Fire and Vegetation history of the Pine Forest Range, NV over the past 4,000 years

Robert Shriver

Dept. of Botany, University of Wyoming

Funding: WSGC Undergrad Fellowship

Background

- Fire is an important and widespread disturbance in western forests
- Fire histories provide information on the natural range of variability and relationship to climate and vegetation.
- Short Term - Dendrology
- Long Term - Lake Sediments

http://www.uoregon.edu/%7Edonovan/images/Forest%20Fire.bmp

Research Questions

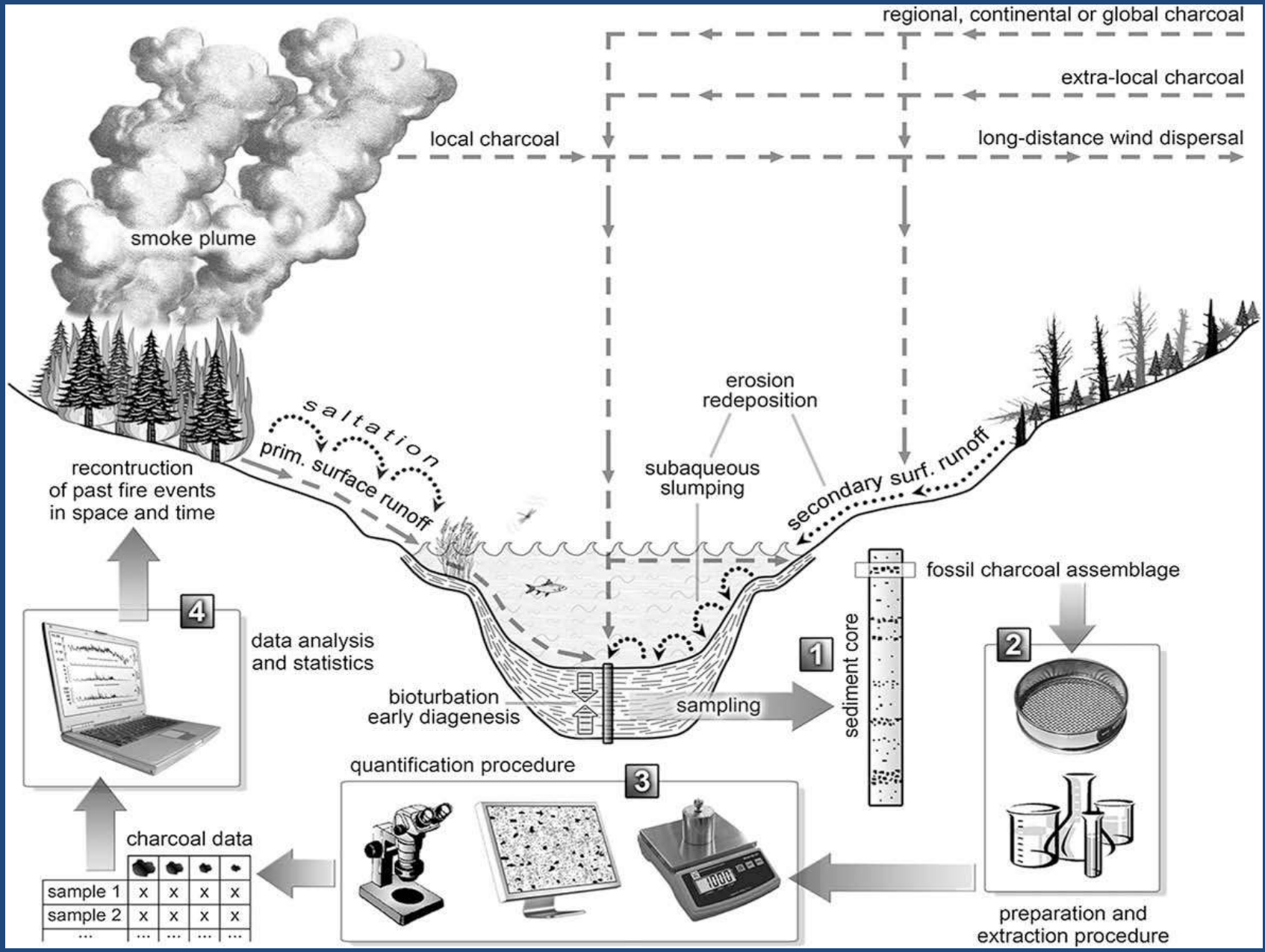
- 1. What is the historic range of variability of fire in the Pine Forest Range?

- 2. How have changes in vegetation interacted with fire regimes?

Blue Lakes

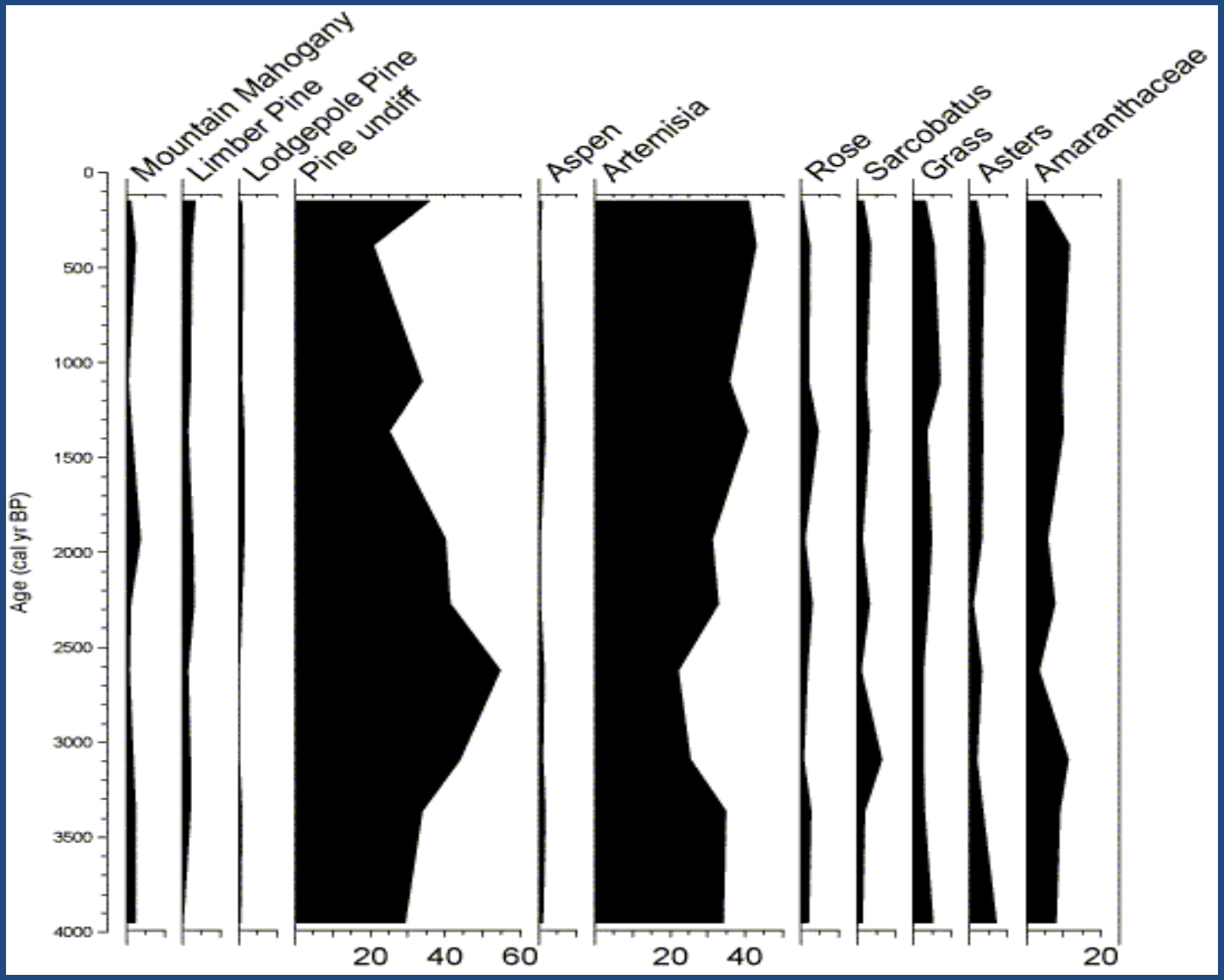
Pine forest range, Northwest Nevada

Pater Noster series of lakes
Coring Lake: 9 meters deep

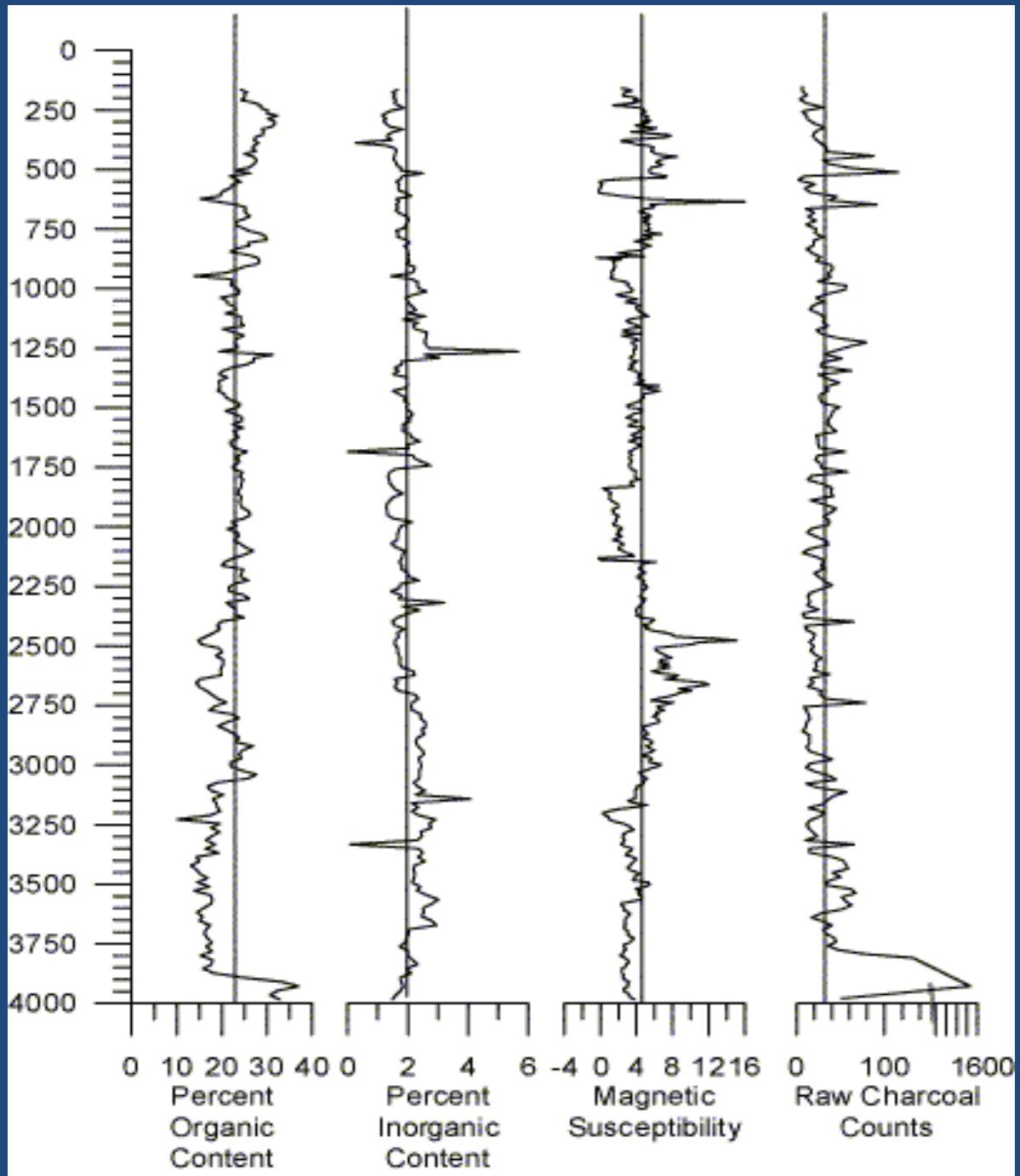


Conedera et al. 2009 QSR

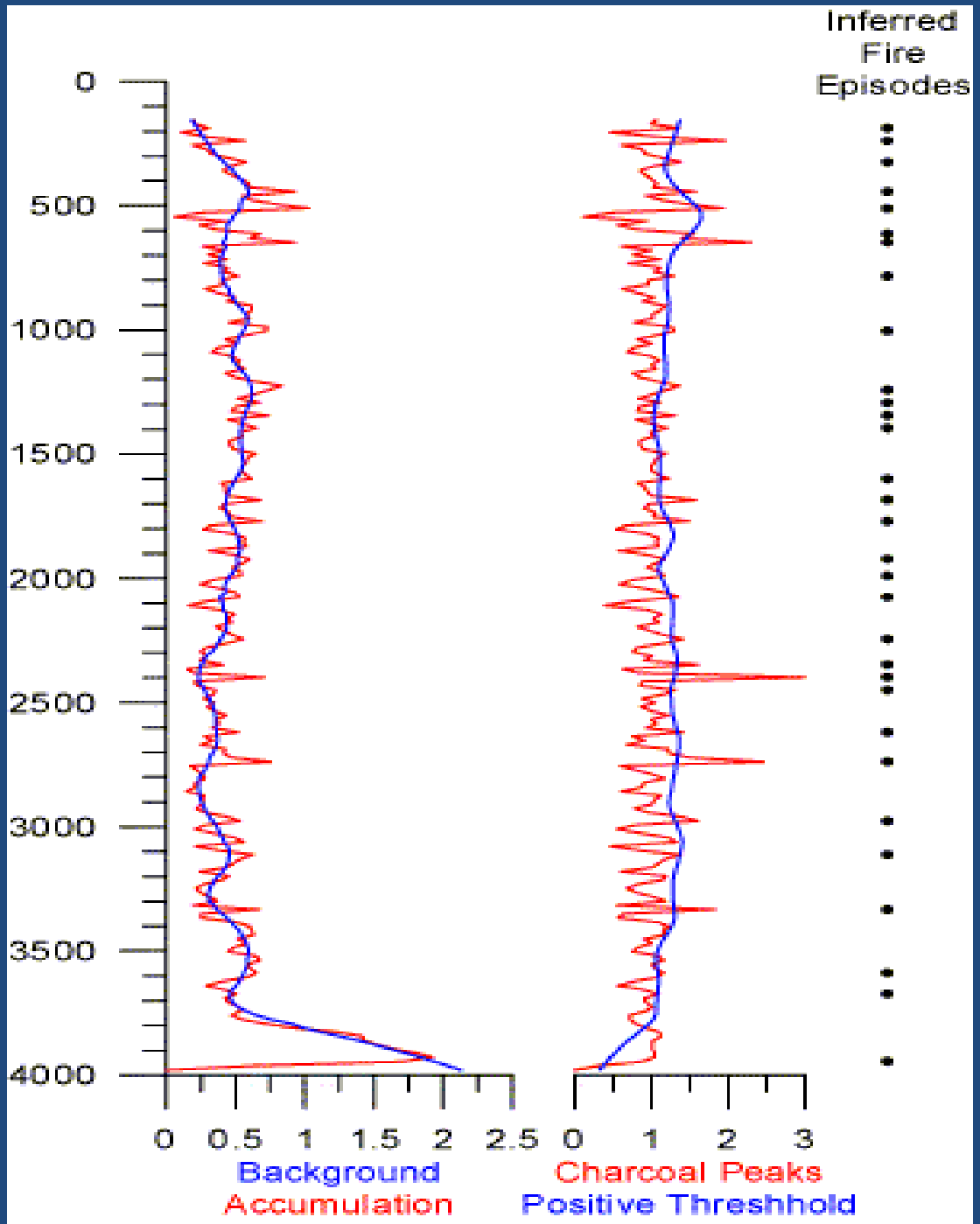
Vegetation History



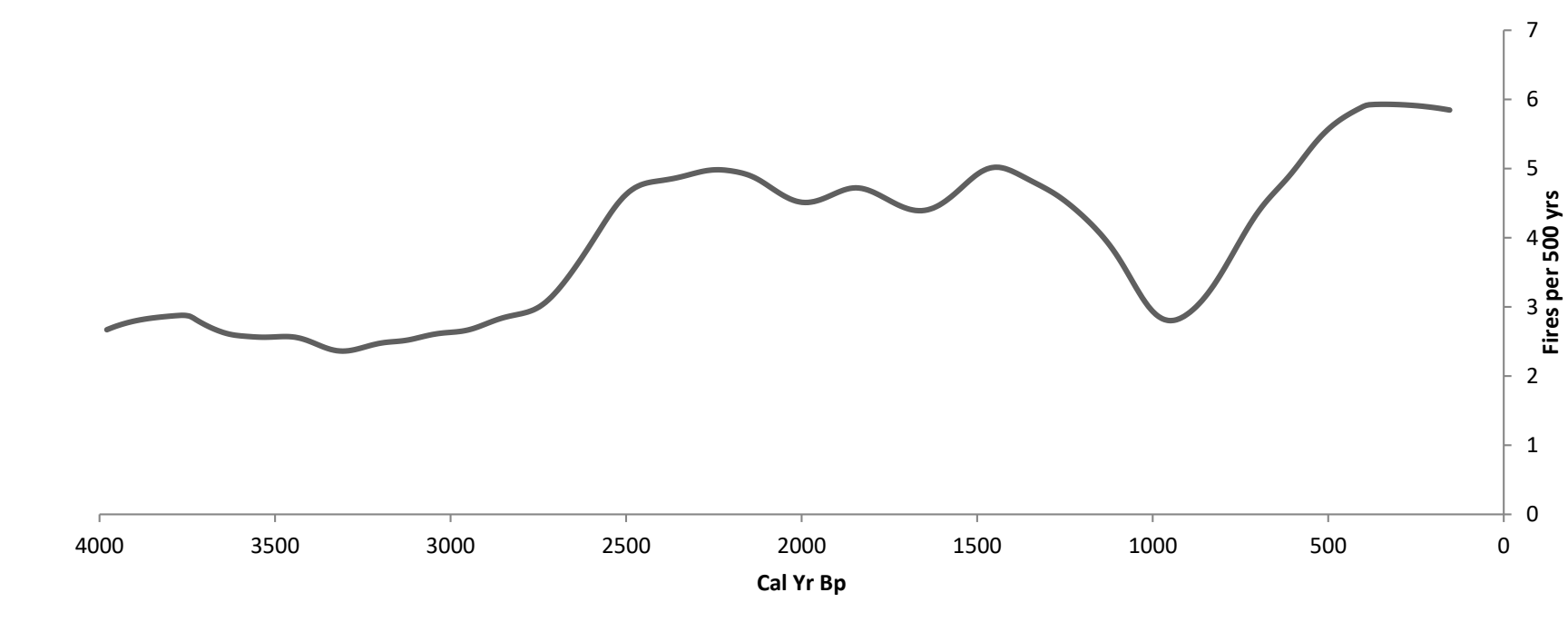
Raw Data


0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
3500
3750
4000
0 10 20 30 40
Percent Organic Content
0 2 4 6
Percent Inorganic Content
-4 0 4 8 12 16
Magnetic Susceptibility
0 100 1600
Raw Charcoal Counts

Charcoal "Peak" Data



Fire Frequency



Discussion

- Lake likely dry prior to 4,000 cal yr BP; Lake reformed during period of increasing moisture in Rockies and Great Basin.
- Long term fire frequency seems to interact with vegetation composition, particularly pine abundance.
- Results show variation in fire frequency, with modern fire return interval of ~ 83 yrs.

What's Next?

- Potential for Dendrology study in nearby limber pine forest.
- Target detailed pollen sampling to randomly selected fires, hoping to find evidence of specific fires on vegetation composition.

Research Questions

- 1. What is the historic range of variability of fire in the Pine Forest Range?

- 2. How have changes in vegetation interacted with fire regimes?

Conclusions

- Historic range of variability (last 4,000 years) has been 2.5-6 fires/ 500 yrs.
- Average fire return interval over entire record:

  -125 yrs ± 25 yrs
- Long term changes in vegetation show:
  - Relatively stable vegetation composition over past 4,000 yrs.
  - Vegetation appears to respond to long term changes in fire frequency.
  - More detailed sampling approach needed to address specific impacts of fire episodes.

Acknowledgements

- Dr. Tom Minckley
- Dr. Bryan Shuman-Furnace and Geotech

- Wyoming Nasa Space Grant Consortium