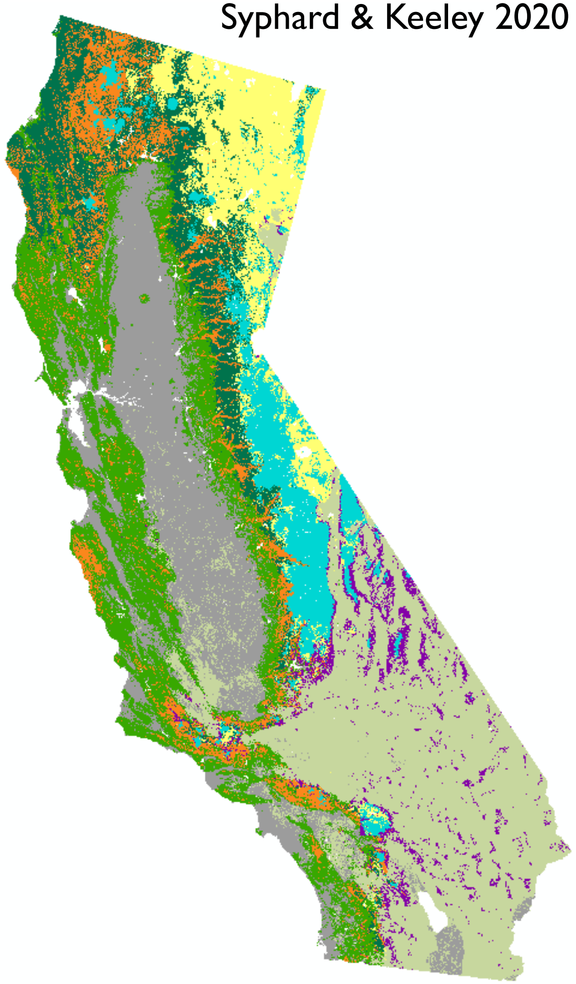


Historical fire count

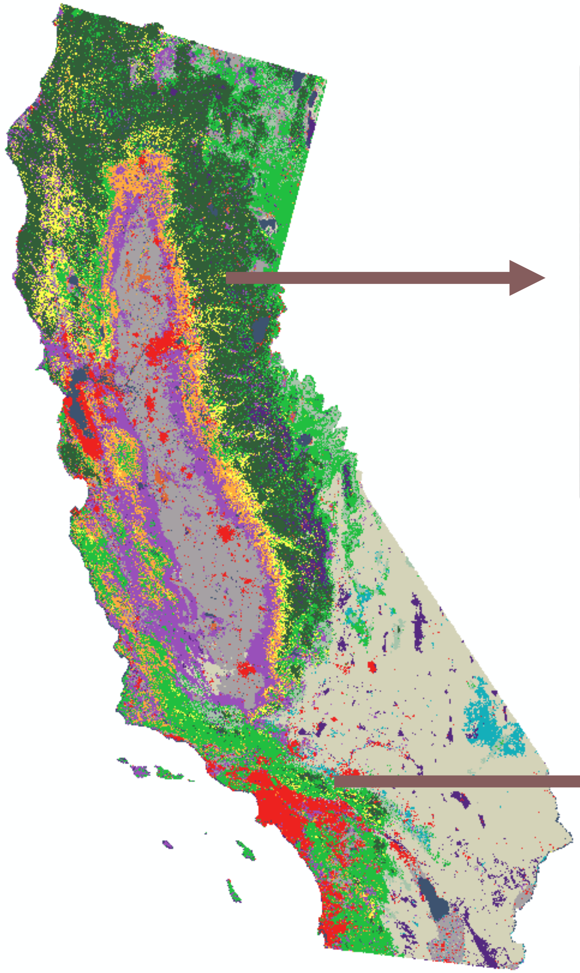


Fire Ecoregions

Syphard & Keeley 2020

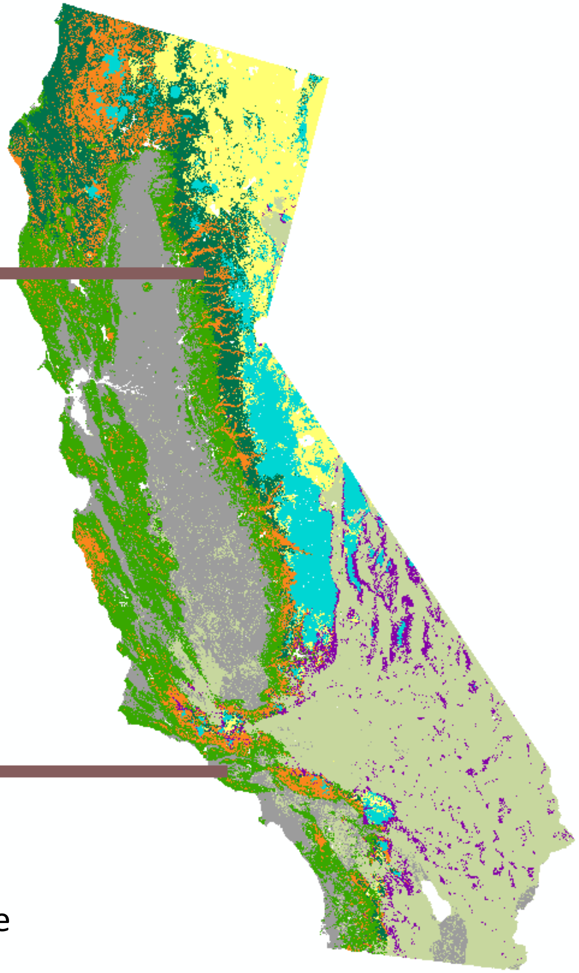


Broad Distinctions



Dry mixed conifer
Frequent fire
Low-mixed intensity
Understory to crown

Chaparral shrublands
Lightning ignitions very rare
Periodic high-intensity crown fire



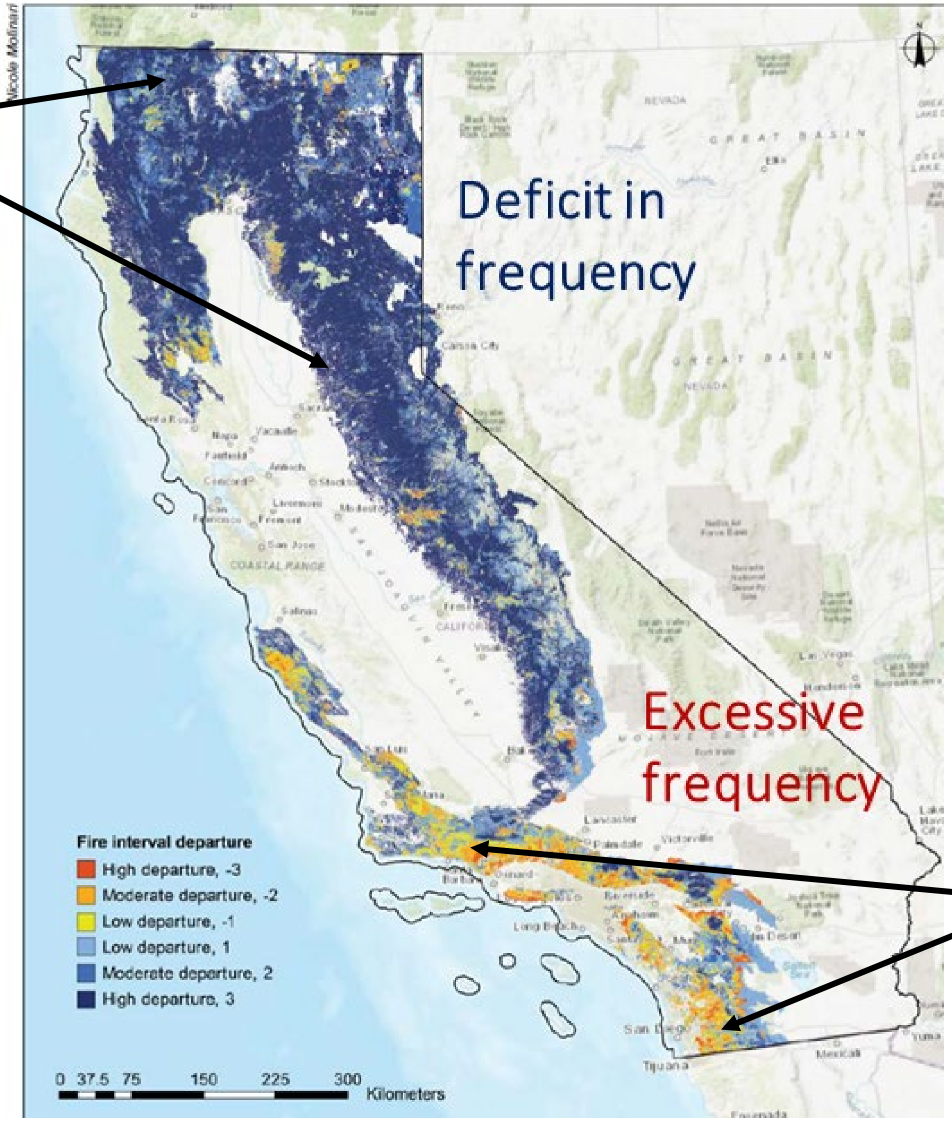
Reversed Patterns of Departure

Fire suppression effects in formerly frequent-fire forests (F4)

<u>Fire Return Interval Departure (FRID)</u>

Recent frequency *Vs.* pre-settlement

Safford & Van de Water 2014



F4 ecosystems

- Oak woodland
- Yellow pine
- Mixed conifer
- Drier mixed evergreen

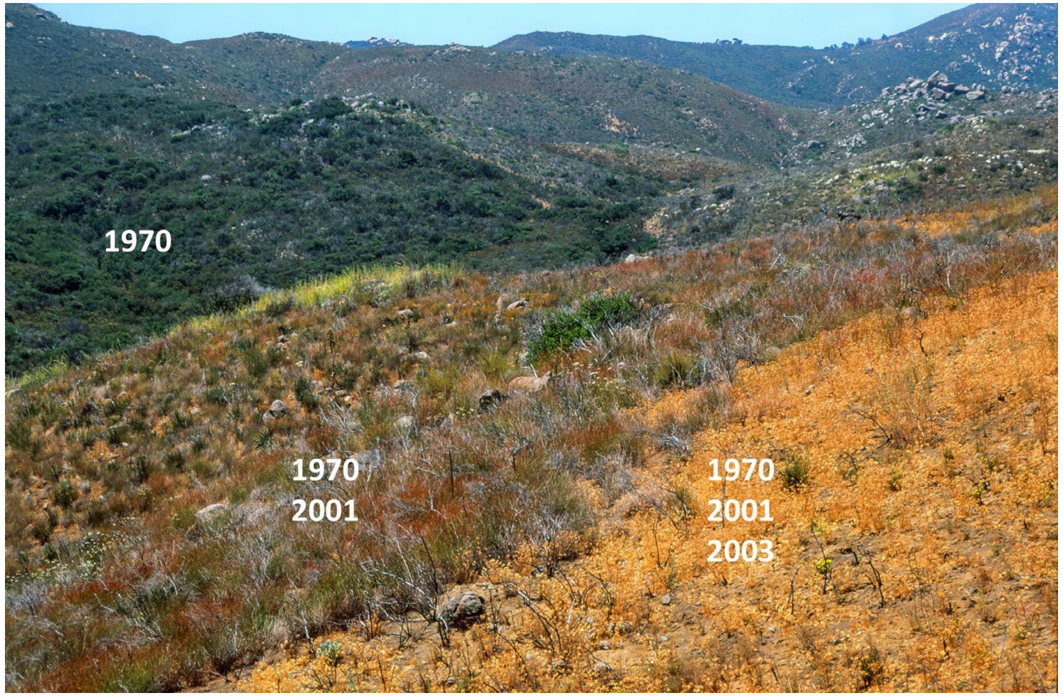
Ecosystems experiencing excessive fire

- Chaparral
- Sage scrub
- Desert mixed shrublands
- Sagebrush

Enhanced ignition effects in shrublands

UCDAVIS
UNIVERSITY OF CALIFORNIA

Ecological Transformations



Impact from change relative to natural fire regime

1) forest converting to shrub/grass 2) shrub converting to grass

Vegetation Type Conversion - Forests

- Tree mortality ~ Forest stand densification
  - Competition -> drought stress -> bark beetles
  - High-severity crown fires
- Post-fire regeneration
  - Large patches may exceed dispersal
  - Low recruitment ~ climate change

Allen et al. 2019

Die-off

High-severity crown fire

Post-fire

Vegetation Type Conversion in Chaparral

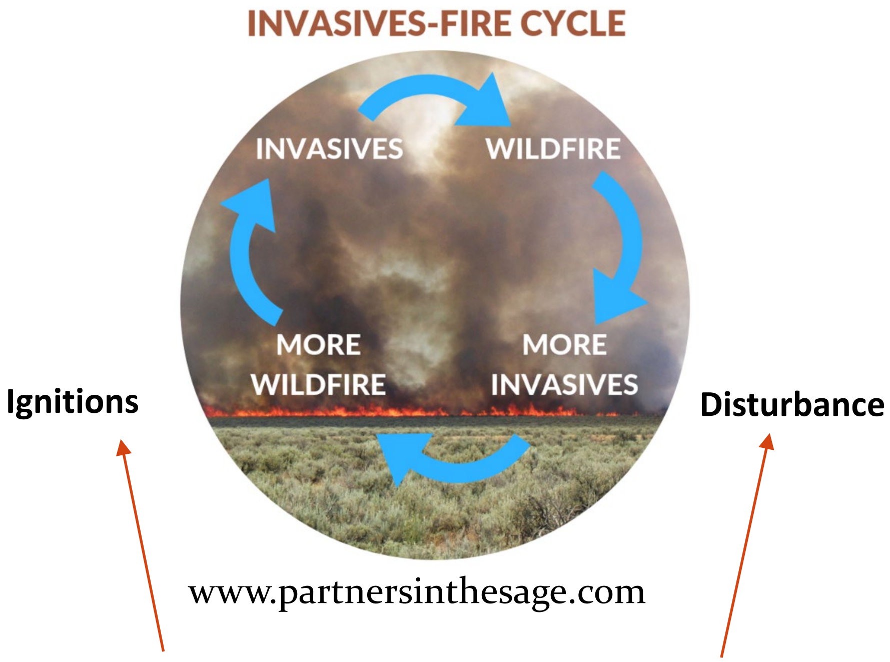
- *Obligate seeders* (60% biodiversity)
  - Fire-cued seed germination
  - Only recruit after fire
  - Decades to replenish seeds
- *Obligate resprouters* (15% biodiversity)
  - Stems or lignotubers
  - Low recruitment between fire
- *Facultative* (25% biodiversity)
  - Seed & resprout

Low recruitment rates & short seed dispersal distances
Hard to re-establish once gone

Vegetation Type Conversion - Chaparral

The premise:

- Short intervals prevent recovery
- Alien *spp.* invade, ignite, replace



www.partnersinthesage.com

(*Human*) **grass-fire cycle**
Fusco et al. 2021

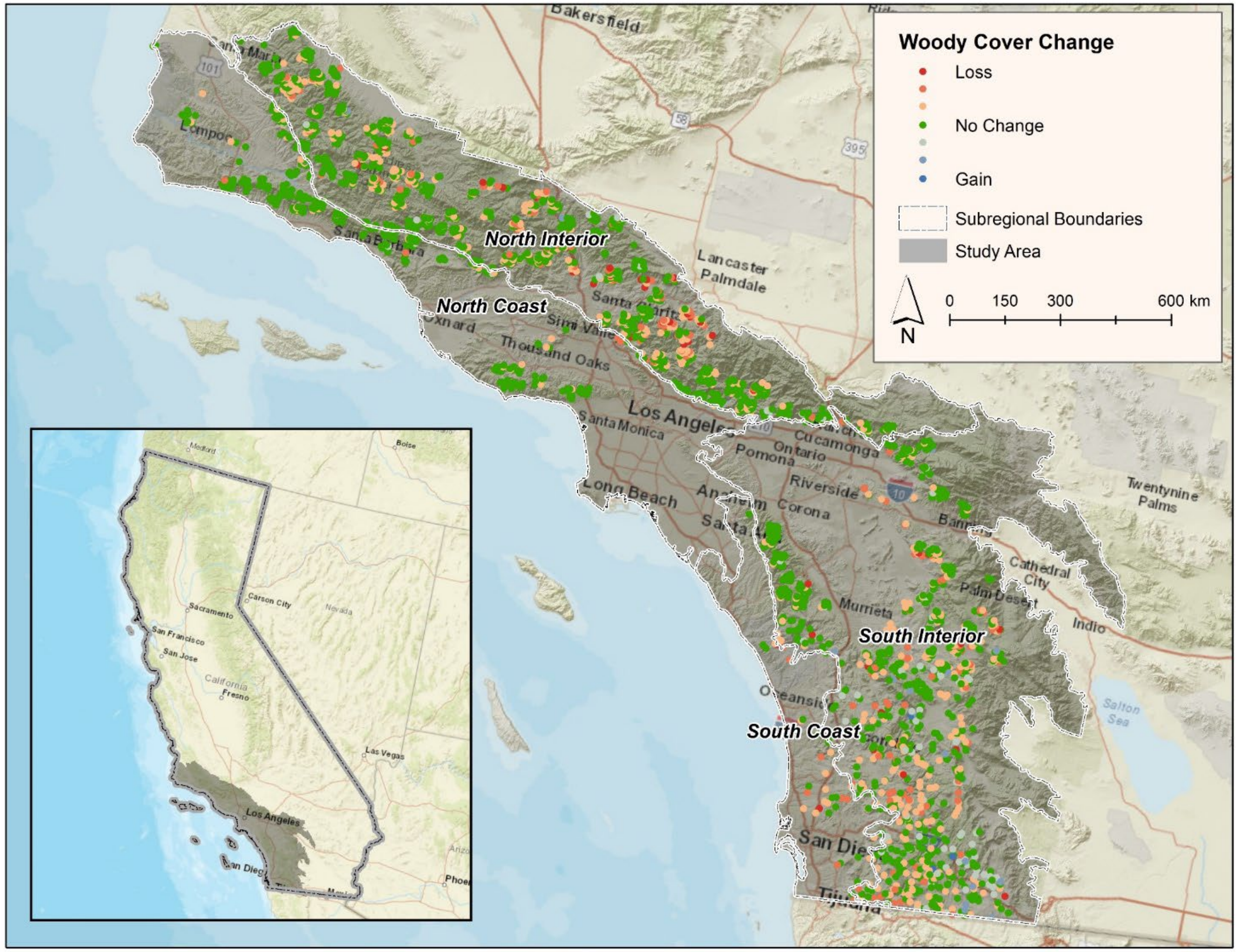
Our research:

How much is happening? Where? Why?

Santa Monica Mountains, CA

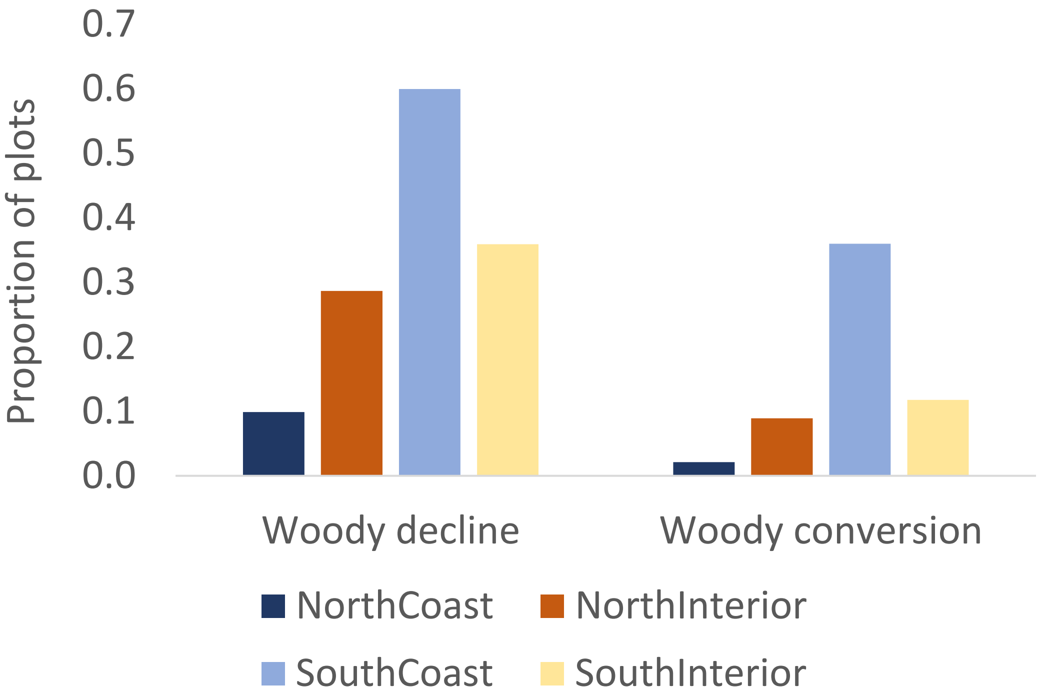
VTC: How Much?

- Airphoto analysis ~1950 - 2019



Geographical differences, even in soCal

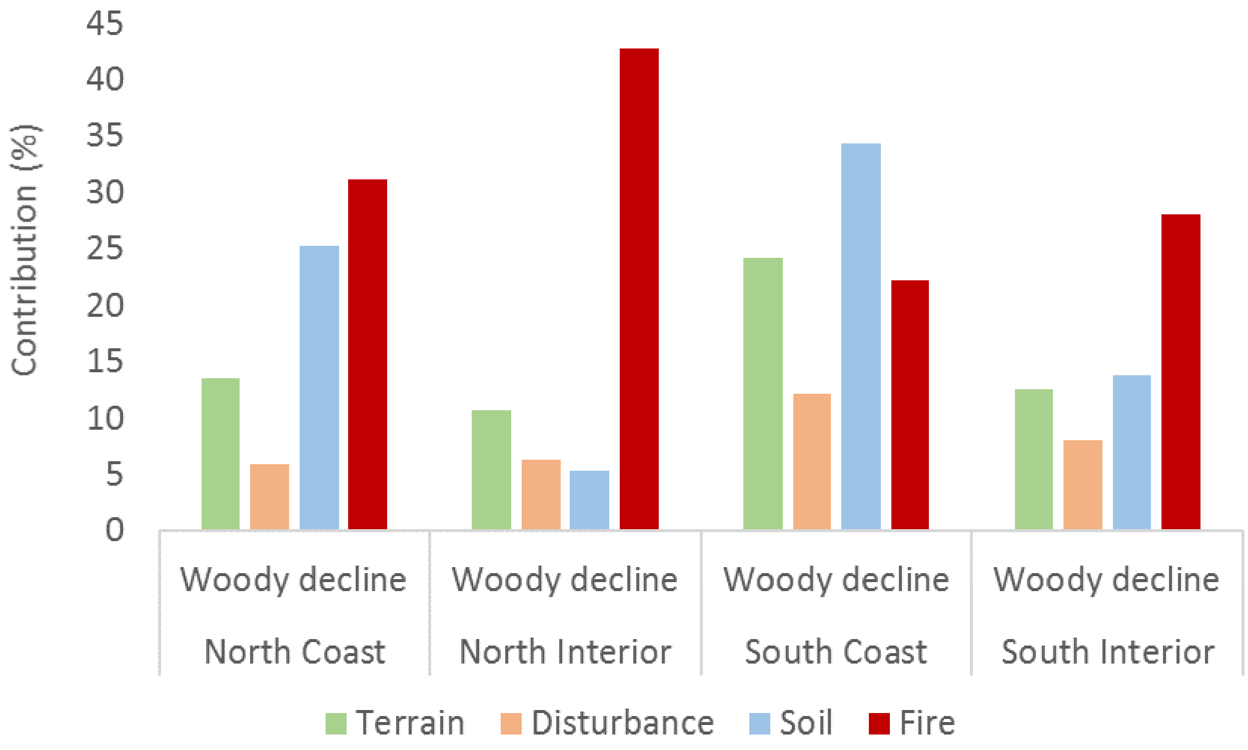
Proportion plots with chaparral decline or total conversion to grass



Syphard, Brennan & Keeley 2022

VTC: Why?

- Fire + environmental context (e.g. soil water storage, AET, elevation)



Syphard, Brennan & Keeley 2022
…and others

Ecosystems. Author manuscript; available in PMC 2020 Dec 7. *Published in final edited form as:*
Ecosystems. 2020; 2020: 10.1007/s10021-020-00551-2. Published online 2020 Oct 19.
doi: 10.1007/s10021-020-00551-2

PMCID: PMC7720657 | NIHMSID: NIHMS1640907 | PMID: 33293894

Evaluating Drought Impact on Postfire Recovery of Chaparral Across Southern California

Emanuel A Storey,[1] Douglas A. Stow,[1] Dar A. Roberts,[2] John F. O'Leary,[1] and Frank W. Davis[3]

Review > New Phytol. 2018 Jul;219(2):498-504. doi: 10.1111/nph.15186. Epub 2018 May 4.

Extensive drought-associated plant mortality as an agent of type-conversion in chaparral shrublands

Anna L Jacobsen [1], R Brandon Pratt [1]

Vulnerability is Species-Specific

Minimum interval for species persistence: 8 – 30 years

It isn’t just Southern California chaparral

2020 Valley Fire (San Diego Co) burned across mature and immature stands of chaparral

	Mature (>50 yrs)		Immature (14 yrs; overlapped with 2006 Horse Fire)	
	% Resprout	Seedlings/ prefire shrubs	% Resprout	Seedlings/ prefire shrubs
Adenostoma fasciculatum (FS)	58	3.1	59	2.5
Ceanothus perplexans (OS)	0	584	0	18.9
Arctostaphylos glauca (OS)	0	16.3	0	1.2

Same Species, Geographically Variable

CELE Only resprouts in southern CA

TABLE 1 Postfire studies in the summer of 2021 of *Ceanothus leucodermis* in (a) southern California and (b) northern California presented by county after 2020 fires.

County	Fire	Latitude	Age	Sites	Area sampled (m^2)	Prefire density (#/ha)	% Resprouting	Seedlings (#/ha)	Seedlings/prefire shrub
(a) Southern									
San Diego	Valley	32°43′	14	1	448	45	100	242	5.4
	Valley	32°43′	50	1	224	670	80	13,214	19.7
Riverside	Cranston	33°42′	17	1	480	2000	64	521	0.26
	Cranston	33°42′	36	1	160	375	86	2438	6.5
Los Angeles	Bobcat	34°20′	11	5	1088	4210	55	423	0.10
	Station	34°22′	52	1	352	312	55	11,846	38.0
(b) Northern									
Monterey	Dolan	36°01′	12	6	3584	1649	0	262	0.16
	Dolan	36°01′	33	1	320	63	0	156	2.5
Santa Clara	SCU	37°20′	38	1	160	1000	0	13,500	13.5
Stanislaus	SCU	37°22′	15	1	160	2563	0	750	0.29
			18	1	320	1500	0	0	0

Note: Sites were selected by evidence of postfire *Ceanothus* skeletons, accessibility by foot, followed by random number steps to a sampling plot. Presented are stand age at the time of fire, number of sites studied, total area sampled, prefire density, percentage resprouting, postfire seedlings and ratio of seedlings per prefire shrub.

Keeley 2022

Obligate seeder
No burls

FIGURE 1 *Ceanothus leucodermis* resprouting from burned lignotuber after the 2020 Valley Fire, San Diego Co, CA (photo by J. Keeley, 2021).

FIGURE 2 Skeleton of dead 11 year old *Ceanothus leucodermis* burned by the 2020 Dolan Fire in Monterey Co, CA (photo by J. Keeley, 2021).

Lesson 1) Wildfire is a geographical issue

Environmental diversity -> diversity in natural fire regimes

Diverse pathways to ecological transformations

Species vulnerability varies geographically

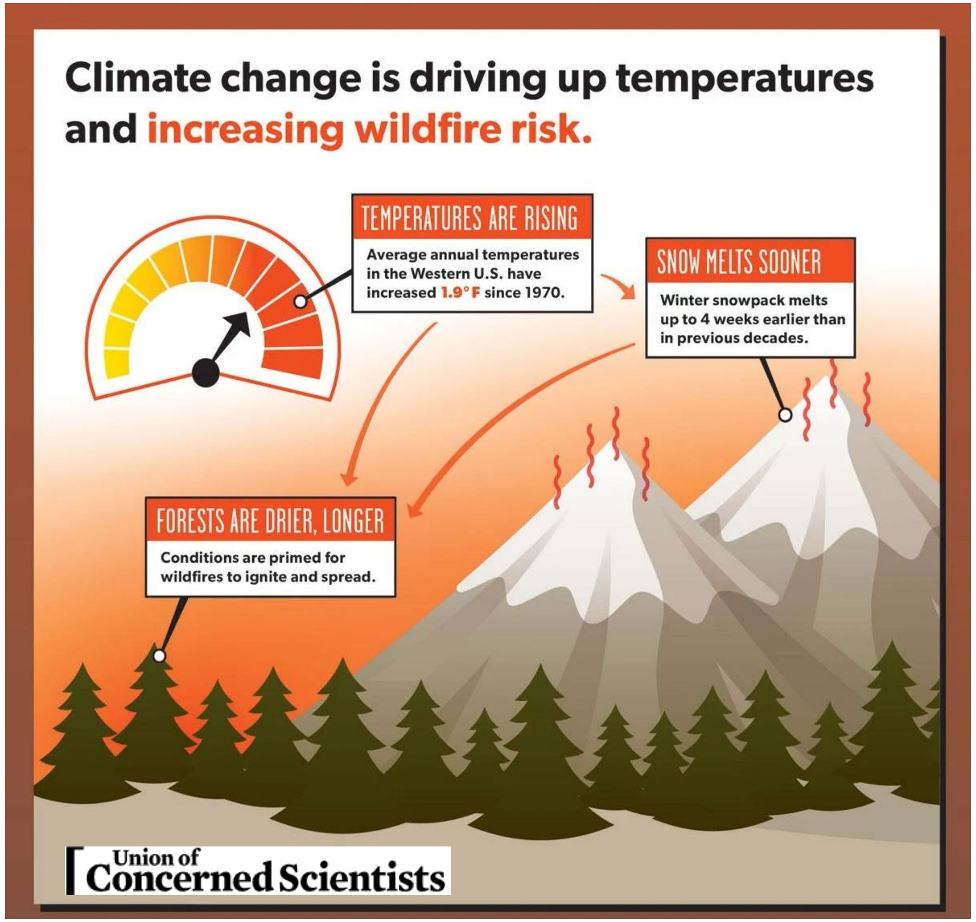
Photo by Malachi Brooks

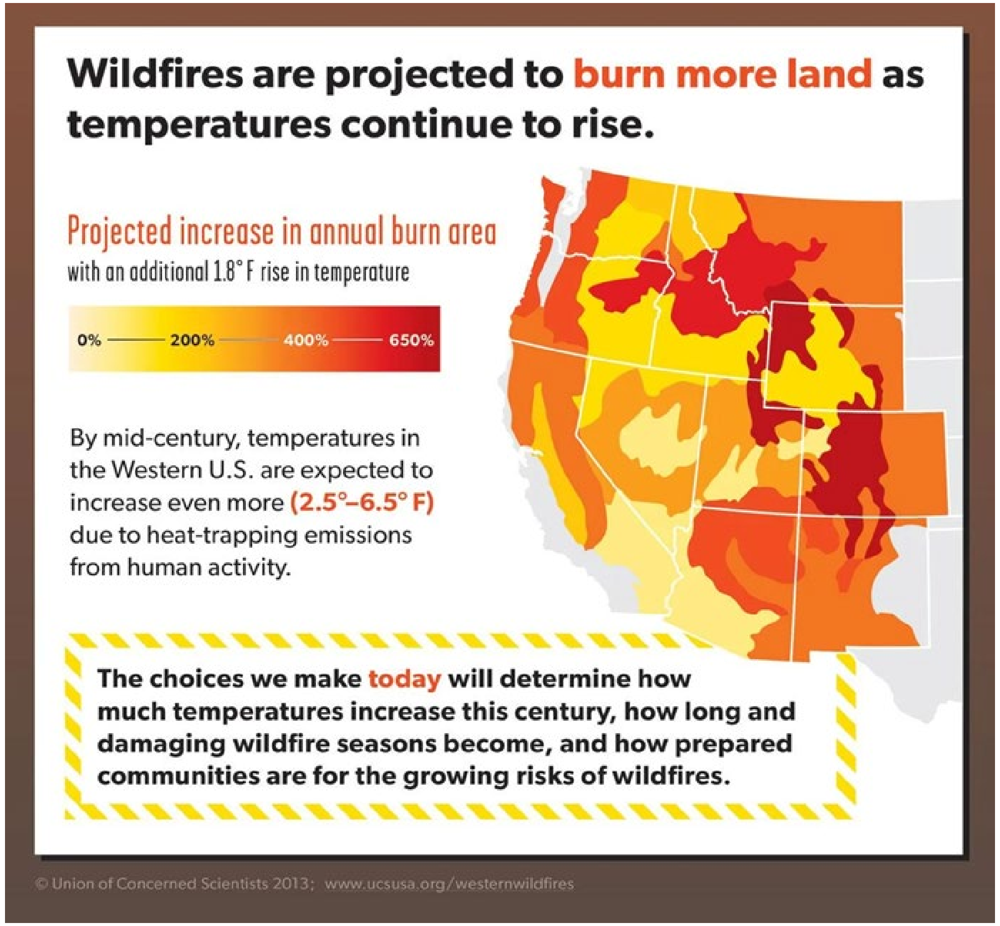
Lesson 2) Fire regimes change for many reasons

Photo by Malachi Brooks

Climate Change is Worsening Fires

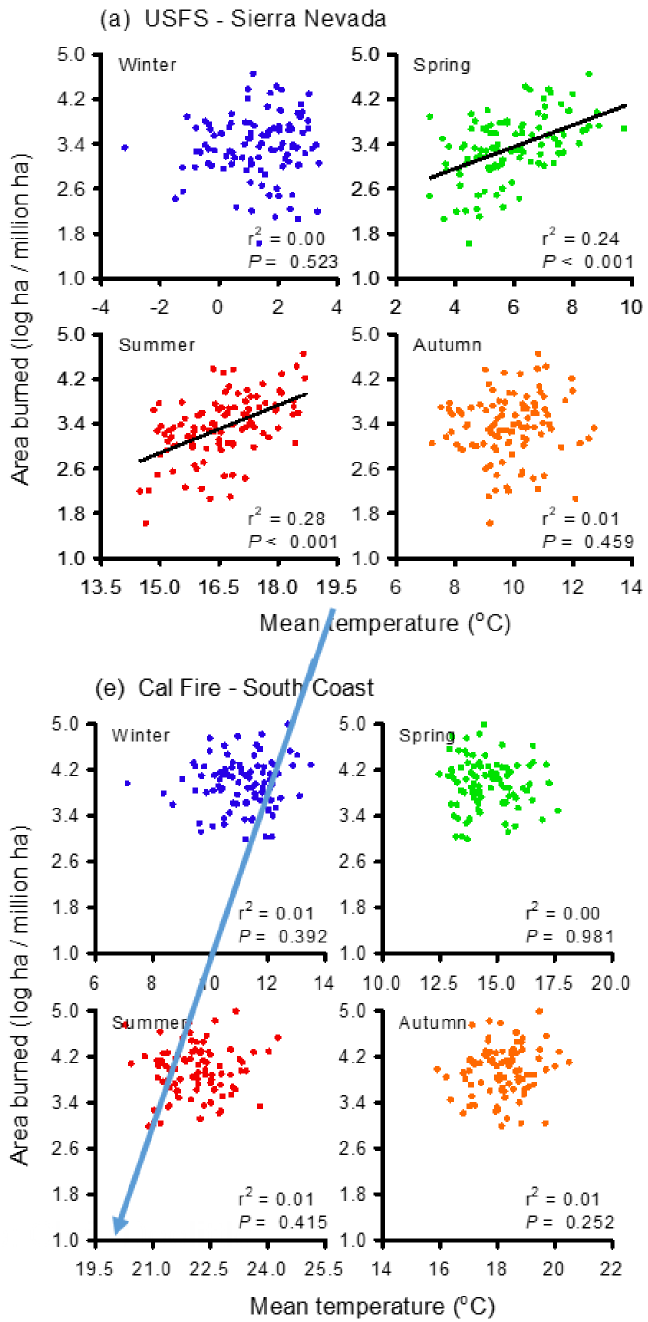
Common assumption of monotonic increase





Fire & Climate

- Montane forests, significant effect
  - -Seasonal temp, ppt, VPD
  - -Climate likely to worsen fire
- Coastal shrublands, not directly
  - - Indirect (e.g. drought, veg change)
- Future projections (e.g., Littell et al. 2018)
  - - Project increases AND decreases depending on region



Keeley and Syphard 2015, 2016, 2017 and others

Human presence diminishes the importance of climate in driving fire activity across the United States

PNAS 2017

Alexandra D. Syphard[a,1], Jon E. Keeley[b,c], Anne H. Pfaff[b], and Ken Ferschweiler[a]

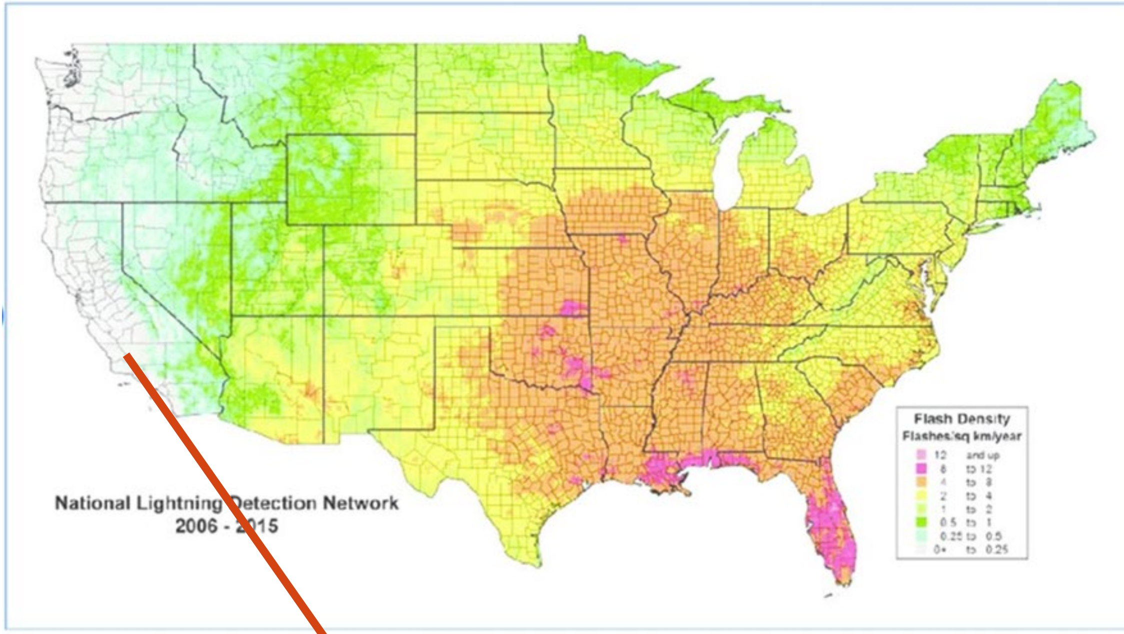
Different type, strength fire-climate relationships

More human presence – weak fire-climate correlations

Humans can OVERRIDE climate

Humans Cause Most Fires

Lightning strike density



Cloud-to-ground flash density per square kilometer per year over the contiguous United States from the Na- tional Lightning Detection Network from 2006 through 2015 (Courtesy Vaisala, Inc.).

> 90 % in CA
Keeley and Syphard 2019

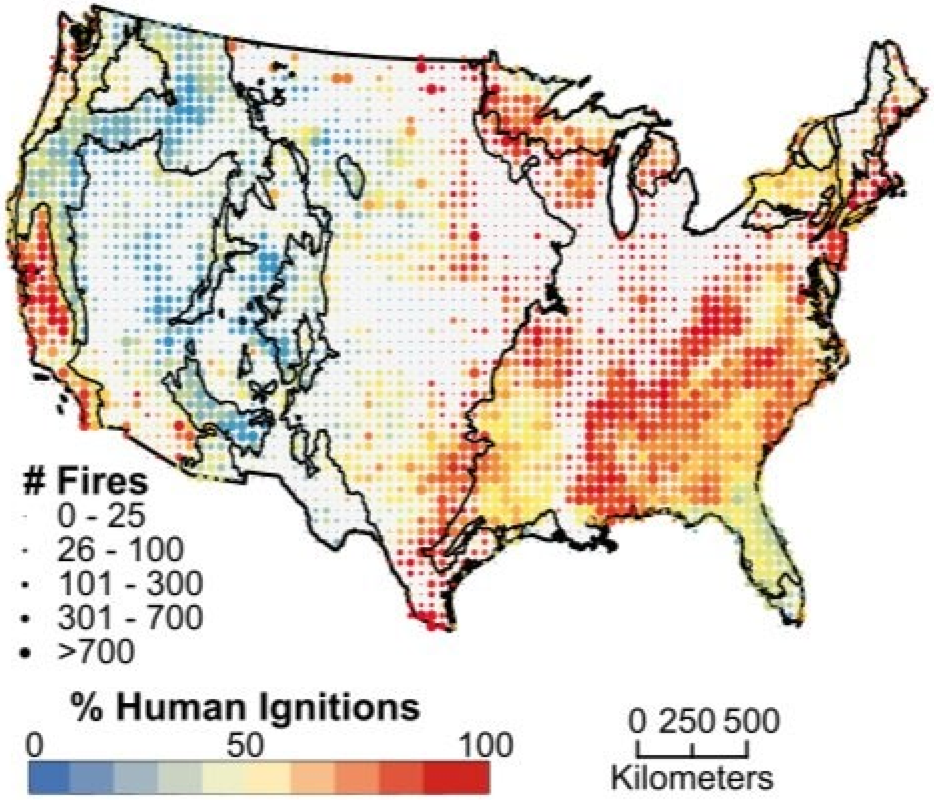


Fig. 1. The total number of wildfires (dot size) and the proportion started by humans (dot color: red indicating greater number of human started fires) within each 50 km × 50-km grid cell across the coterminous United States from 1992 to 2012. Black lines are ecoregion boundaries, as defined in the text.

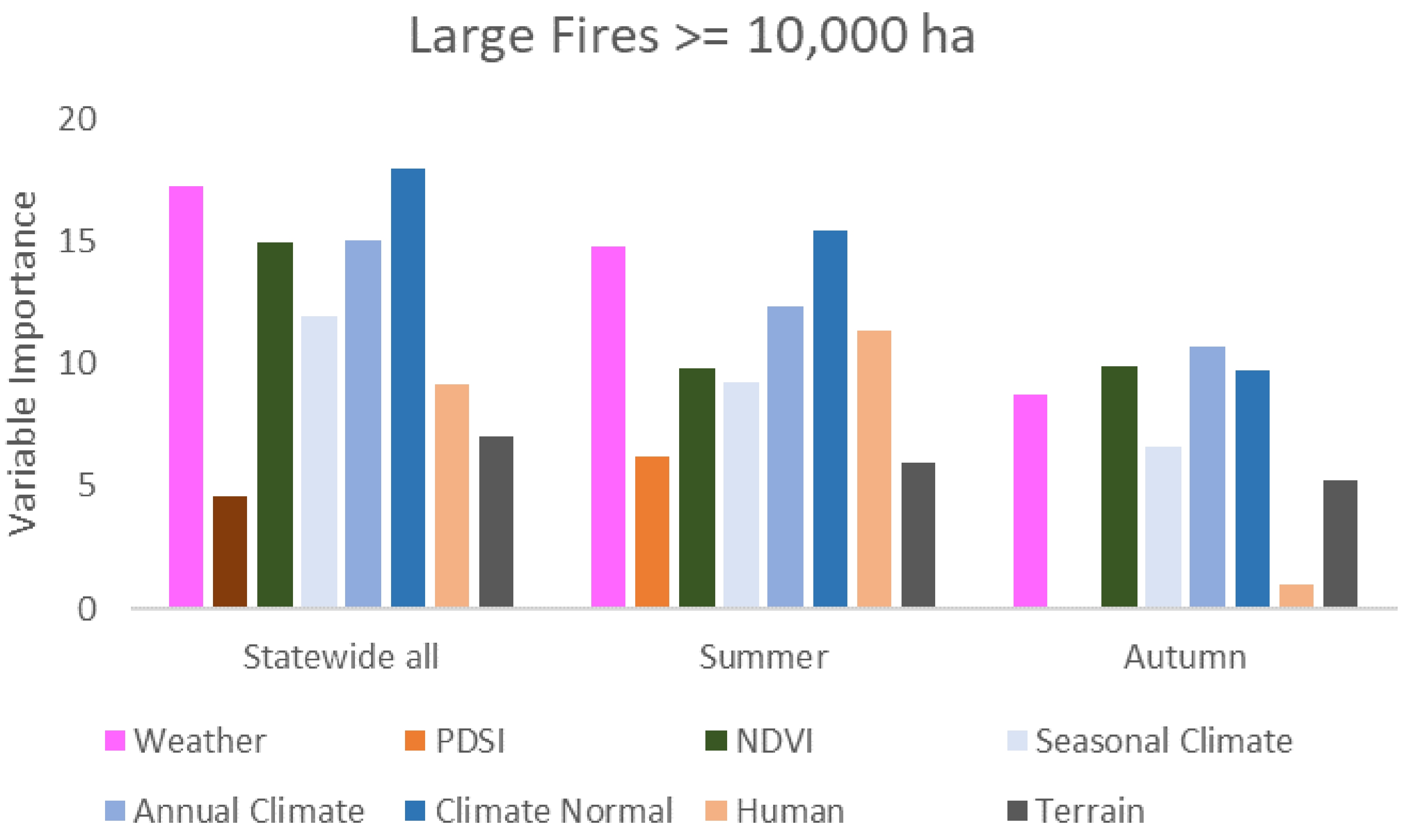
Balch et al. 2018

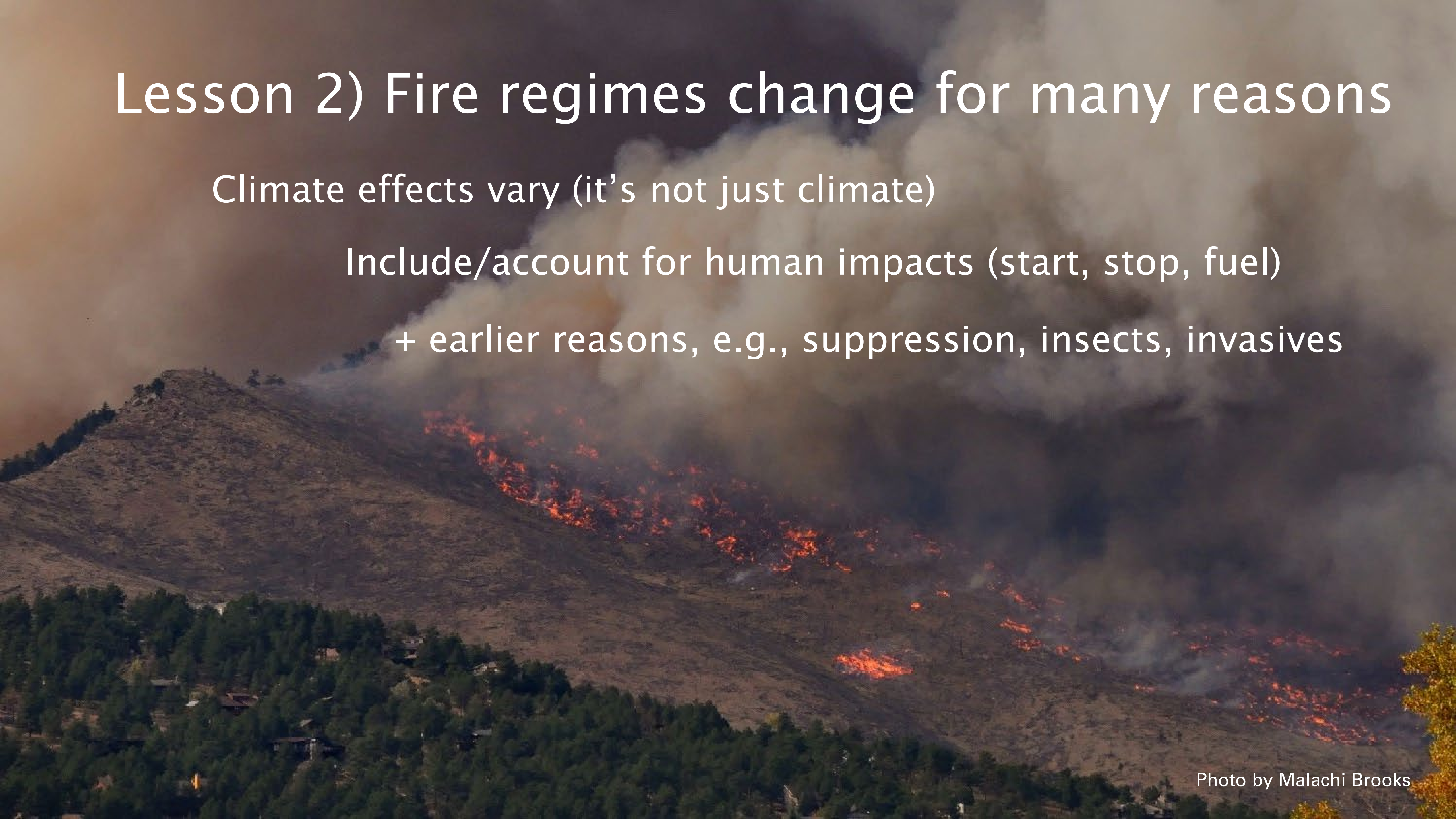
Humans & Wind-Driven Fires

Utilities do not need to worry about other sources of ignition.

But other sources of ignition (*when and where*) may be important for patterns and assumptions in risk modeling

Drivers of Extremely Large Fires




Lesson 2) Fire regimes change for many reasons
Climate effects vary (it’s not just climate)
Include/account for human impacts (start, stop, fuel)
+ earlier reasons, e.g., suppression, insects, invasives
Photo by Malachi Brooks

Lesson 3) Consider solutions with co-benefits

Photo by Malachi Brooks

Urgent Calls for Solutions

Why can't California control the wildfires?

California firefighters have struggled to contain the deadly blazes raging across the state

California wildfires: Seeking solutions to a wicked problem | AP News

Visit

Investment Strategy

California plans $536M for forests before wildfire season

By DON THOMPSON April 8, 2021

Click to copy

$2.8 Billion next 3

SACRAMENTO, Calif. (AP) — California will authorize $536 million toward forest management projects and efforts to reduce wildfires before the worst of the fire season strikes later this year, Gov. Gavin Newsom and legislative leaders said Thursday.

Billions of federal dollars headed to Western forests to manage fires

The money quadruples investment in wildfire prevention and complements Washington state's strategy, sources say.

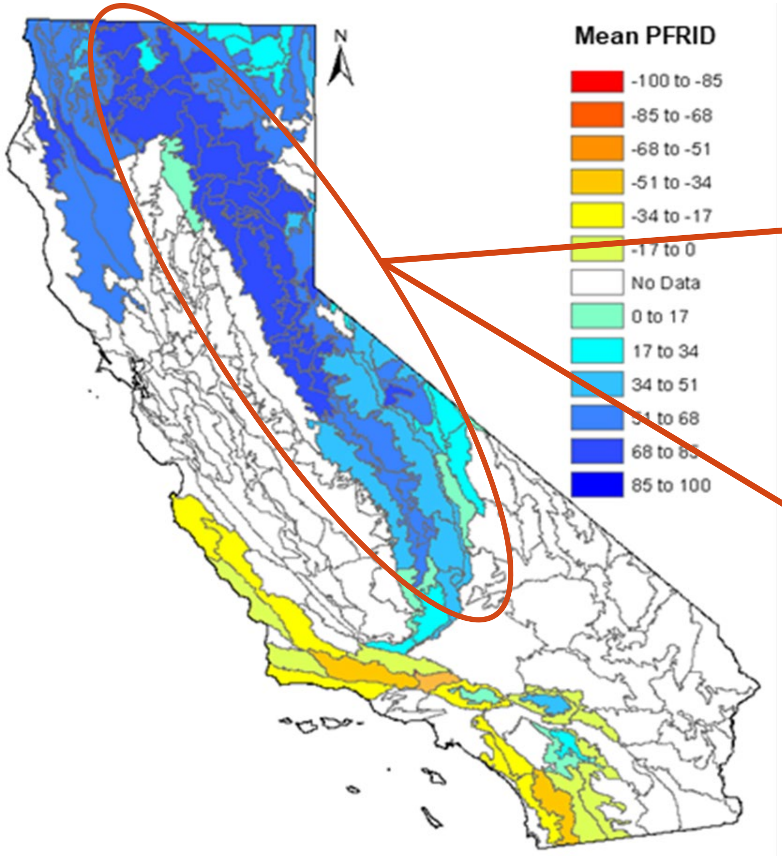
by Hannah Weinberger / February 11, 2022

Matches perception that problem is forest fires

-> A million acres by 2025

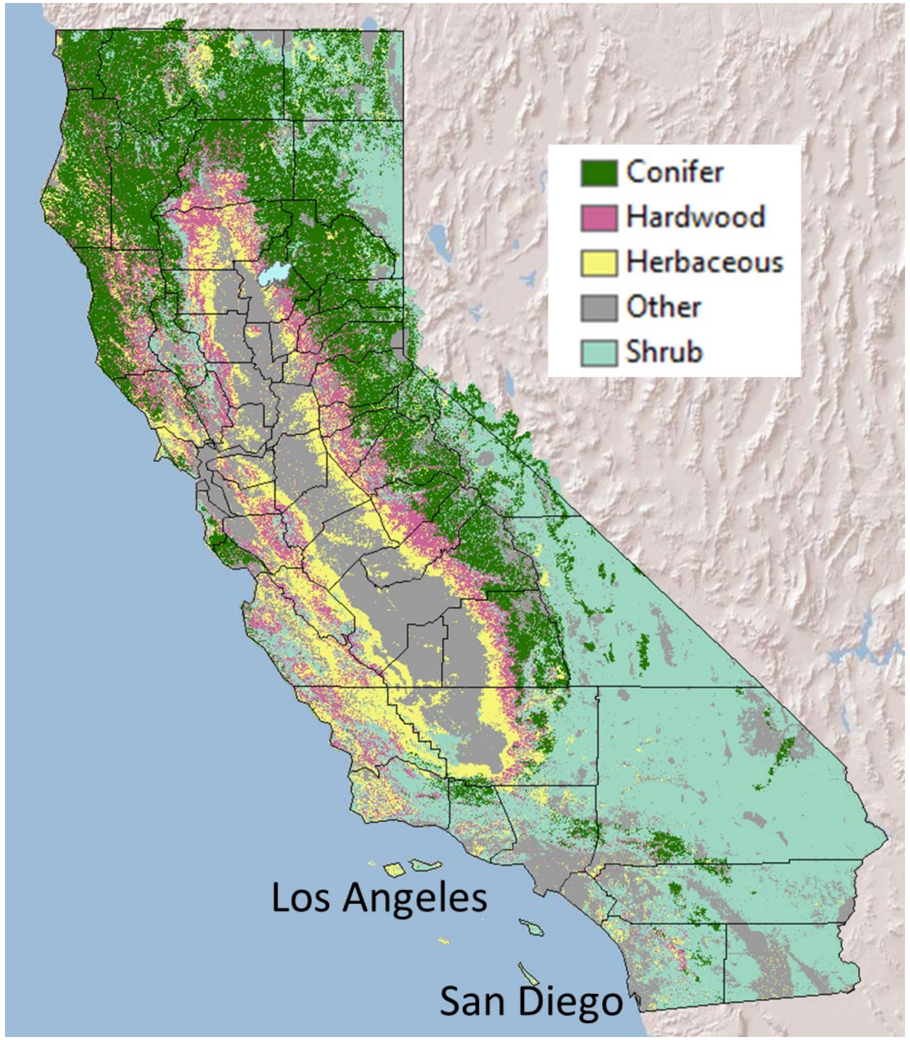
Vegetation Management: Forests

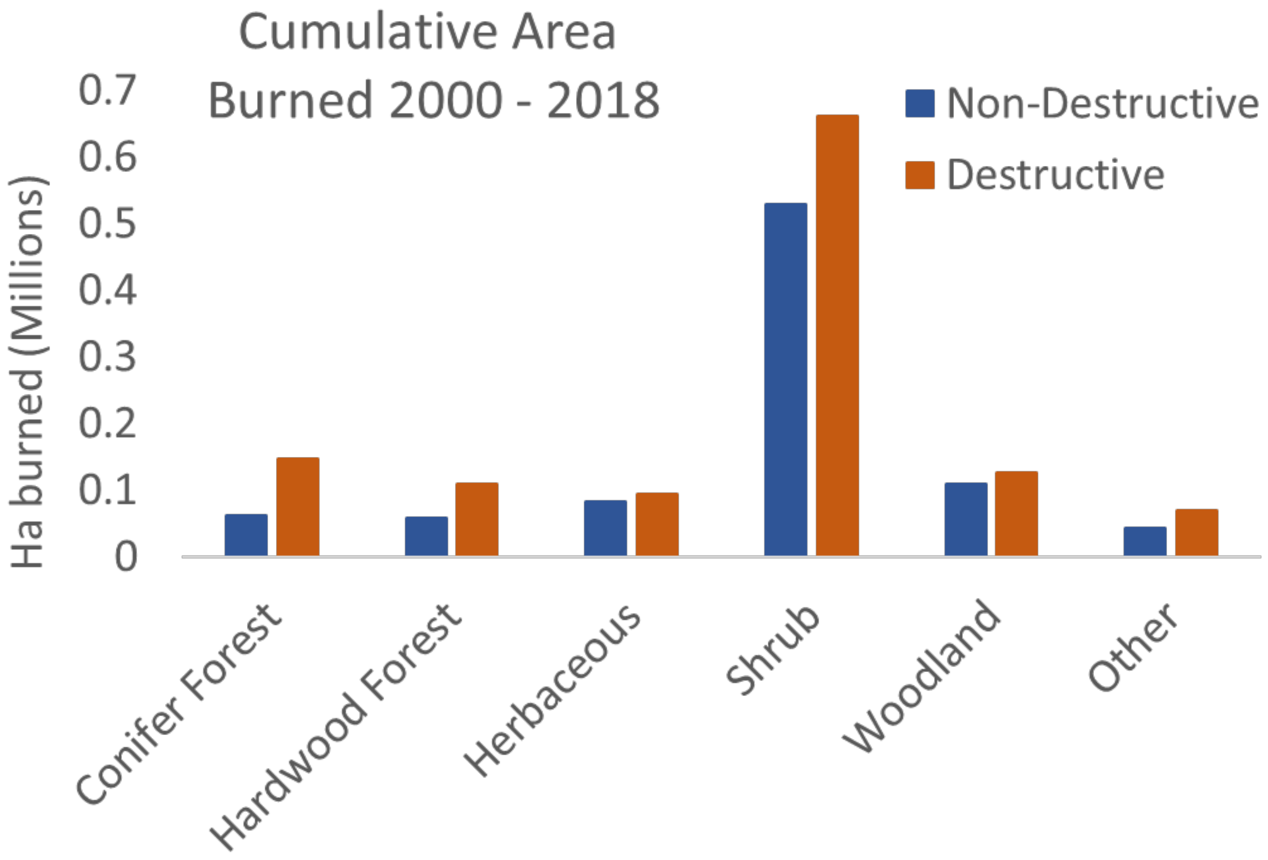
- Solution with co-benefits
  - Thin from below to stand density, restore frequent surface fire
  - Forest resilience, ecosystem services, indigenous rights & culture, community protection



A tribal burn south of Sacramento. Photo by Don Hankins.

A Reminder…


Conifer
Hardwood
Herbaceous
Other
Shrub
Los Angeles
San Diego


Cumulative Area
Burned 2000 - 2018
Non-Destructive
Destructive
Ha burned (Millions)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Conifer Forest
Hardwood Forest
Herbaceous
Shrub
Woodland
Other

Vegetation Management: Shrublands

- Solution with trade-offs
  - Remove canopy: type convert or corridors for invasives
    - Ecological harm


- Most destructive fires are wind-driven
- Most homes ignite via flying embers

The Role of Fuel Breaks in SoCal National Forests

Safe firefighter access to communities
Control behavior, do not stop fires on their own (fires jump freeways)

Unsafe in extreme fire weather

Strategically placed for defensive activities

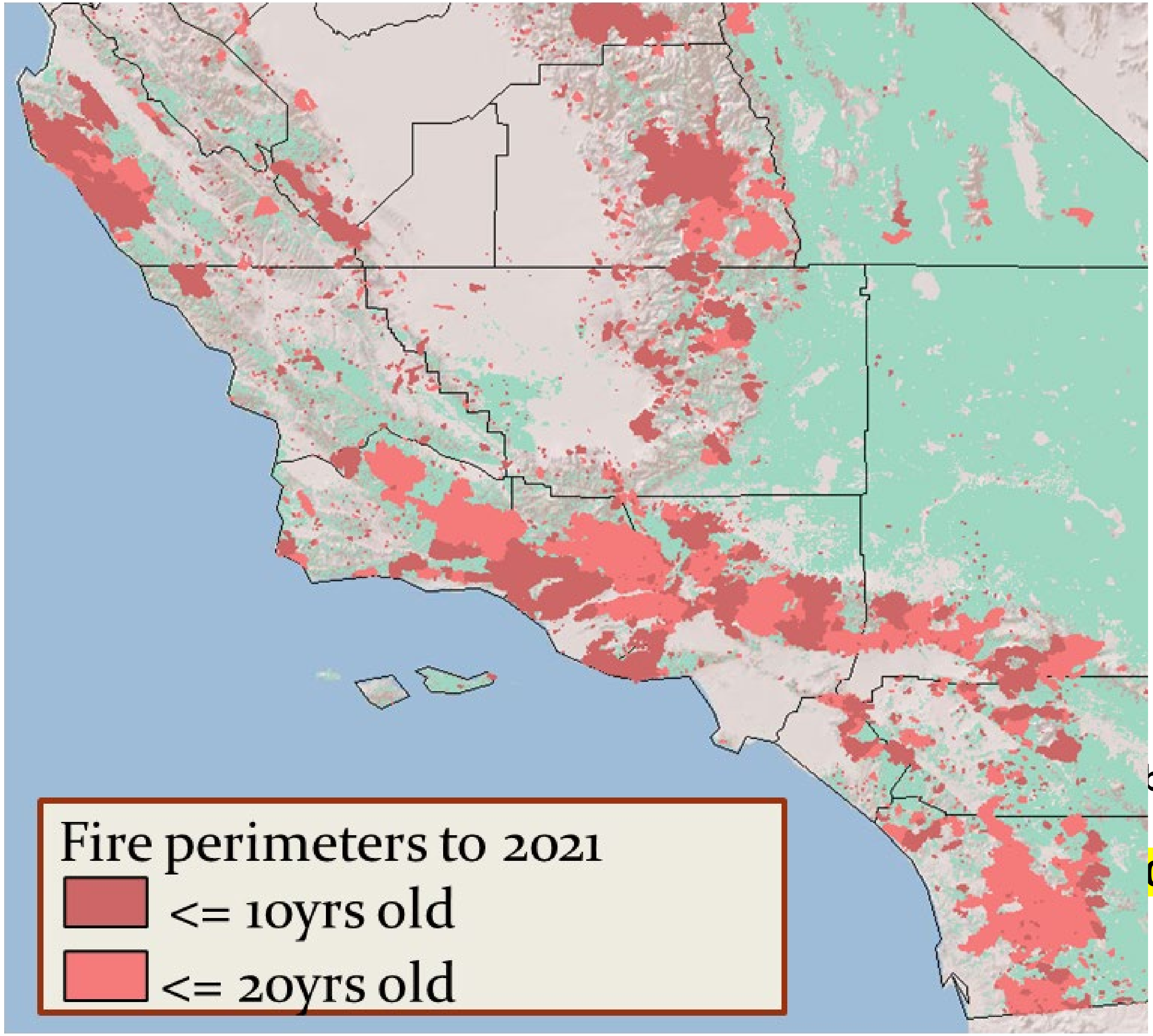
Syphard et al. 2011, 2012

Article

A Quantitative Analysis of Fuel Break Effectiveness Drivers in Southern California National Forests

Benjamin Gannon [1,*], Yu Wei [2], Erin Belval [3], Jesse Young [4], Matthew Thompson [3], Christopher O'Connor [4], David Calkin [4] and Christopher Dunn [5]

Extensive young vegetation



T

2 immature stands

M

Seedlings
bs/ha) /prefire shrub

Ceanothus 0.27
Fremontod 18.3

The Home Ignition Zone (HIZ)

"Not a fire or landscape problem" – J. Cohen

Building materials and defensible space

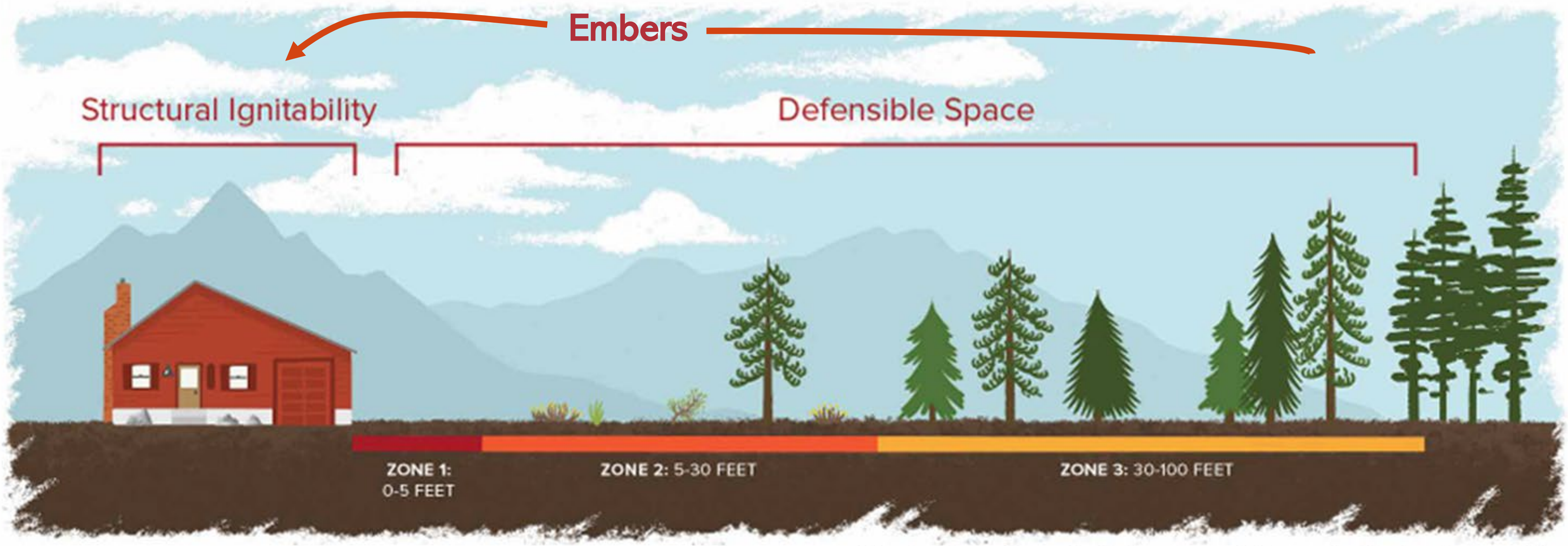
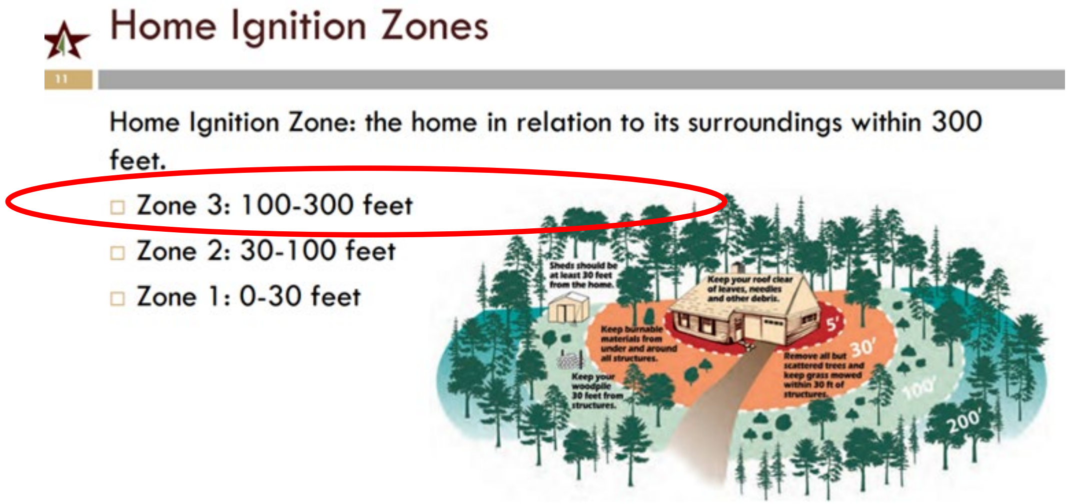


Illustration: Bonnie Palmatory, Colorado State University

Defensible Space – The Push for More

- CA law – 100 ft (*30m*) in mapped hazard zones
- Strong sentiment: more is better
- Distances - little empirical support

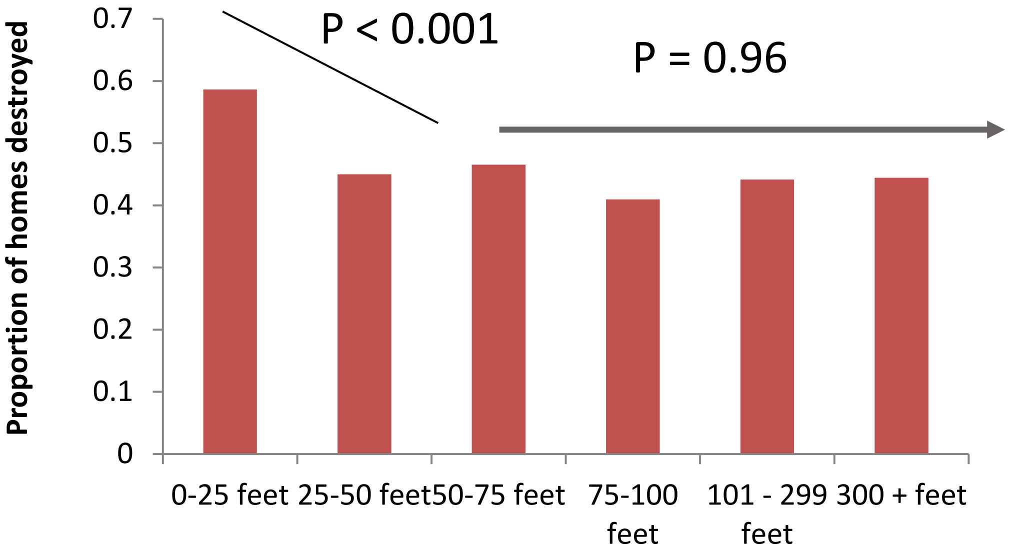


SB 1618 (Hollingsworth)	**Public resources: defensible space** Would prohibit a lead agency from deeming, as having a significant environmental impact, specified activities related to creation of a defensible space for fire safety for a building or structure under specified conditions. SB 1618 would allow property owners to clear up to 300 feet of defensible space under the discretion of a local fire official.

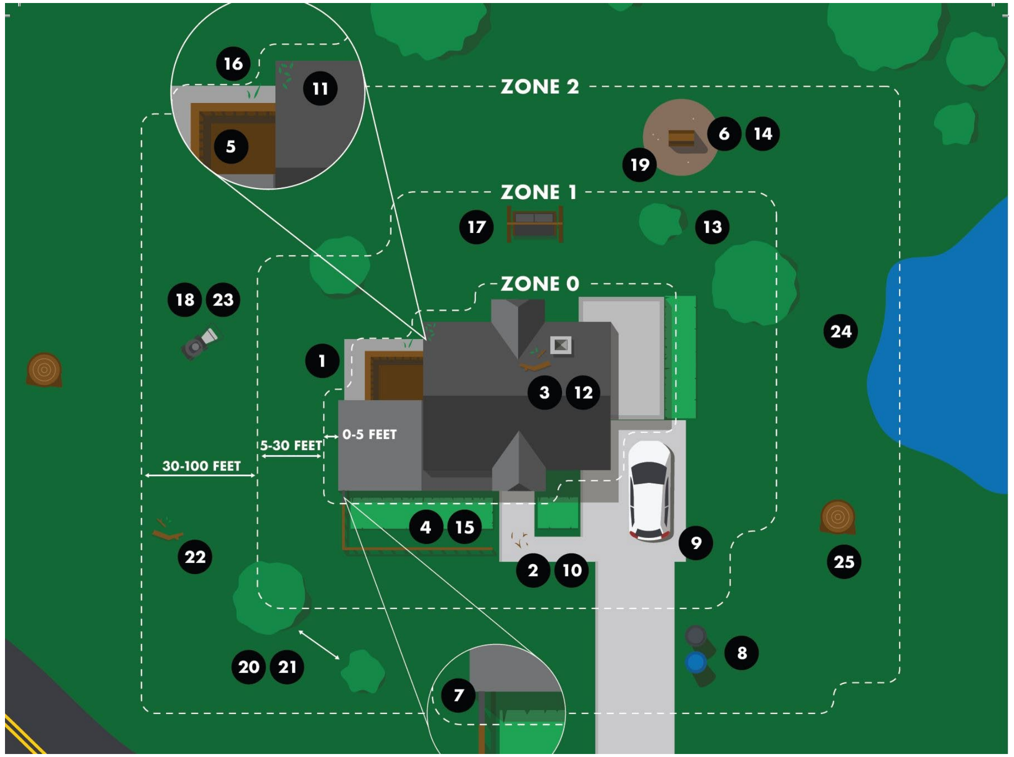
Proposed legislation: 300 ft. w/o environmental review

Empirical Airphoto Analysis

- Significant benefit up to ~ 75 ft., even on steep slopes
- Recommend 100 ft for firefighter safety



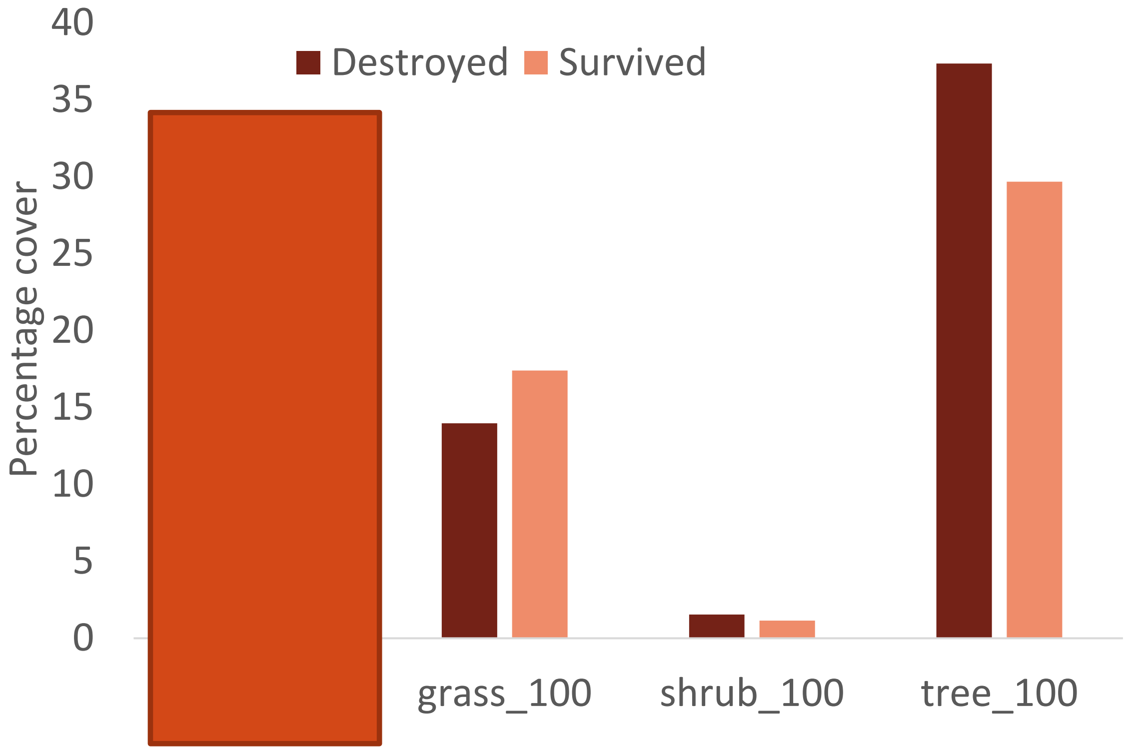
More than 75ft – no additional benefit



Syphard, Brennan & Keeley 2014, 2017, Miner 2016

Could More Be Less?

- Does excessive clearance increase risk?
- LiDAR data from Woolsey 2018 (“soil” most likely = “dry grass”)



Catherine Wheeler

Solutions for Co-Benefits

- Growing support for "greenness" – e.g., Gibbons et al. 2018
- Lightly irrigated native plants reduced hazard
    - *Carbon, cost, biodiversity, aesthetics*
- Need more study of "ember catchers"

Fig. 3. Example of summer lightly irrigated native vegetation (photo by Jon Keeley, USGS).

Trees "caught embers" next to a destroyed house

Summary: Lessons in Complexity

1) Wildfire is a geographical issue

- *Environmental diversity* – diversity in natural fire regimes
  - Altered, relative to historical, disrupts ecological systems
  - Different pathways to VTC
  - Species' vulnerability varies geographically

2) Fire regimes are altered for different reasons

- Climate effects vary (it's not just climate)
- *Include* consideration of humans, etc., where appropriate

3) Consider solutions w/ co-benefits for maximum sustainability

- Vegetation management for resilience & safety in forests
- HIZ, land use planning, ignition prevention in shrublands
- *Equitable* solutions - funding for HIZ, low-income communities

Summary: Lessons in Complexity

1) Wildfire is a geographical issue

Which is why…

2) Fire regimes are altered for different reasons - in different regions

Which is why…

3) Consider solutions for maximum sustainability

- Appropriate in one region may be destructive in another

One big lesson: a thousand smaller lessons, and many more to learn

“Everything has to do with geography”

– Judy Martz


Thank you!
Photo by Malachi Brooks

5 – Concept Development for White Paper: Wildfire Regimes in California and Implications for Vegetation Management

a. Introduction

b. Presentation by Board Member Alexandra Syphard

c. Overview of Energy Safety working group and scoping meetings related to Vegetation Management: Lucy Morgans, Electric Safety Policy Division (Energy Safety)

d. Board Discussion

e. Next Steps

6 - Adjourn Board Meeting

- For more information:
  - Website: www.energysafety.ca.gov/wsab
  - Email: WSAB@energysafety.ca.gov