CNPS GUIDELINES FOR LANDSCAPING TO PROTECT NATIVE VEGETATION FROM GENETIC DEGRADATION

"Genetic pollution from non-native ecotypes of native plants has the potential to be almost as damaging as noxious weeds to the natural heritage of California…" -Truman Young, UC Davis[1]

Purpose: to protect the remaining natural stands of California's native vegetation from genetic degradation.

Introduction: Ecological landscaping, or restoration, is an emerging science. An important aspect is proper matching of genotypes to the environment to be restored. Oftentimes the designation of "native" is used in a broad manner to cover large areas. However, fine-scale genetic differentiation can occur in response to both biotic and abiotic factors in the environment, which can change quickly across a given landscape. Abiotic factors include climate, elevation, and aspect. When non-local populations of a species are introduced into a given environment, they may not establish successfully. For example, "native" antelope bitterbrush (*Purshia tridentata* 'Lassen') promoted by the Soil Conservation Service to restore depleted rangelands, burned areas, mined lands, and other disturbed sites in the western US, originated from a single strain from the Lassen area of California (Knapp and Dyer 1998). However, it was found that although the 'Lassen' bitterbrush often does establish well in many areas, it commonly experiences a decline in vigor before maturity (S. Monsen, USDA Forest Service Shrub Sciences Laboratory, Provo UT, pers. comm. in Knapp and Dyer 1998).

When we introduce non-local genes into an area through horticulture or restoration, the genetic integrity of surrounding native populations may be affected. According to Millar and Libby (1989), "The genetic nature of introduced stock can profoundly influence the behavior of the individuals, which in turn may affect the dynamics of the entire community and disrupt or alter the course of co-evolution within the community".

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[1] From: *"What is a Native Plant?"* in Growing Points, Dept. of Environmental Horticulture, UC Davis newsletter, Vol. 5:2 pg. 2. Spring 2001. Dr. Young is an Associate Professor and Restoration Ecologist in the Department.

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THE GUIDELINES:

*Ecological/Revegetation Landscaping**(see also next page)*

When landscaping for ecological purposes (habitat restoration, mitigation, revegetation, etc.) **first encourage natural revegetation of local ecotypes of native taxa by actively managing against weeds and exotics.**

If natural revegetation from surrounding areas or the native soil seedbank is inadequate, actively assist revegetation by planting seeds or plants grown from seeds, cuttings or divisions **collected locally**. What follows is a hierarchical list of recommended collection sites with the most desirable listed first:

1. From the project site.
2. From adjacent or nearby sites, such as from the same watershed at the same approximate elevation and slope aspect as the project site.

*Erosion Control Landscaping**(see also next page)*

When landscaping for erosion control in or near natural areas, the following practices are recommended with the most desirable listed first:

1. To provide immediate protection and allow gradual re-colonization by local ecotypes,
    a. Use biodegradable erosion control blankets made of 100% natural materials or seedless hydromulch or straw.
    b. Use sterile or non-persistent plants at low planting densities:
        i. As a nurse crop for local natives
        ii. To avoid cross-pollination with native vegetation
        iii. And to preclude migration of non-natives into adjacent natural areas.
2. Sow or plant local ecotypes of native taxa (see above).

Horticultural Landscaping

When landscaping for ornamental purposes and **if naturally occurring native vegetation exists on, close to, or downstream from the project site**, the following cautions are recommended:

1. Prevent irrigation runoff and fertilizer & pesticide overspray into native vegetation.
2. Avoid planting any taxa that are invasive.
3. Avoid planting any taxa that are likely to cross-pollinate wild natives growing nearby. Some examples of promiscuous cross-pollinators include *Ceanothus, Arctostaphylos, Quercus, Mimulus,* and *Erysimum*.
4. Avoid vegetation management practices that adversely impact local native vegetation (ex. Timing of brush clearance or pruning).
5. If you wish to landscape with a taxon that grows locally, use plant material propagated from those wild populations (check your local native plant nursery or CNPS Chapter for availability).
6. Avoid landscaping with cultivars of taxa that grow locally, since their genetic make-up may be unknown, non-local or from multiple, wide-ranging populations. Cultivars of locally-occurring taxa should be avoided unless it is absolutely certain they originated locally.

NOTE: *It is understood that these guidelines are of special importance in the "urban interface": areas where natural vegetation and man-made landscapes come into close contact. It is not the intent of these working guidelines to add unnecessary constraints or to discourage the planting of a broad selection of natives where it is very unlikely that their presence would have any effect upon rather distant native plant taxa or habitat. The intent of these guidelines is to instruct and provide guidance, utilizing concepts of conservation biology and genetics, in areas where landscapes or potential landscapes are very close to native habitat.*

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***SPECIAL CONSIDERATIONS** (Please also see Resources section below):*

- *There may be situations where additional botanical consultation will be necessary to determine appropriate practices (e.g. unique floristic areas containing high endemism or special edaphic features). In areas where rare and endangered taxa occur or where there are significant plant occurrences, all revegetation activities should be planned and executed with caution and the greatest respect for the ecological fragility of these areas.*

- *All revegetation activities should have adequate advance preparation. Advance planning is especially important for activities that involve seed/propagule collection and propagation.*

- *Wherever possible, the native topsoil and seedbank should be preserved.*

- *In some cases, evaluation of existing features such as native seed bank or abundance of exotic species may dictate a more passive planting approach where the area is managed to remove exotics and then allowed to revegetate on its own via a natural influx of propagules from adjacent areas.*

- *For erosion control landscaping, various other CNPS Policies may also be appropriate material to consult, such as the CNPS Statement of Policy on Seeding After Wildfire (s ee*www.cnps.org *for a complete list of policies).*

Resources

California Native Plant Society state office (916) 447-2677.
Website: www.cnps.org
Local chapters of the California Native Plant Society.
Local and regional herbaria and botanic gardens.
Local, regional and state floras.

Glossary

abiotic factors: the non-living physical and chemical factors in an environment that affect ecological interactions (ex. light availability, moisture availability, temperature, pH, etc.)

biotic factors: all living organisms and their effects, both direct and indirect, on other living things (ex. Predator-prey relationships, poisonous plants, herbivores, etc.)

close: Adjacent or within pollen or seed dispersal range.

cultivar: A cultivated variety, often propagated vegetatively and often of unknown lineage. (e.g. Ceanothus 'Julia Phelps' or Populus fremontii 'Nevada', etc.)

ecotype: A genetic subdivision of a taxon with distinct physiological or morphological characteristics.

floristic region: See *The Jepson Manual* (Hickman 1993)

genetic degradation: deleterious change in a native taxon's gene pool due to addition of non-local genes. The gene source can be plants of --

a) the same genus or species, but a non-local Californian taxon, ecotype or cultivar;
b) the same genus, but a foreign taxon.

genotype: the internally coded, inheritable information (genetic make-up)carried by each living organism.

local natives: native taxa occurring naturally on a site.

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non-persisting: a plant that will disappear from the landscape in less than three years without affecting the native vegetation or seed bank.

phenotype: the visible characteristics of an organism.
seed bank: the seeds that are present in, or on, the soil at the site.

sterile: incapable of successful sexual reproduction; infertile.

taxon: a scientifically named organism (e.g. Nassella pulchra, Oenothera deltoides var. howellii, Lyonothamnus floribundus ssp. asplendifolius, etc.)

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