Conservation Corner by Jim Nellessen

Conserving the Process – Lessons in Plant Ecology

We as plant lovers often focus our attentions on the individual species. Learning to identify and recognize them by their name(s) and their characteristic features. But all of these individual species assemble themselves into a wide variety of plant communities or associations. Learning where in the environment to find a particular species does become a part of our recognition of the species. This is the stuff of plant ecology. Each species has its own set of environmental tolerances and preferences and the species sort themselves out within various habitats based on those tolerances and preferences. These abiotic (or non-living) aspects of the environment are diverse and may consist of moisture availability, soil texture, soil nutrient and mineral content, daily amount of sunlight, daily and annual changes in temperature, and average wind intensity, just to name a few. Then the biotic (or living) components of the ecosystem add another layer of factors in the sorting out of plant communities. These factors can be competition with other plant species, effects from herbivores (whether they be mammals or insects), effects from disease causing organisms, and of course effects resulting from human activities.

This is all basic ecology, but things we may not always be thinking about while we admire the beauty of an individual wildflower. Various habitats are more or less diverse in quantities of plant species, based on the abiotic and biotic factors, and the carrying capacity of the environment. Carrying capacity means that a particular area can only sustain a certain number of species and/or a certain amount of biomass (i.e. a limited quantity of plant material). Limitations on moisture, nutrients, and space are classic examples. In restoring "damaged" ecosystems or habitats it helps to have a baseline natural habitat with which to compare.

Plant species are sometimes grouped into categories that best describe their behavior in the environment. For example, ruderals are generally early successional species that colonize recently disturbed ground (e.g. tumbleweed, *Salsola tragus*, and hiddenflower, *Cryptantha crassisepala*). Frequently, but not always, these species are annuals. Then there are competitors, species that compete well for certain resources, and can outlive many other species (e.g. creosote bush, *Larrea divericata*, and blue grama, *Bouteloua gracilis*). Often these are long-lived dominant members of plant communities. Finally, there are the stress tolerators, species that have developed tolerances for one or more "stressful" abiotic factors in the environment (e.g. greasewood, *Sarcobatus vermiculatus*, and iodine bush, *Allenrolfea occidentalis*, are species extra tolerant of saline soils). These are species that could potentially grow in a wider range of sites than they are actually found, but tend to be less competitive in "normal" sites, hence get pushed to the sidelines in sites not tolerated by most other species. These three categories are not set in stone, and a species may have characteristics of more than one category. Non-native species could fall into any of these three categories as well and although we often think of non-natives as ruderals, capable of moving easily into disturbed settings, I would categorize species such salt cedar (*Tamarix* spp.) and Canada thistle (*Cirsium canadense*) as competitors.

As we attempt to protect and conserve individual plant species or particular plant communities we need to keep in mind all of these larger ecological factors that are constantly molding and transforming ecosystems. In other words, we want to also conserve the processes. In relatively

undisturbed natural habitats this may mean to leave things as they are, keeping to a minimum our manipulations (take only photos and leave nothing behind). In places already substantially altered by human activities (and/or the complete takeover of non-natives), this can mean initial major manipulations to restore an area to natural conditions, but it can also mean not to over-manipulate a site. Over-manipulation could set a site onto some other undesired trajectory. This is where the concept of relay floristics comes into play. The species that are initiated onto a site, whether one is talking about natural plant succession, or manipulated succession via human influence, play a significant role in the species that follow. Just as in a relay race, the baton is passed from runner to runner, a initial suite of species is succeeded by a second suite of species, and so forth as succession proceeds. We must also keep in mind that nature is going to take her own course and may not follow the path that we envision her to. After all, we humans are also a part of the system, we do not stand outside of it (as sometimes we tend to think). We are fully embedded into the system. This is why sometimes our conservation and restoration efforts seek to maintain a plant community based on a historical point in time. This point in time could be 1000 or more years ago, it could be the 1600's, the 1700's, the 1800's, or even the early 1900's. As time moves forward, the perspective of individual researchers and restorationists will change. Unfortunately, nature and time are not static, but in a constant state of flux (sometimes slow in our eyes). Plant communities, ecosystems, and time *will move forward*. These have been more ramblings of a plant ecologist.