NATIONAL PARK SERVICE COOPERATIVE AGREEMENT NUMBER*: CA 1200-99-007*

Summary of Statistical Consulting Activities Under

Ken Gerow, July 25, 2008

The agreement was initiated in Sep 2003, and ran until July of this year (with an extension from the original end-date of 2006). During that time, I engaged in principally two types of activities: one-on-one consultation and collaboration with individual NPS fire ecologists (and their colleagues) and teaching statistical workshops in Fort Collin, for the NPS Fire Ecology Program.

Over the five years of this project, I engaged in consultations on approximately 50 occasions. Many of the one-one-one consultations were relatively short (several hours over several days): a few email exchanges, perhaps a short document for me to read and/or some data to take a look at, and, often a phone conversation to go over the lot. A few were a more in-depth. I didn't keep track of many of the brief interactions. I found records (files sent to me, or emails that I kept) for a dozen; they are listed for reference at the end of this report.

Some of that work inspired creation of notes that I shared (usually through Kara); an example on Pre-Post comparisons is included with this report as an attachment.

I conducted two workshops in Fort Collins directed at NPS fire ecologists. The first (Spring 2004) was mostly comprised of lectures and discussion (they were great at engaging and asking questions!) on the topics listed in the **Statistical Foundations for FEAT** syllabus (last page of this document).Two colleagues from the University of Wyoming (David McDonald and Richard Anderson-Sprecher) assisted me during two of the days when folks were mostly working on data analysis assignments (i.e. "homework") associated with workshop.

The workshop was backed up with an interactive e-book of statistical tools and notes that I prepared (said preparation was not solely for this workshop; the e-materials are part of an ever-growing collection that I use in my teaching and consulting more broadly).

The second workshop (September 2006) was directed more to working directly with fire ecologists on their own data. It was a chance for them to engage with statistical analyses with other fire ecologists to bounce ideas off of, as well as to seek assistance from me. I did some formal lecture/discussions on an as-needed basis: when I saw statistical issues coming up in several different data sets, I would launch on a formal session, for those interested in the issue at hand. The second workshop was much less structured; a dance between them and me.

Finally, I visited with Kara Paintner (NPS Key Official) two to three times per year (sometimes by phone, sometimes in Fort Collins) to keep in touch with current needs and to plan workshops.

Consults for which I have a record of some sort

Eric Miller	Feb ‘04
Julie Crawford	Mar ‘04
Jen Hooke, Monica Buhler	Sep ‘04
Dan Swanson	Apr ‘05
Nathan Williamson	Apr ‘05
Jennifer Gibson	Sep ‘06
Perry Grissom	Sep ‘06
Andy Thorstensen	Sep ‘06
Deanna Boensch	Sep ‘06
Scott Weyenberg	Oct ’06, Jan ’07, and other brief occasions
Larry Weddle	Oct. ’06 (several exchanges, ms read)
Lisa McInnis	April ’05, Jan ‘08

Statistical Foundations for FEAT

In this short course we will study conceptual foundations for statistical inference, with a specific focus on techniques that would be most relevant in NPS Fire Ecology work. Course material will be based on an interactive e-book (written by K. Gerow) that features a hands on approach to understanding pedagogical elements and effective use of research tools (and provides certain research tools with an eye to filling gaps in standard statistics packages). We will focus our attention on the following areas:

- Different types of data (discrete, continuous, and ordinal).
- Statistical Concepts
    - Measures of central tendency and dispersion.
    - Standard Deviation versus Standard Error
    - Confidence intervals.
- Normal versus non-normal data.
- Data Review
    - Outliers
    - Identify biases
    - Identify constancy
- Compare and contrast populations
    - t-test
    - F-test
    - mean separation: SNK, LSD, Duncans, etc.
    - Chi-square stats
    - Non-parametric tests
    - Contingency tables
    - Regression (simple and multiple) models for quantitative predictors.
- How to determine an adequate sample size (i.e. set precision or power goals and do the requisite calculations)
- Type I (false rejection of the null) and Type II (false retention of the null) error and their consequences.
- Why do we structure data and how.
- Importing data and conducting analysis: How to get FEAT data into a stat package for appropriate analysis
- Graphing data: data review and presenting results
- Brief overview of the need to use exploratory tools,
- Brief overview of diversity indices, multivariate analysis. (This will function as a lead into the next stats course)