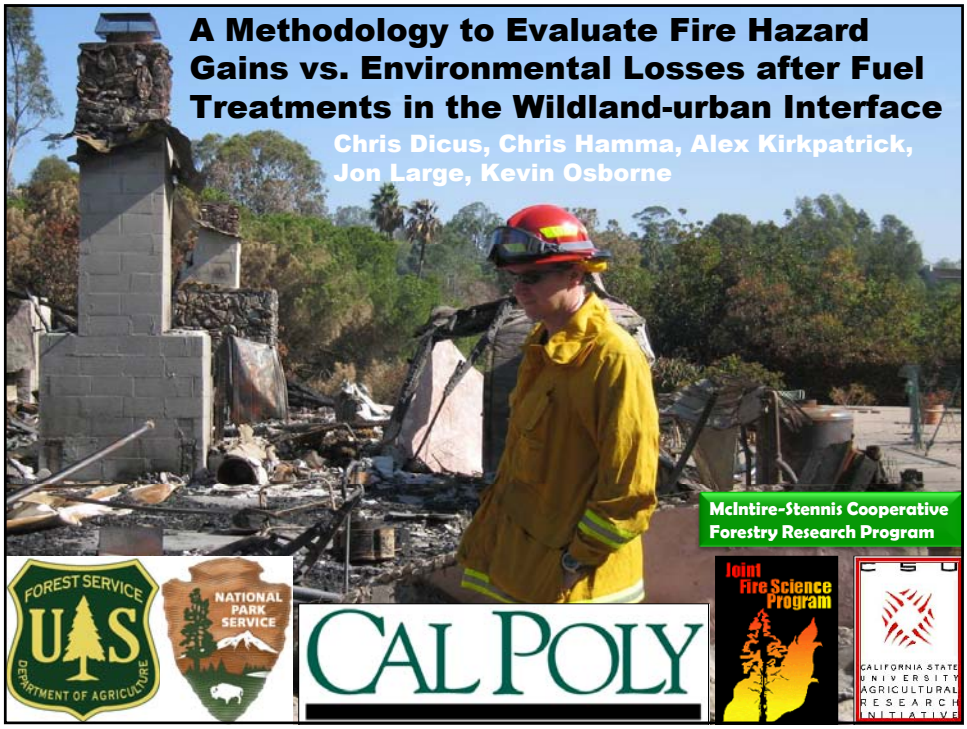
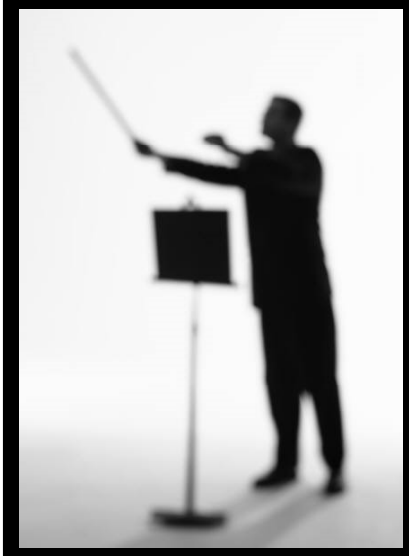


Our objectives…

- Try to keep you from falling asleep right after lunch
- Provide an *overview* of a methodology
  - What we can and can't do
- Provide a cookbook for your own assessments

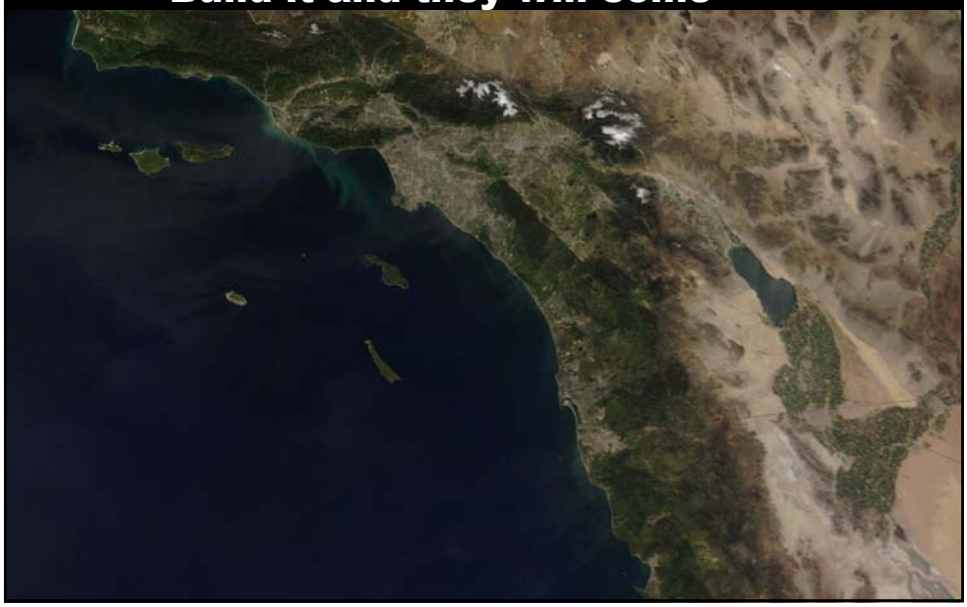
A delightful medley…



- Chris Dicus (me)
  - Introduction
- Chris Hamma
  - Fuels and fire in forests
- Alex Kirkpatrick
  - Fuels and fire in shrublands
- Jon Large
  - Ecosystem services
- Kevin Osborne
  - Landscape-level considerations

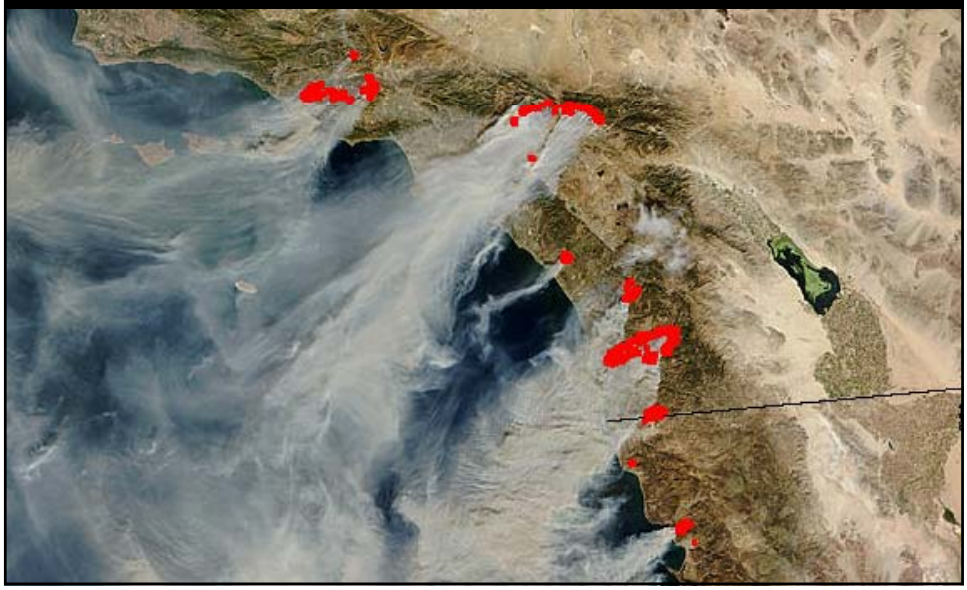
California dreamin'…

- Build it and they will come



California dreamin'…

- Build it and they will burn (2003)



California dreamin'…

- Build it and they will burn (2007)

The result???

- Thar's 2 types of bushes…
  - "Those that's burnin' and those that ain't"
- California now requires 100' defensible space around all structures
- For 36 million people, that's a lot of clearance

Hazards vs. benefits

- Vegetation provides benefits
  - Air pollution removal
  - Carbon sequestration
  - Soil stabilization
  - Home cooling costs
  - Stormwater retention
  - Wildlife habitat
  - Home value
  - And on and on…

Vegetation is more than fuel!!

Bridging the stereotypes…

Stupid "firenecks" wanna pave the world, man!

Dang hippies like bushes more than people!

July 2003

Urban Ecosystem Analysis San Diego, California

Calculating the Value of Nature

Report Contents

2	Project Overview
3	Major Findings
4	Creating a Green Data Layer
5-6	Tree Canopy Trends from Landsat
7-9	Building a Green Data Layer
10-11	San Diego's Green Data Layer
12-13	The Green Data Layer Applied to Local Issues
14-15	Environmental Benefits of Urban Forests
16	Analysis Report
17-18	Recommendations
19	About the Urban Ecosystem Analysis

AMERICAN FORESTS
americanforests.org

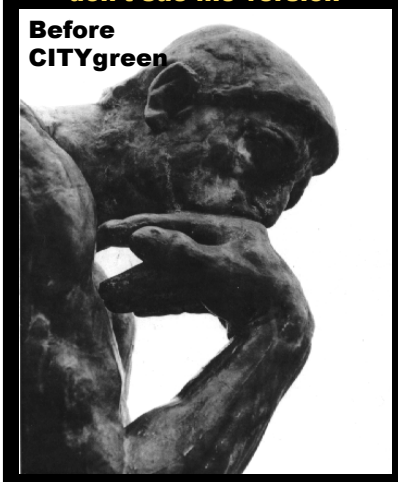
- **The result???**
  - **Plant 100,000 trees**
  - **Then came the Cedar Fire**

This is TOO easy…

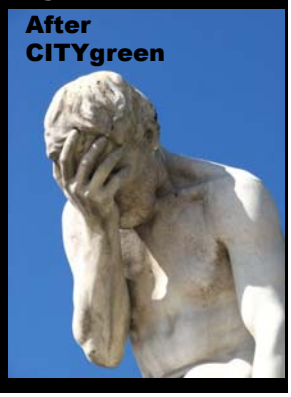
- Looked at major woodlands, shrublands, and grasslands
- CITYgreen data from UEA
  - Measures benefits
    - Air pollution removal
    - Carbon sequestration
    - Stormwater runoff
- FARSITE
  - Measures fire behavior
    - Same data as CITYgreen

Conclusions…

Politically-correct, please-don't-sue-me version



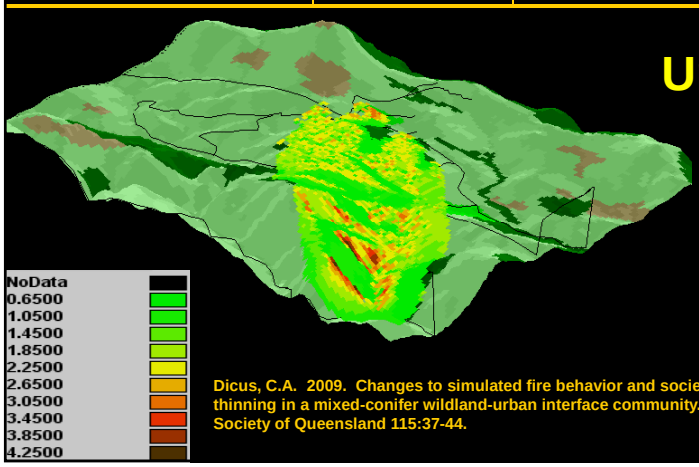
- When assessing canopy benefits…
  - Consider assumptions of CITYgreen model
- So what *if* just trees



Dicus, C.A., and M.P. Zimmerman. 2007. Quantifying fire behavior vs. community benefits of southern California shrublands and grasslands. Pages 214-221 *in* R.E. Masters and K.E.M. Galley (eds.). Proceedings of the 23rd Tall Timbers Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems. Tall Timbers Research Station, Tallahassee, FL.

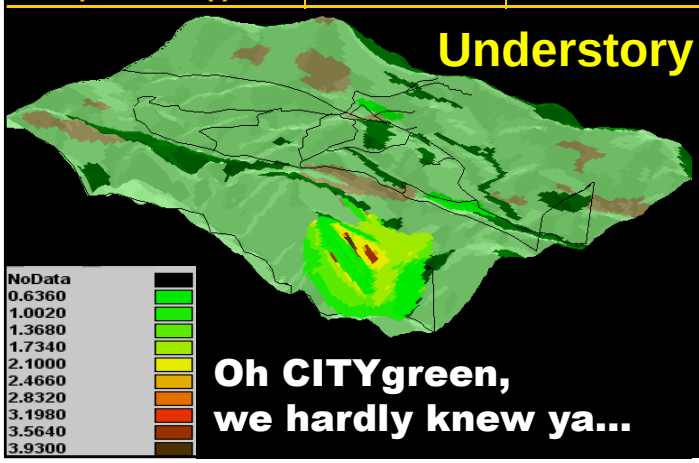
Sierra mixed-conifer

Simulation	Stand ht (m)	Canopy Base ht (m)	Canopy bulk density (kg/m^3)
Untreated	34	2	0.101
Understory Removal	34	4	0.101
Thin to 50% BA	33	11	0.037



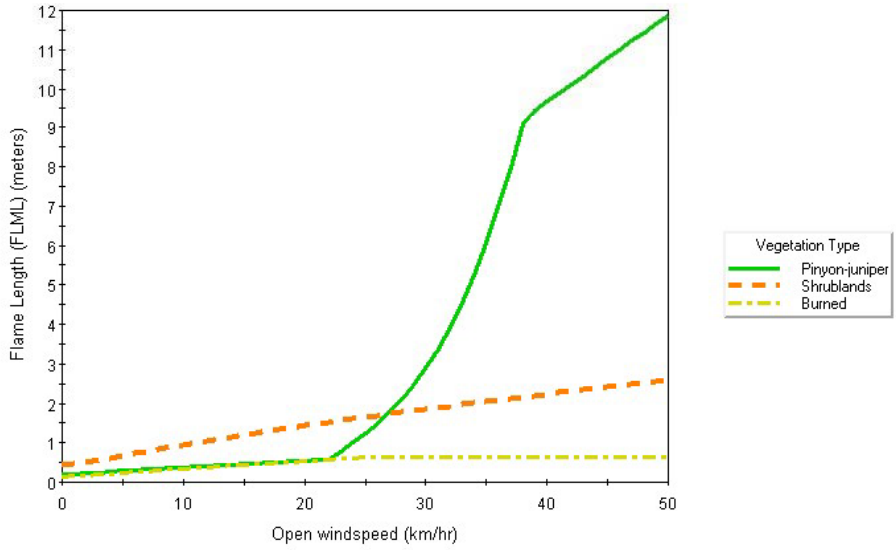
Dicus, C.A. 2009. Changes to simulated fire behavior and societal benefits after two levels of thinning in a mixed-conifer wildland-urban interface community. Proceedings of the Royal Society of Queensland 115:37-44.

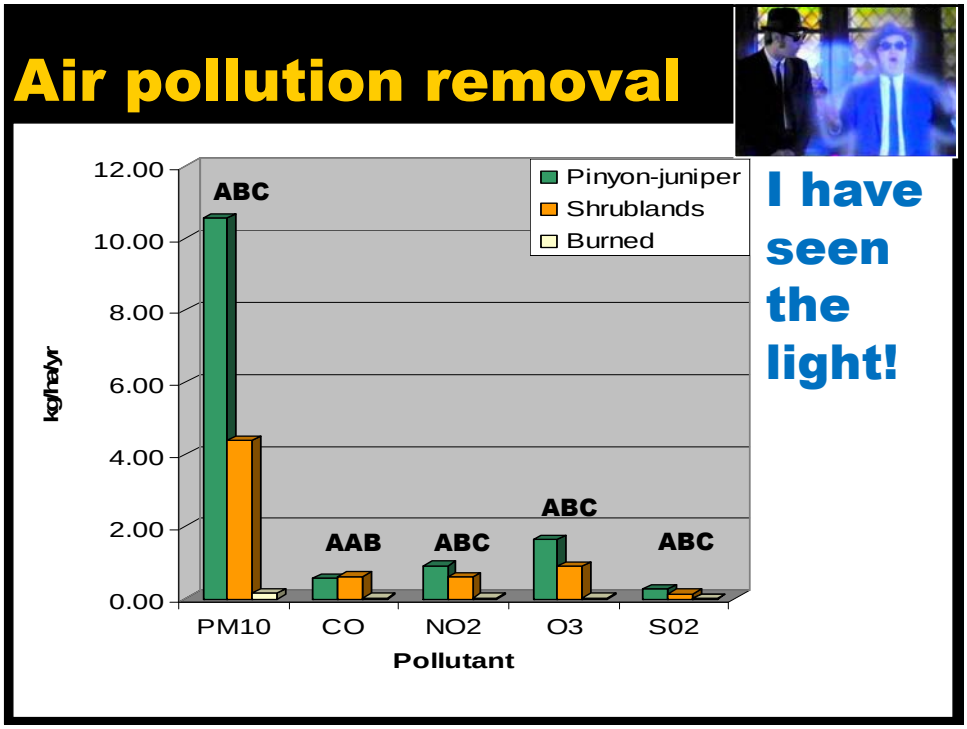
	Untreated	Understory Removed	Thin to 50% BA
Stormwater runoff (m^3)	773,046	773,046	3.5
Air pollution (t)	371,045	371,045	3084
C sequestered (t)	1,288	1,288	11

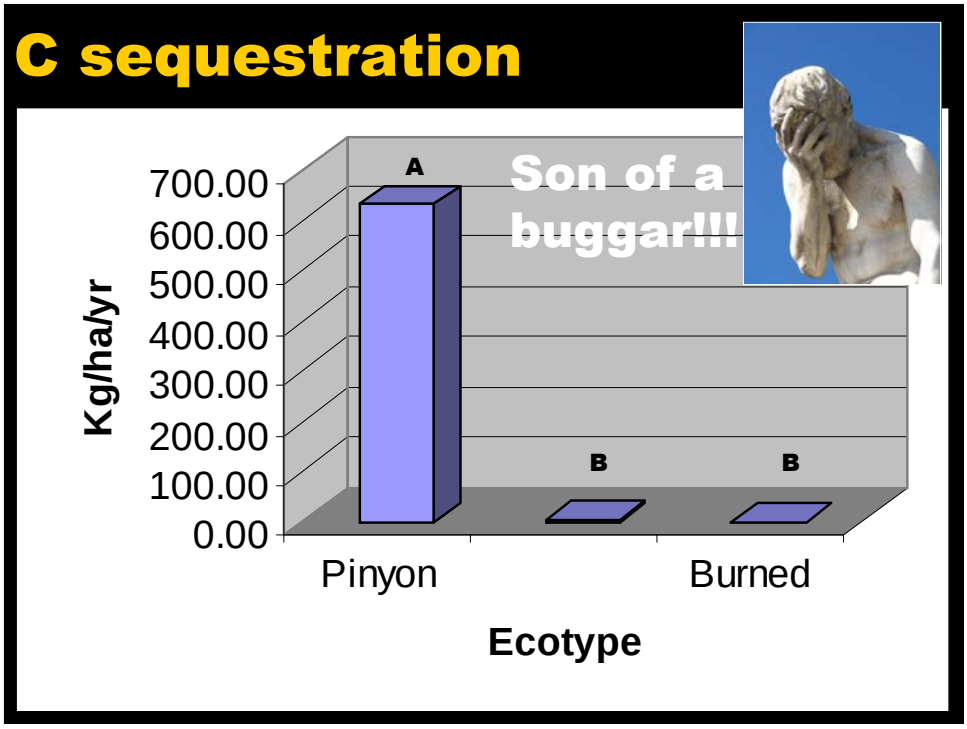


Dicus, C.A., K. Delfino, and D.R. Weise. 2009. Predicted fire behavior and societal benefits in three eastern Sierra Nevada vegetation communities. Fire Ecology 5(1):61-58.

NEXUS simulations




Air pollution removal
I have seen the light!
Pinyon-juniper
Shrublands
Burned
12.00
10.00
8.00
6.00
4.00
2.00
0.00
kg/ha/yr
ABC
AAB
ABC
ABC
ABC
PM10
CO
NO2
O3
S02
Pollutant


C sequestration
Son of a buggar!!!
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Kg/ha/yr
A
B
B
Pinyon
Burned
Ecotype

Methods

- **Hypothesis**
  - ***After treatment changes***
    - ***Ho***: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$
      - Fuels
      - Fire behavior outputs
      - "Benefits"
- **Data identical**
  - **Forests**
    - Surface fuels
    - Species, DBH, Ht, canopy properties
  - **Shrublands**
    - Loading
      - By size class
      - By live and dead
    - Species, height and width

Final thoughts…

- **Potential slip-ups**
  - **Lot's of field work**
    - **You can take the easy way**
  - **Lots of computer work**
    - **No way around it**
  - **Have to send away UFORE data**
  - **Shrubs are (still) the red-headed stepchild of plant world**

- **Other considerations**
  - **Stand-level only**
    - **Landscape-level coming**
  - **For wildlands only**
    - **Not as important as near structure**
  - **Doesn't speak to embers**