Ecological Restoration Brief

Monitoring More Using Photos – (Series)
Part I: Ground Cover Photography

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Monitoring is a little like restoration broccoli: we all know we should get more of it, but there always seem to be more important (and fun) things to do. My job with The Nature Conservancy is to help our preserve staff monitor their restoration and management activities. With preserves all over the state, I have a lot of different projects to work on. Because I can't be everywhere at once (I'm really looking forward to self-driving cars), I have tried to figure out fast and efficient monitoring techniques that still provide us with the data we need. For that reason, I'm increasingly relying on photo-based monitoring techniques. In this series of articles, I'll describe some techniques that I've used successfully, and another that I'm testing out.

**Wet Pine Savanna at Big Thicket Bogs and Pineland Preserve, Tyler County.
Photo credit: Charlotte Reemts**

Ground cover photography: Ground cover (the amount of ground covered by various plants, rocks, bare soil, etc.) is a useful measurement in many different contexts. Ground cover is often measured using quadrats and Daubenmire-style cover categories (variation on <5%, 5-25%, 25-50%, 50-75%, 75-100% cover). The problem with these categories is that they are very broad and that people are very bad at estimating cover (e.g., Andujar et al 2010).

One solution is to replace estimation with photos (Cagney et al 2011). We use a 0.5-m^2 quadrat frame (rectangular to match the dimensions of a standard photo) so that we always sample the same size area on the ground. Using a level to make sure that you hold the camera parallel to the ground, take a photo of your frame. The photos are then treated like plots in free software (SamplePoint): a certain number of pixels are "sampled" to measure

Creek Edge at Davis Mountains Preserve, Jeff Davis County. Photo credit: Charlotte Reemts

ground cover. I usually do 100 pixels in a grid (the default for the software), but you can use any number of pixels and distribute them randomly across the photo. I usually take 4 photos for any monitoring plots (distributed 2-5 m away from the plot center point in the four cardinal directions) to capture any variability in the plot.

I really like this technique because it is easy to teach to volunteers and the photos can be re-analyzed using different cover categories. Learning how to take photos is a little tricky and works best with cheaper point-and-shoot cameras. Taking photos on slopes is more challenging, because you need to hold the camera parallel to the ground. Analyzing the photos takes about as long as visually estimating cover in the field does, and it is admittedly a little tedious. Still, field time is precious and the photo analysis can be done at any time that I am in the office.

If you have any questions about using this technique, you can contact me at creemts@tnc.org.

Coastal Grassland at Mad Island Marsh Preserve, Matagorda County. Photo credit: Volunteer

References:

Andujar, D., A. Ribeiro, et al. (2010). "An assessment of the accuracy and consistency of human perception of weed cover." Weed Research, **50**: 638:647.

Cagney, J., S.E. Cox, et al. (2011). "Comparison of point intercept and image analysis for monitoring rangeland transects." Rangeland Ecology & Management **64**(3): 309-315.

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