March 12, 4 pm BSS 166
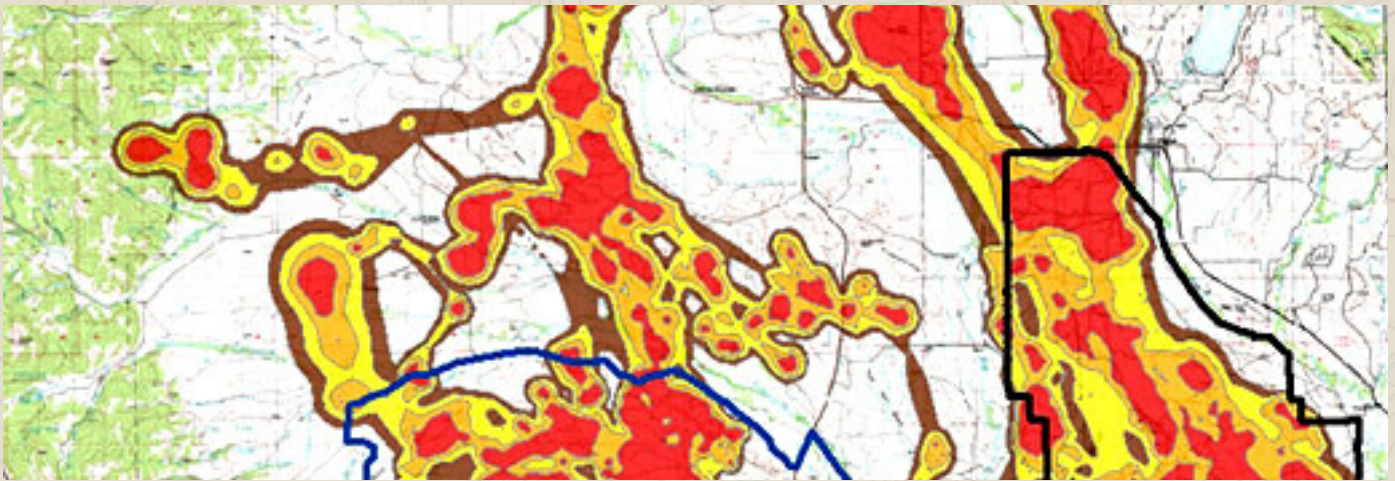
Dr. Trent McDonald

Senior Biometrician
WEST Inc., Environmental & Statistical Consultants

ADVANCES IN SPATIALLY BALANCED SAMPLING: THE **HIP** AND **BAS** METHODS

In this talk, I introduce environmental sampling design by describing three study components: spatial design ("where" sample sites are located), temporal design ("when" sample sites are visited), and site design ("what" is measured at sample sites and how). I then go on a "deep dive" into two recent algorithms. I describe mathematical and practical issues behind selecting Balanced Acceptance Samples (BAS) and Halton Iteratively Partitioned (HIP) samples. Both utilize randomized Halton sequences to select measurement locations. BAS operates on polygonal resources and throws "Halton darts" at the study area until enough locations are obtained. HIP operates on point resources and iteratively maps equal numbers of points to progressively smaller Halton boxes until only one appears in each, then selects boxes in their natural order. Modular arithmetic affords fast computation of the Halton sequence and hence both BAS and HIP samples. Audience members will add to their understanding of environmental monitoring design, the virtues of spatially balanced sampling, and modern methods for sampling space.