Changes to fuels

- Fire exclusion
  - Natives removes
  - Grazing introduced
  - Fire suppression

- Understory grows up in dry forests
Changes to fuels
- Ex. Cheatgrass in desert

Changes to Weather
- Longer fire season
- Drier fuels
- “Megafires” that don’t go out until it snows
• Growing population in I-zone

• Growing costs and losses
  – 100k Zaca Fire burns for 2 months, but largely ignored until it threatened Santa Barbara

---

### 20 Largest California Wildland Fires (By Structures Destroyed)

<table>
<thead>
<tr>
<th>FIRE NAME/CAUSE</th>
<th>DATE</th>
<th>COUNTY</th>
<th>ACRES</th>
<th>STRUCTURES</th>
<th>DEATHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEDAR (HUMAN)</td>
<td>October 2005</td>
<td>SAN DIEGO</td>
<td>273,246</td>
<td>4,847</td>
<td>15</td>
</tr>
<tr>
<td>TUNNEL (REKINDLE)</td>
<td>October 1991</td>
<td>ALAMEDA</td>
<td>1,000</td>
<td>2,800</td>
<td>55</td>
</tr>
<tr>
<td>WITCH (UNDER INVESTIGATION)</td>
<td>October 2007</td>
<td>SAN DIEGO</td>
<td>197,000</td>
<td>1,426</td>
<td>3</td>
</tr>
<tr>
<td>OLD (HUMAN)</td>
<td>October 2005</td>
<td>SAN BERNARDINO</td>
<td>912,281</td>
<td>1,800</td>
<td>0</td>
</tr>
<tr>
<td>JONES (UNDETERMINED)</td>
<td>October 1999</td>
<td>SANTA BARBARA</td>
<td>26,200</td>
<td>564</td>
<td>1</td>
</tr>
<tr>
<td>PAINT (ARSON)</td>
<td>June 1990</td>
<td>SANTA BARBARA</td>
<td>4,000</td>
<td>641</td>
<td>1</td>
</tr>
<tr>
<td>FOUNTAIN (ARSON)</td>
<td>August 1993</td>
<td>SANTA BARBARA</td>
<td>62,960</td>
<td>438</td>
<td>0</td>
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<tr>
<td>CITY OF BERKELEY (POWERLINES)</td>
<td>September 1993</td>
<td>ALAMEDA</td>
<td>120</td>
<td>564</td>
<td>0</td>
</tr>
<tr>
<td>BILL AIR (UNDETERMINED)</td>
<td>November 1961</td>
<td>LOS ANGELES</td>
<td>6,000</td>
<td>484</td>
<td>0</td>
</tr>
<tr>
<td>HARRELS (UNDER INVESTIGATION)</td>
<td>October 2007</td>
<td>SAN DIEGO</td>
<td>90,440</td>
<td>548</td>
<td>0</td>
</tr>
<tr>
<td>LAGUNA FIRE (ARSON)</td>
<td>October 1991</td>
<td>ORANGE</td>
<td>14,417</td>
<td>441</td>
<td>0</td>
</tr>
<tr>
<td>LAGUNA (POWERLINES)</td>
<td>September 1978</td>
<td>SAN DIEGO</td>
<td>175,435</td>
<td>582</td>
<td>5</td>
</tr>
<tr>
<td>PANORAMA (ARSON)</td>
<td>November 1980</td>
<td>SAN BERNARDINO</td>
<td>23,600</td>
<td>225</td>
<td>4</td>
</tr>
<tr>
<td>TOPANGA (ARSON)</td>
<td>November 1993</td>
<td>LOS ANGELES</td>
<td>18,000</td>
<td>321</td>
<td>3</td>
</tr>
<tr>
<td>49ER (BURNING DEBRIS)</td>
<td>September 1986</td>
<td>NEVADA</td>
<td>33,760</td>
<td>312</td>
<td>0</td>
</tr>
<tr>
<td>ANGORA (HUMAN)</td>
<td>June 2007</td>
<td>EL DORADO</td>
<td>3,100</td>
<td>599</td>
<td>0</td>
</tr>
<tr>
<td>SUMI (UNDER INVESTIGATION)</td>
<td>October 2005</td>
<td>VENTURA</td>
<td>186,284</td>
<td>506</td>
<td>0</td>
</tr>
<tr>
<td>SLIDE (UNDER INVESTIGATION)</td>
<td>October 2007</td>
<td>SAN BERNARDINO</td>
<td>13,759</td>
<td>575</td>
<td>0</td>
</tr>
<tr>
<td>RICE (UNDER INVESTIGATION)</td>
<td>October 2007</td>
<td>SAN DIEGO</td>
<td>9,472</td>
<td>249</td>
<td>0</td>
</tr>
<tr>
<td>CANYON (VEHICLE)</td>
<td>September 1998</td>
<td>SANTA BARBARA</td>
<td>2,180</td>
<td>239</td>
<td>0</td>
</tr>
</tbody>
</table>

Note that this list does not include fire jurisdiction. These are the Top 20 within California, regardless of whether they were state, federal, or local responsibility. Also note that "structures" is meant to include all loss - homes and outbuildings, etc.
More than an economic toll...

Complexities

- I-Zone fires not the same as managing wildlands
  Not the same as managing urban development

- I-zone is a distinct entity
  Distinctly complicated
Ubiquitous problem....

• Not confined to any one region
  – California to Tennessee to Greece to Australia to...

• Continued immigration from city to rural areas
  – Little thought given to wildfire hazard
  – Bring expectation of urban emergency services

• Been compared to raising a Teenager

Long Island, New York 1995

So what does it take for “sustainable communities”???

If I ran the zoo...
Goal: Reduce costs and losses associated with wildfires in the wildland-urban interface

Focus Areas for Research & Policy Recommendations

Mitigation
- Existing communities
- Undeveloped communities

1. Fuels
   - Landscape-level
   - Landscaping standard
2. Construction
   - Materials
   - Assembly
   - Codes
3. Land-use planning
   - Community Design
   - Zoning
   - Critical Infrastructure
4. Education
   - Effectiveness

Preparedness, Response

1. Personal
2. Agency (suppression, law enforcement, etc.)
   - Mutual aid agreements
   - Number/staging of resources
   - Emergency coordination
3. Private business (utilities, insurance, medical, etc.)

Recovery

1. Secondary disaster mitigation
   - Environmental recovery
   - Infrastructure recovery
2. Economic recovery
   - Loans, grants, etc.
3. Social/Emotional recovery
4. Cost recovery

1. Identify effective management strategies
2. Determine sociopolitical/economic constraints
3. Provide potential solutions to overcome constraints
4. Monitor implementation of strategies and adjust

• Appropriate Suppression Resources
  • Problem where small tax base
  • Both agencies and private overemphasize
**Wise man wonder...**

- Shell left after house fire
- Wildfire burns to ground
- Both **EXTREMELY** hot... so why the difference???
  - No one to squirt water during wildfire

**Even Superman had his kryptonite...**

Atascadero 2006
- No time
- 2 minutes, 0.2 acres, 2 homes

Old Fire 2003
- Overwhelmed
We must prepare the battlefield!!!

Goal: Reduce costs and losses associated with wildfires in the wildland-urban interface

**Focus Areas for Research & Policy Recommendations**

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<td>2. Agency (suppression, law enforcement, etc.)</td>
<td>• Environmental recovery</td>
</tr>
<tr>
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<td>• Mutual aid agreements</td>
<td>• Infrastructure recovery</td>
</tr>
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<td>2. Construction</td>
<td>2. Number/staging of resources</td>
<td>2. Economic recovery</td>
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</tr>
<tr>
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<td>4. Emergency coordination</td>
<td>4. Cost recovery</td>
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<td>3. Land-use planning</td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
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<tr>
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<td></td>
<td></td>
</tr>
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1. Identify effective management strategies
2. Determine sociopolitical/economic constraints
3. Provide potential solutions to overcome constraints
4. Monitor implementation of strategies and adjust
**Fuels modification**

- Plenty of choices
- Ever thought about what the trees think???

Would we be so cavalier at cutting down trees if they had the ability to scream???

Well, maybe. Especially if they screamed all the time for no good reason – Jack Handey
Whisper of God theory...

- The whisper of God theory...
- Tools taken away

Appropriate Fuels Management

Pismo Beach, California

- Vegetation is more than fuel
  - Soil stabilization
  - Home cooling costs
  - Stormwater retention
  - Carbon sequestration
  - Wildlife habitat
  - And on and and on…
Sierra Mixed-Conifer

- Thinning from below
  - Canopy base height
    - 3’ to 15’

Pre-thin

Post-thin

• Future work
  - Specific fuel treatments

Benefit Category

- CO2 (tons)
- Stormwater runoff (Cubic Yards)
- Electricity Savings (MWh)

Jon Large
Chris Hamma
Alex Kirkpatrick
**Enforceable Construction Standards**

- House burned yet vegetation is untouched
  - Huh???
  - “It’s the embers, stupid”…

**What to prepare for…**

- Two main ignition sources
  - Fire front (radiation and flame impingement)
  - **EMBERS!!!**
Result of 2008 WUI Building Code...

- **Roofs are MOST important construction consideration**

- **Tiles or synthetics best**
  - Got to watch weak links
Windows

- Worst
  - Untempered glass
    - Expands and breaks

- Better (but more expensive)
  - Double paned glass
  - Tempered glass
  - Shutters
    - Got to be there to close

Siding...

- Unless flames (or embers) touched structure, no ignition
  - Too fast
- If structure doesn’t ignite, it doesn’t burn…

Crown fire experiments (Jack Cohen)
• **Sound Land Use Planning**

• The San Diego way
  - Not so good...

• Roads
  - Often narrow, steep
  - Often 1 way in
  - Delays response
  - Delays evacuation

---

*With neighbors like these...*
Bridges

- Must support fire apparatus
- Shouldn’t burn

Politics and fire...
Shelter in Place...  
A changing paradigm???

The Malcolm Gill story..

- Canberra, Australia
- Mid-day, 2003
Common arguments against...

- What about liability?
  - What about liability of evacuations???
- They don’t have training!
  - So train them

Not without controversy...

- International FireWise Conference
  - Denver 2006
- James Hubbard
  - Deputy Chief, U.S. Forest Service
  - “We will NEVER have shelter in place in the United States”
  - San Diego 2006
Silly politicians...

- Rancho Santa Fe was 20 miles from Conference
- 100% survival during Witch Fire

Not for everybody...
But it is for some...

Utilities

- Causes or exacerbates fire
  - Ignite vegetation
    - 2007 Witch & Harris Fires
- Blocks roads
Ignition traced to this pole... (Cause???)

Structure placement...

- No saddles or chimneys
  - Why???
  - Funnels heat toward house

- Away from slope
  - Why???
  - Little direct heat
• Community education and buy-in

♪ … Taken’ it to the streets… ♪

Collaboration is key!!!

♫ Kumbaya my Lord…
**Goal:** Reduce costs and losses associated with wildfires in the wildland-urban interface

### Focus Areas for Research & Policy Recommendations

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<td>mitigation</td>
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4. **Cost recovery**

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### Post-disaster recovery

- **Physical**
- **Mental**

---

C.A. Dicus
Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.

-- Douglas Adams, 1952 - 2001