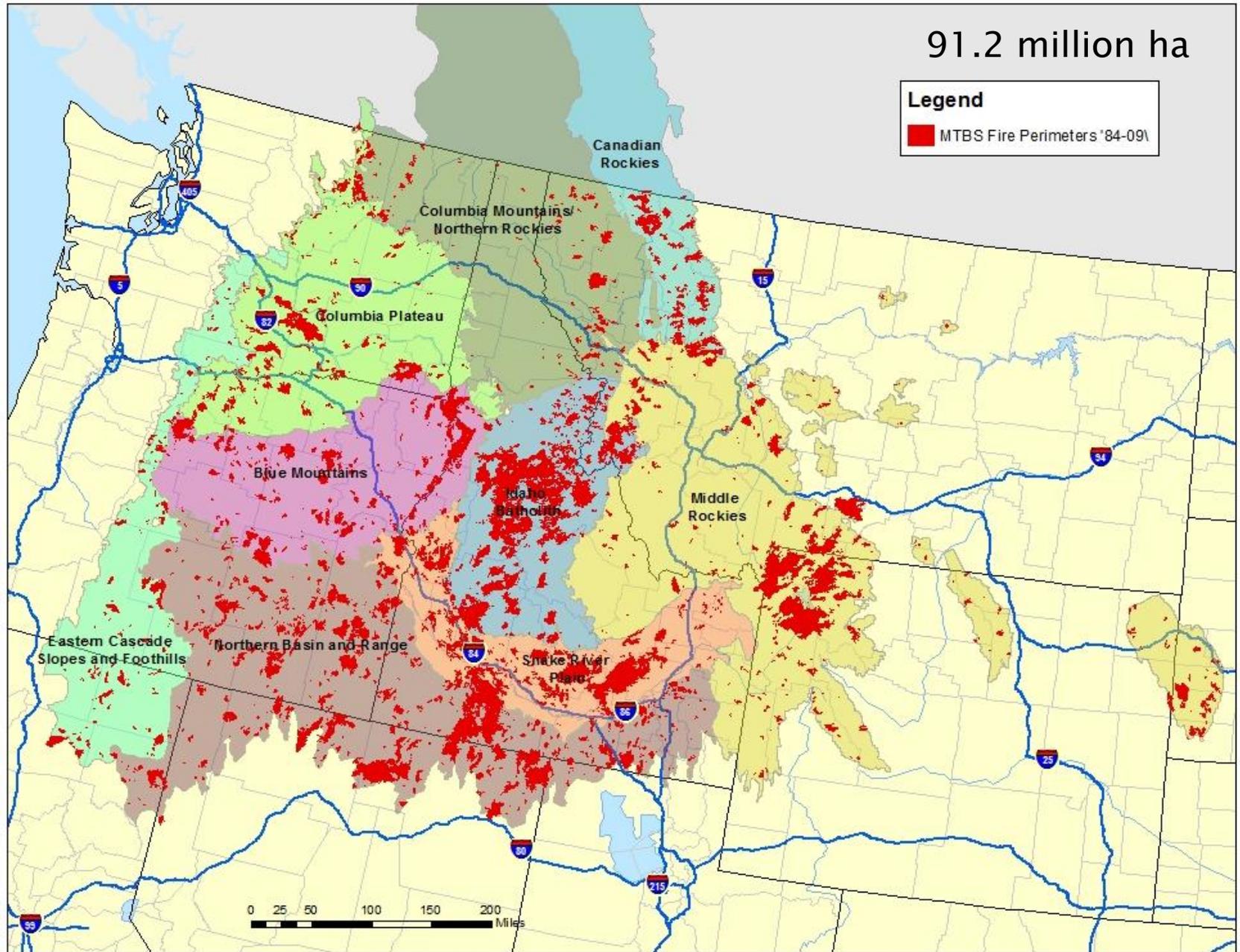


# NASA Extreme Project

“Biogeoscientific” Postdoc, Karen Lannom  
Progress to Date

# • Identified Study Area

91.2 million ha



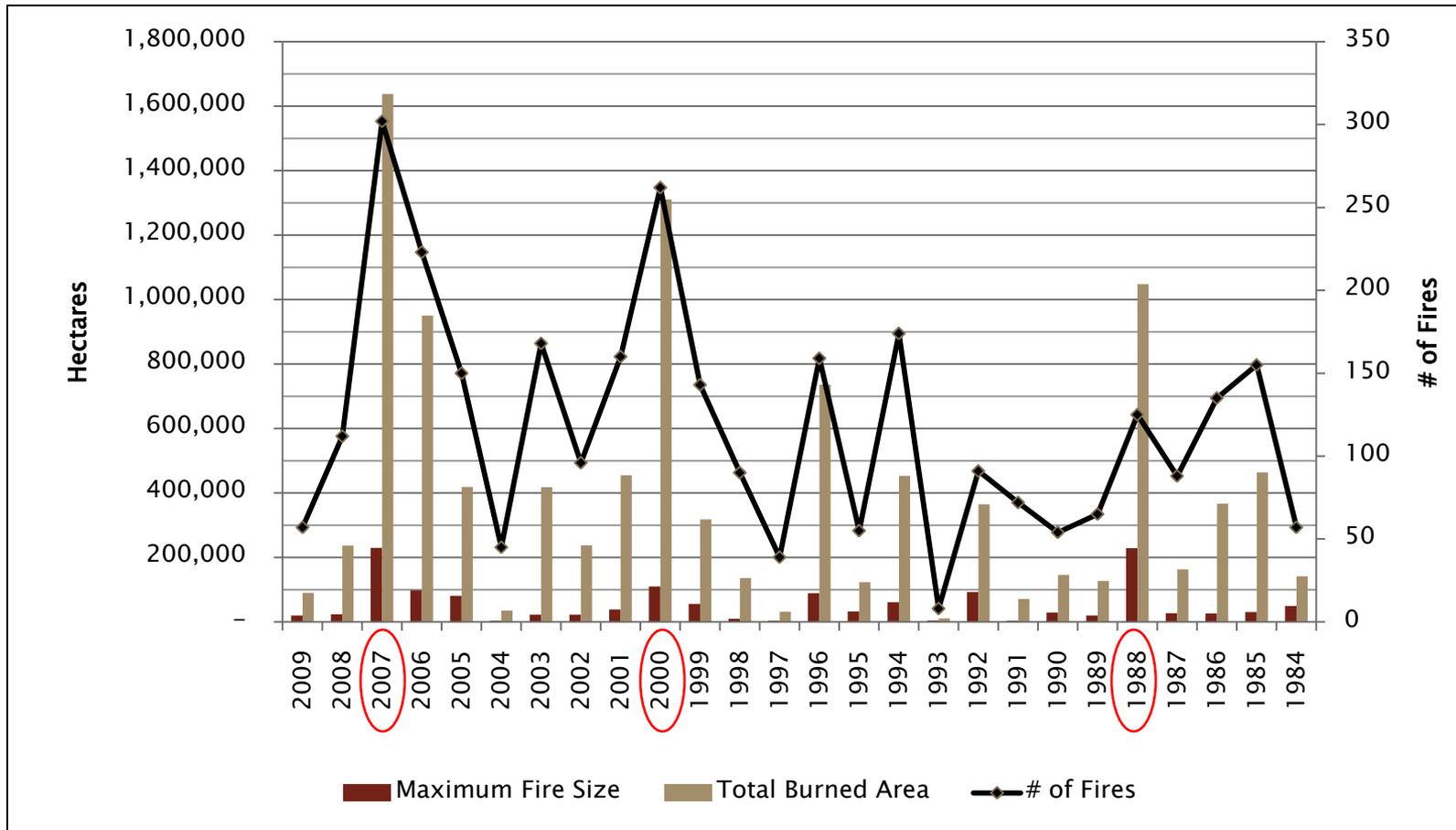
# Task 1. Collation of Datasets

- Digital fire atlases – ID and Western MT (1889–2003)
- Landsat imagery – 1910, 1934, 1967, 1988, 2000, 2007 fires (chronosequence analyses)
- Monitoring Trends in Burn Severity (MTBS) data 2004–2009
  - 1984–2007 prefire and postfire imagery, burn severity data (dNBR, RdNBR), thematic burn severity, 2004–2009 fire occurrences

## Task 2. Identify Characteristics of Extreme

- Characteristics we can analyze from MTBS:
  - Size
  - % High Burn Severity
  - Fire timing (# of days based on start date/out dates)
  - Distance to WUI
- 3,085 fires from 1984–2009 in our study area
- 2,916 fires from 1984–2007 analyzed for burn severity, timing and distance to WUI

# Fire Size



The largest 412 fires (13% of total) accounted for 70% of total reported burned area.  
The largest 849 fires (27% of total) accounted for 85% of burned area.

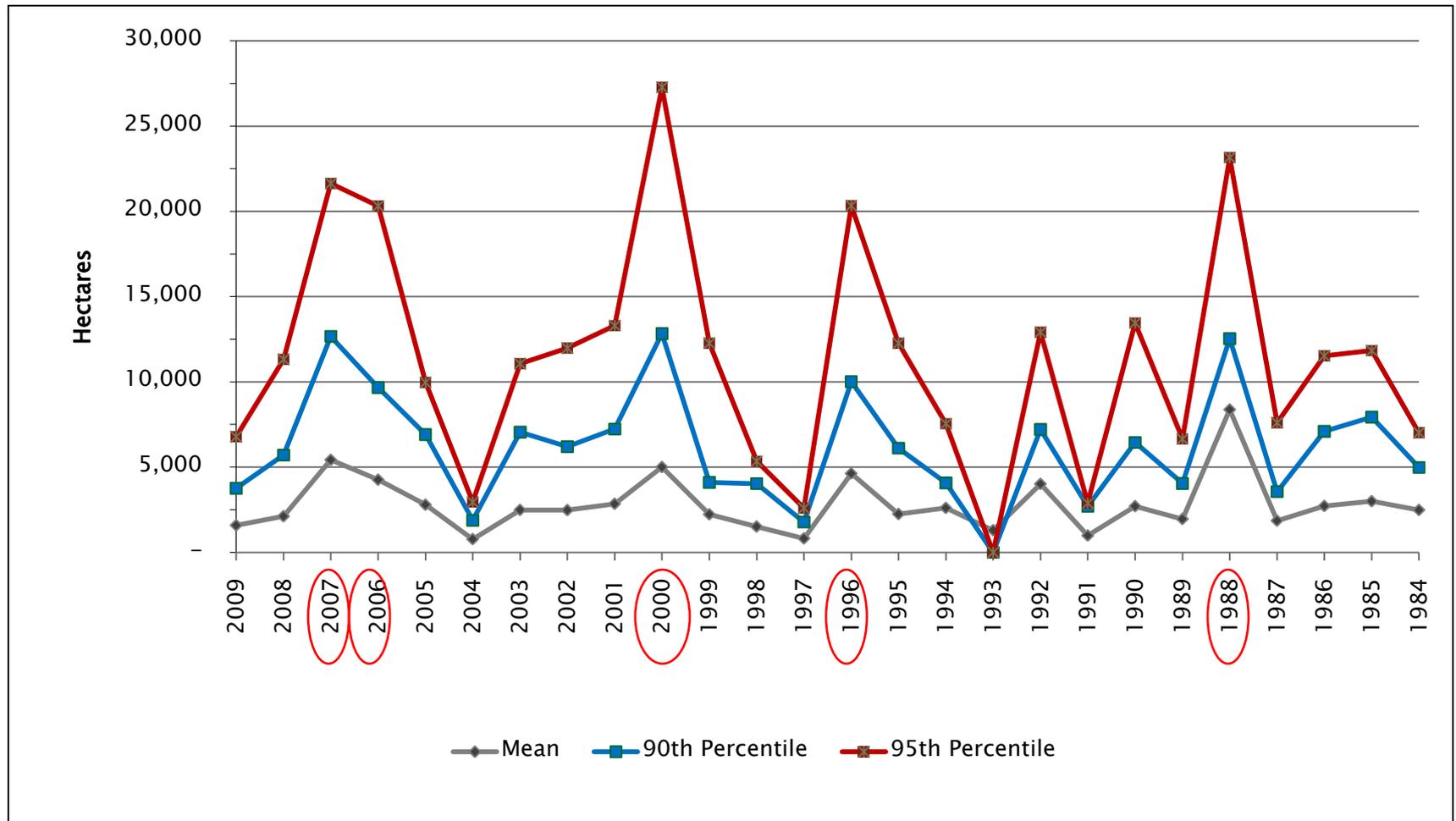
## “Big” fire years

2007 - Largest total burned area, highest # of fires, largest maximum fire size

2000 - 2<sup>nd</sup> largest total burned area, 2<sup>nd</sup> highest # of fires

1988 - 3<sup>rd</sup> largest total burned area, 2<sup>nd</sup> largest maximum fire size

# Fire Size

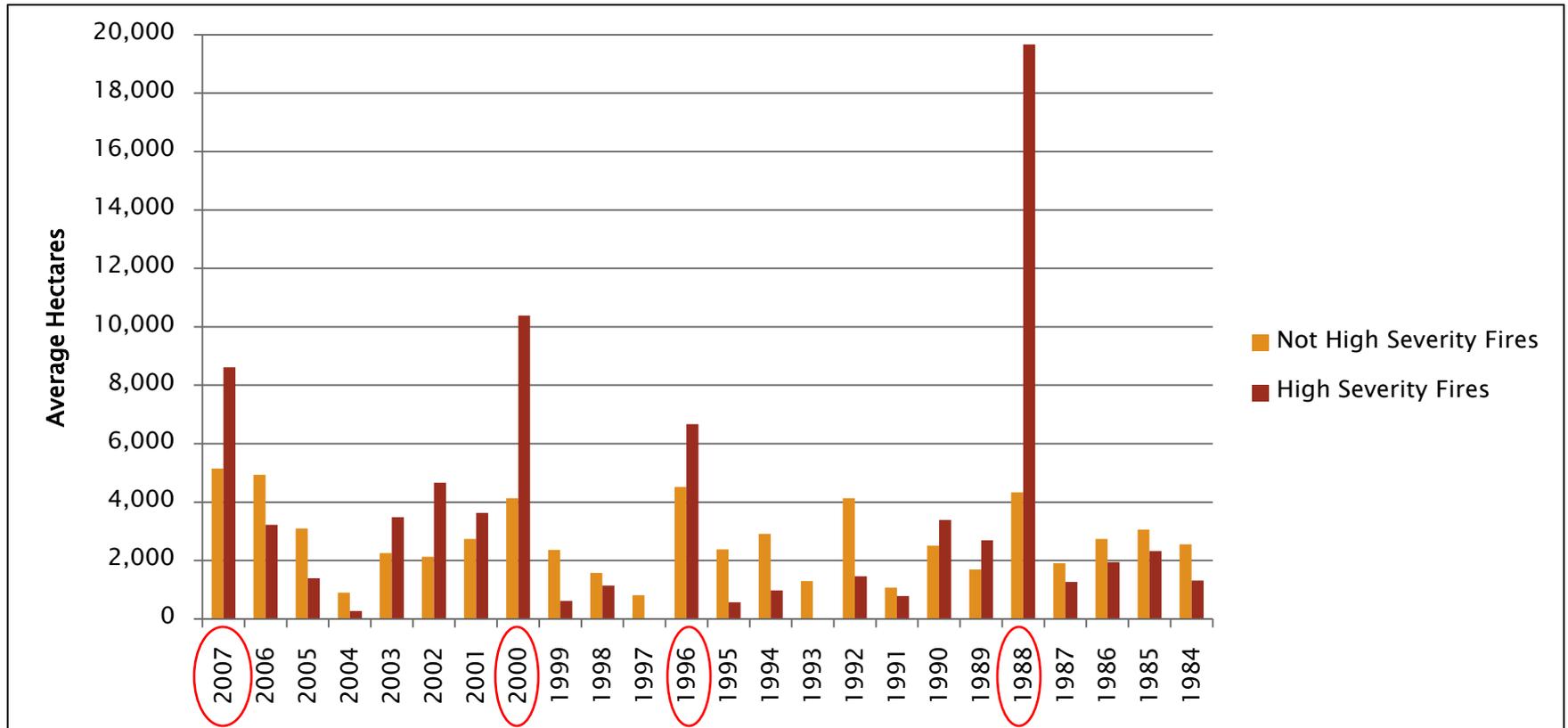


Looking at fires from 2007, 2006, 2000, 1996 and 1988 I identified fires with size greater than the 95<sup>th</sup> percentile cutoff.

**52 fires** were identified, all fires > 19,000 ha (~47,000 acres), 22 fires > 4,000 ha (98,000 acres)

# Burn Severity

## Average Fire Size by Burn Severity



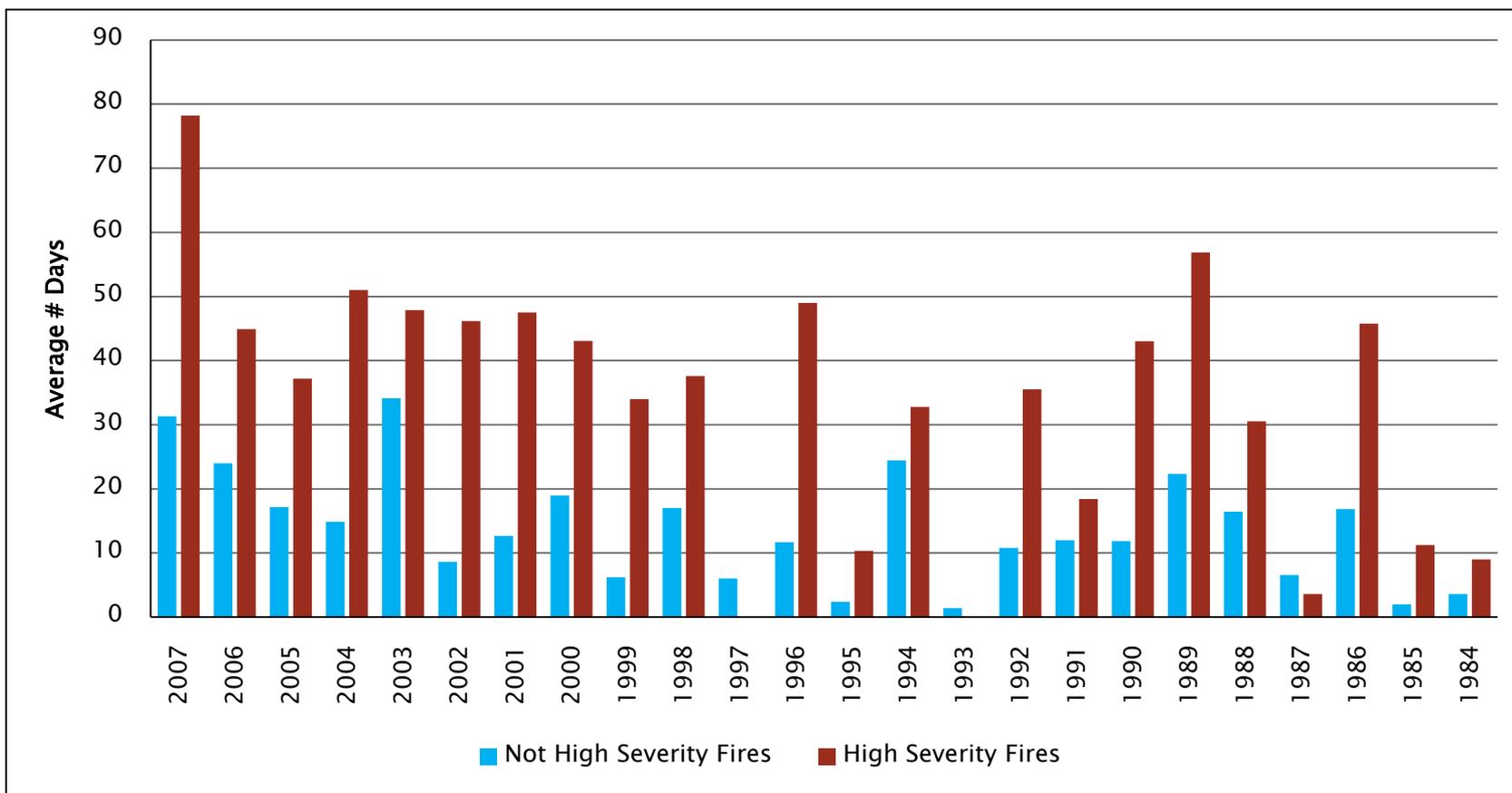
2,916 MTBS Thematic Burn Severity Datasets (high, med, low burn severity) were analyzed with ArcGIS. Fires with >25% area mapped as High Burn Severity were identified.

425 fires were identified, 15% of all the fires. Big fire years had high severity fires that burned larger areas than other fires.

Of the 52 big fires, 14 fires were also mapped as being >25% burn severity.

# Fire Timing

\*Note: Our “big fire years,” except for 2007, did not stand out as different in average # days burned.



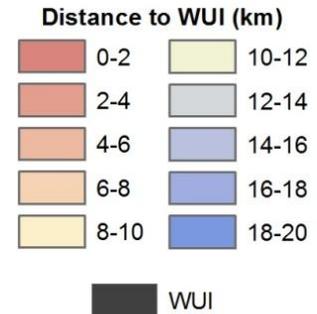
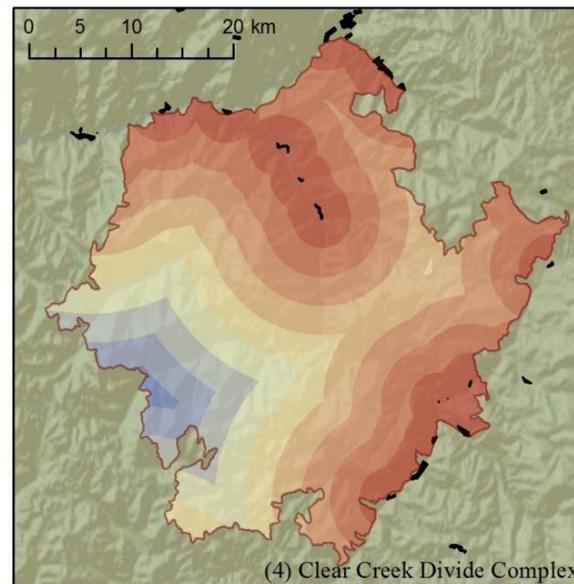
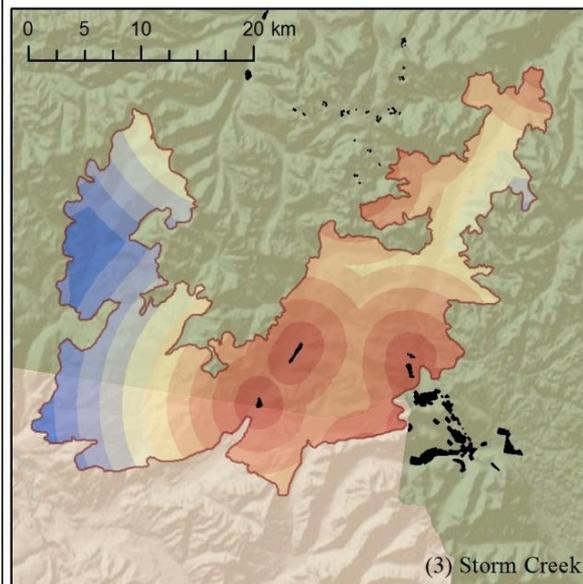
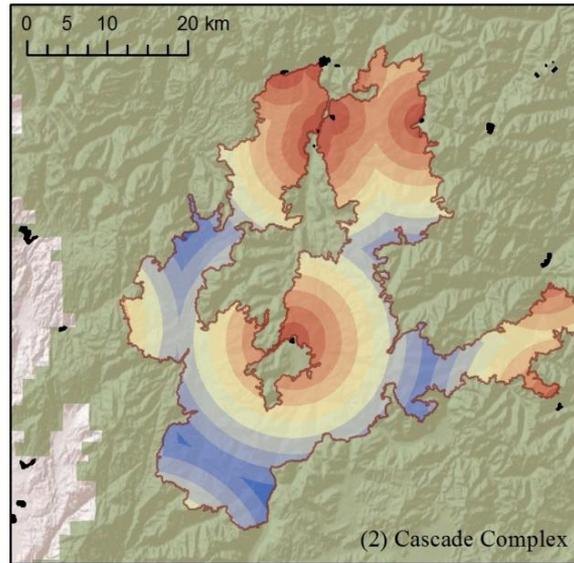
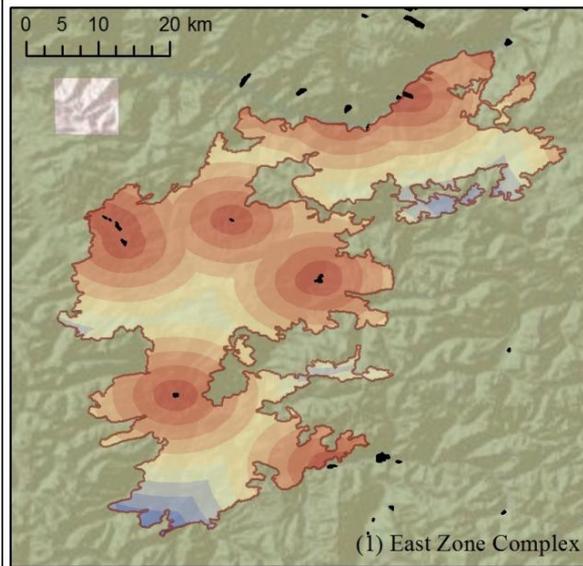
Of the 2,085 MTBS fires, 2,135 were analyzed using start-dates and out-dates to determine # days each fire burned.

High Severity (>25% area) fires were significantly different than non-high severity fires in # days burned.

Of the 14 fires identified based on size and burn severity, 12 had out-dates listed. Using the 95<sup>th</sup> percentile values of fire duration each year, **9 fires** exceeded the 95<sup>th</sup> percentile. All of these fire lasted > 100 days.

# Distance to WUI

## Example Output of Distance Analysis



Used 1990 and 2000 WUI datasets and fire perimeter polygons. Using ArcGIS, determined the distance of each grid cell in a fire to the closest WUI.

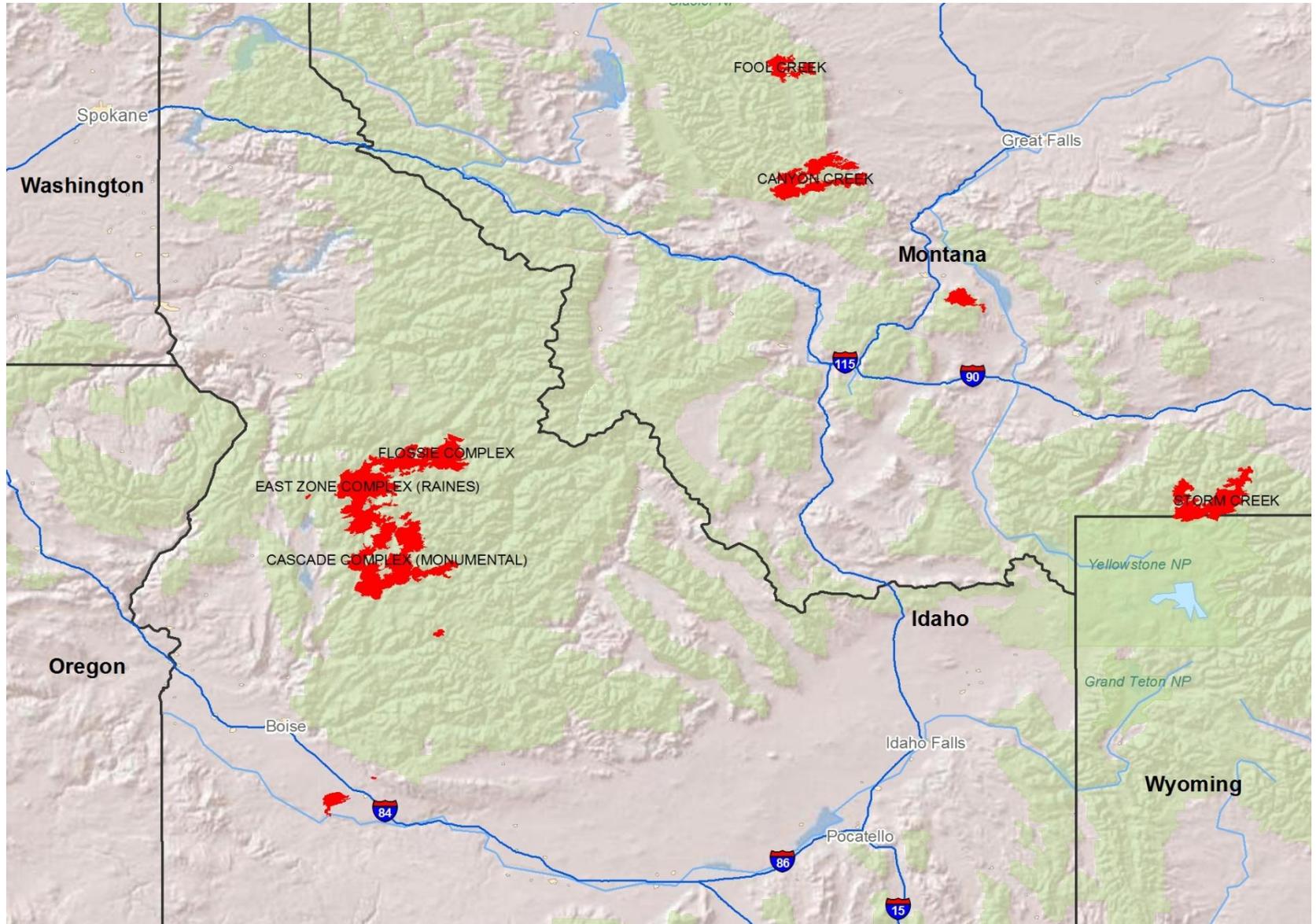
Of the 9 fires identified by size, burn Severity, and duration, 7 fires had a minimum distance to WUI = 0.

# Extreme Fires?

Summary of our 9 fires identified by their size, burn severity, duration, and distance to WUI.

| Fire Name                                | Size (ha) | % High Burn Severity | # of Days | % Area Burned Within X Distance of WUI |     |     |      | 1 <sup>st</sup> Quartile Dist to WUI (m) | Estimated Suppression Cost (\$) |
|--|-----------|----------------------|-----------|--|-----|-----|------|--|---------------------------------|
|  |           |                      |           | 1km                                    | 3km | 5km | 10km |  |                                 |
| CASCADE COMPLEX (MONUMENTAL)             | 128,174   | 37.2                 | 107       | 1                                      | 8   | 18  | 51   | 6,136                                    | 43,518,922                      |
| EAST ZONE COMPLEX (RAINES)               | 126,441   | 29.4                 | 112       | 2                                      | 11  | 26  | 61   | 4,105                                    | 8,581,484                       |
| STORM CREEK                              | 72,478    | 35.6                 | 124       | 3                                      | 15  | 33  | 64   | 4,185                                    | 87,000                          |
| CLEAR CREEK DIVIDE COMPLEX (CLEAR CREEK) | 68,927    | 29.3                 | 144       | 6                                      | 25  | 46  | 80   | 3,054                                    | 71,500,000                      |
| CANYON CREEK                             | 67,937    | 49.8                 | 107       | 1                                      | 8   | 17  | 47   | 6,340                                    | 100,000                         |
| FLOSSIE COMPLEX                          | 36,669    | 29.8                 | 114       | 3                                      | 11  | 26  | 60   | 3,800                                    | not available                   |
| FOOL CREEK                               | 21,818    | 45.0                 | 154       | 2                                      | 17  | 31  | 50   | 5,705                                    | 6,048,257                       |

# Top 9 Fires

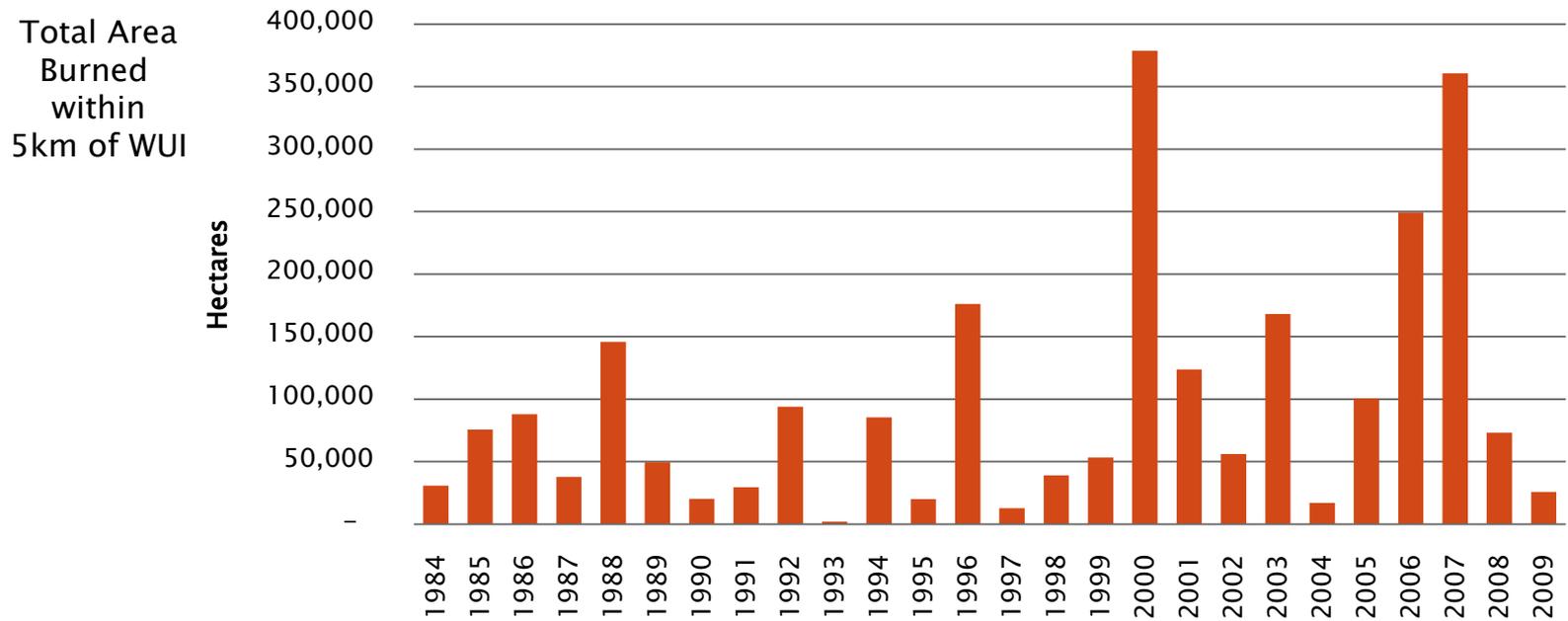
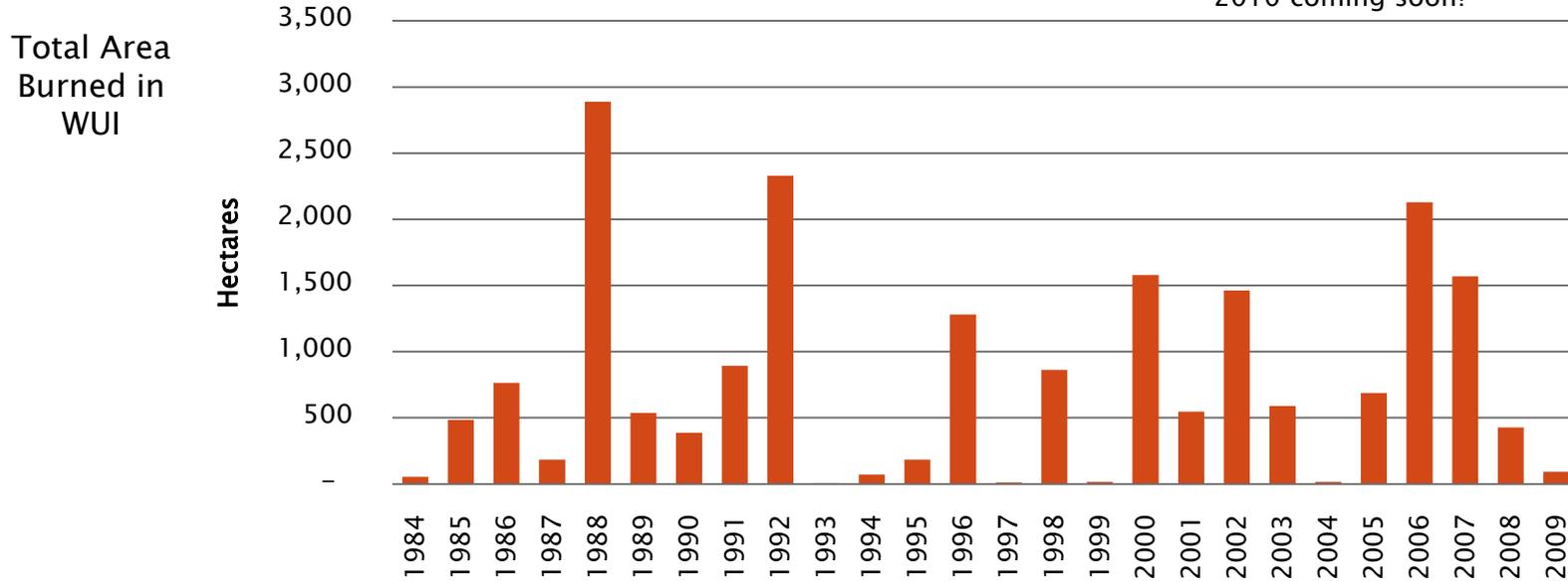


# In Progress

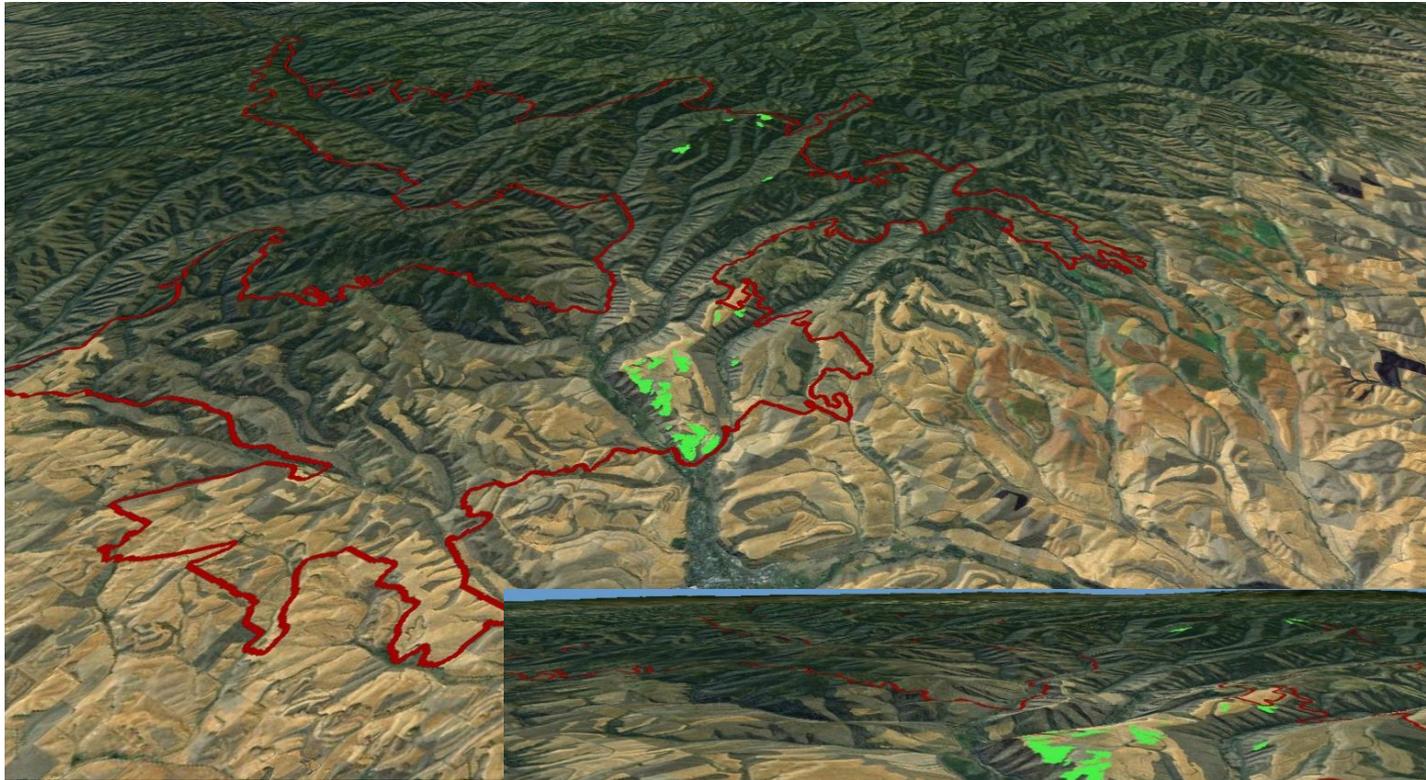
- Contributing to Frontiers Paper
- Drafted manuscript for submission to International Journal of Wildland Fire, “Spatial and temporal metrics for characterizing extreme wildfires in the northern Rocky Mountains, USA”
- Presenting poster at AGU conference, “Development of Extreme Wildland Fire Recovery Chronosequences for the Northern Rockies, U.S.”
- Further analysis using WUI data (1990, 2000, 2010) and MTBS data
- Extreme Fire Portal

# Further WUI Analyses

1990 WUI in project area = 1,921,680 ha  
 2000 WUI in project area = 2,465,135 ha  
 2010 coming soon!



# Viewshed Analysis



## Columbia Complex



# In Progress

- Extreme Fire Portal through FRAMES



## Welcome to the Extreme Fires Portal

The Extreme Fires Portal is a result of the collaborative efforts of the University of Idaho, Washington State University, USDA Forest Service, Michigan Technological University, and the Fire Research and Management Exchange System (FRAMES). The portal is a source of information about the ongoing NASA-funded research project, "Quantifying the characteristics and investigating the biogeoscientific and societal impacts of extreme wildland fires in the United States northern Rockies region."

Web hosting by:  FRAMES Site Map

© 2012 FRAMES. [Sign In](#) to [Edit this Site](#)