



Range Scientists Should Calculate Effect Sizes, Not P-Values

Matthew J. Rinella and Jeremy J. James; USDA-ARS; Contact Author Email: matt.rinella@ars.usda.gov

Null hypothesis significance testing (NHST) is the default analytical procedure in range science, with over 90% of the recent articles in *Rangeland Ecology and Management* reporting some kind of NHST result (e.g. P-value, LSD). Unfortunately, NHST is less useful than its ubiquity implies. For one thing, P-values from NHST do not provide what range scientists need most; estimates of the magnitude and uncertainty of studied effects. And even if researchers can live with this shortcoming, P-values are wrought with other problems. Namely, P-values are hard to interpret, are regularly misinterpreted, and are not very informative even when they are interpreted correctly. In this paper, we reanalyze four datasets (including two of our own) from the range science literature to illustrate problems with P-values. Through our reanalysis, we build the case for interval estimates (i.e. confidence intervals and credibility intervals) as preferable alternatives to P-values. Confidence and credibility intervals indicate effect sizes, and in comparison to P-values, provide a more complete, intuitively appealing depiction of what data do/do not indicate.

2009. 62nd Society for Range Management Annual Meeting. Paper No. 23-10.