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A Guide to Selecting Existing Vegetation for Low-energy Landscapes[1]

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Commonly, Florida homeowners overlook the beauty and usefulness of the natural landscape. Each year thousands of people move to Florida and transform a home lot into an exotic garden. The transformation is not only expensive to implement, but a great amount of energy is expended in maintenance. Additionally, the beauty of the natural landscape is marred.

The benefits from trees and other native vegetation are not limited to rural areas. Their importance in urban areas is recognized today more than ever. Among other benefits, they provide esthetic settings, cooling shade, and protection from wind, dust, and noise. Landscaping with plants that would grow naturally without energy subsidy requires a minimum of supplemental care. This practice conserves energy by limiting the need for pesticides, fertilizers and water, all of which require fossil fuels for processing and delivery. It also helps protect the balance of natural systems and living organisms that depend on a natural environment.

Developers and builders are increasingly aware of protecting and using much of the natural beauty of the landscape during the development and building process. In many instances, using existing vegetation has increased the value of the site, reduced initial landscaping costs, and contributed to low-energy and low-maintenance landscaping concepts.

In other instances however, homeowners and developers have found that many native species decline and perish, within a few years, regardless of noble attempts to select and protect the specimen native plants during construction. Under these conditions, the owners and the builders have found the trees and associated vegetation to be liabilities. Trees that appeared to have potential in contributing to the site have, in fact, become unsightly, unhealthy, and hazardous. All efforts to increase the site value, reduce landscaping costs and energy consumption are offset by the high costs of tree removal and other property damages directly related to the existing native vegetation.

Leaving too many trees around buildings contributes to mildew, mold, and moisture problems inside and outside the structure. Periodic drying by the sun and wind is important, especially in Florida. A structure densely shaded, year-round, may cause the owners to use more energy! Electric lights, which may not be needed otherwise during daylight hours, become essential. Maintenance costs on wooden structures may be higher. The use of air conditioning to reduce high levels of humidity created by surrounding vegetation may become more prevalent. All of these energy-consumptive activities may be related to the lack of periodic drying by the sun and wind.

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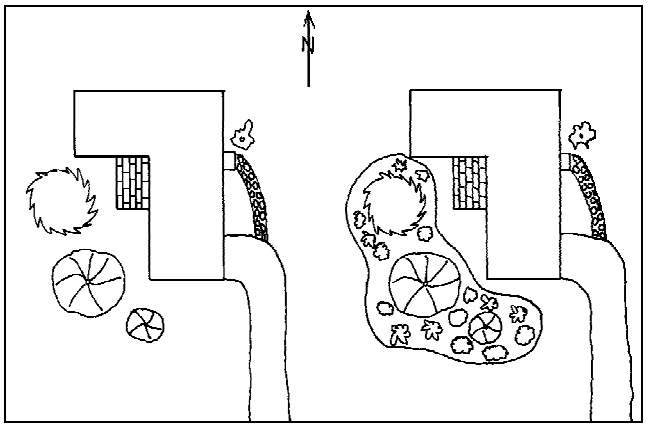

Figure 1. The natural area in the landscape on the right maintains itself to a large degree on the energy it captures and recycles.

Existing vegetation can be helpful to the low-energy, low-maintenance landscaping concept. It may also be harmful and energy consumptive. The key, then, is to use the information that is currently available to take optimum advantage of the benefits that may be derived from the natural communities on each site.

TREES IN A NATURAL SETTING

Trees and associated vegetation that have grown and developed in a native community are quite different from trees of the same species that developed in the open. The mature forest tree is an outstanding example of the interaction between the hereditary characteristics of an organism and its environment. The total environment of the tree is a complex integration of numerous interrelated physical and biological factors.

Competition for sunlight, nutrients, water, and space between individuals of the same species and among different species, plays a large part in the physical appearance of a tree in its natural setting. When released form this competition, or when the elements of the competition change, as would be expected during construction and development, an individual tree may respond in an entirely different way from what one might expect. Growth rates may increase and the tree crowns may exhibit unexpected branching habits. The root system, which supported the tree in its natural setting, may no longer be adequate for anchorage; finally, the increased amount of sunlight may have harmful effects on some species. Along coastal areas changes in air currents may also have positive or negative affects on the native species.

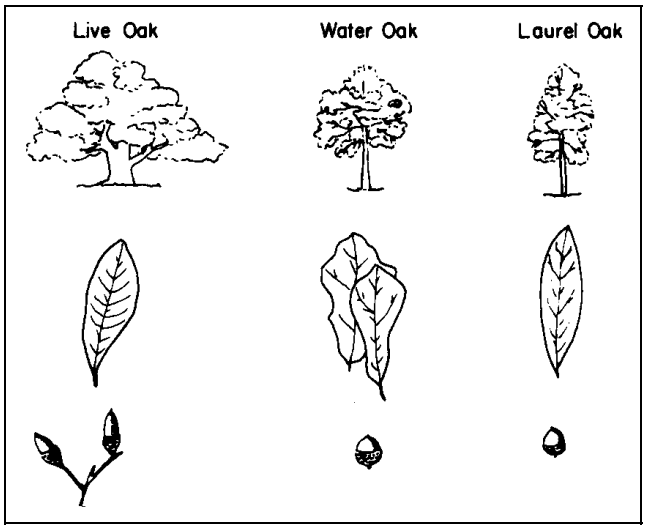

Figure 2. Identifiable traits of live oak, water oak, and laurel oak. If the choice exists, live oak would be the best species to leave on the building site.

The impact of a change in environment seldom can be related directly to a single measurable factor. Complex and subtle interrelationships between the various factors of the environment usually preclude any such simple cause-and-effect answer. But it is useful to know how, in general, a plant may respond to various factors.

Because of the complexity of the total environment and the difficulty with which some factors are measured, complete and exact quantification of the environment is practically impossible. While there are exceptions to every rule, the following guidelines should be considered when selecting trees to be left on new building sites.

1. Leave as Many Undisturbed Natural Areas as You Can.

The chances of your trees surviving will be much higher. A natural area also contributes to a low maintenance, energy conservation landscape. It not only maintains itself on the energy it captures and recycles, but it also provides energy for a complex association of interacting, inter-related living organisms (Figure 1). Choosing the energy efficiency and productivity of a native landscape is not only practical but it requires no sacrifice of beauty and diversity, as is often suggested. A setting of native trees and shrubs grown formally can look very neat and appealing without demanding care. A well designed native landscape, once established, will require limited maintenance and look the way it is naturally supposed to look. A wide range of color,

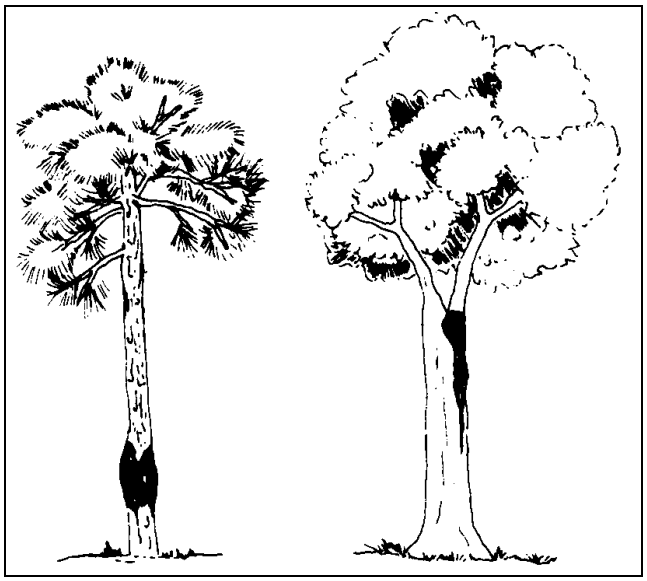

Figure 3. Fusiform rust galls on pines and heartrot symptoms on hardwoods indicate potential problem trees.

plant form and foliage texture is available to the natural gardener who takes the initiative to learn about native plants.

2. If You Select Individual Trees, Select Those That Live Longest.

All trees eventually die, but some die sooner than others. In the South, live oak (*Quercus virginiana* Mill.) generally lives longer than most other species. Live oaks grow on a wide variety of soils, and are present in nearly every habitat throughout the state. It is hardy, strong, and while many diseases and insects may attack the tree, it nearly always seems to survive. Construction activities appear to have only minor effects on the growth or survival. Young live oaks, when released from the competition of the native surrounding, grow very rapidly. Nutrients from normal turf maintenance generally promotes additional growth. If, per change, the tops are killed or damaged severely during construction, live oak will sprout abundantly from the root collar and roots. Every root that is near the ground surface ends up with three or four sprouts. These sprouts may be protected to result in a small community of live oaks that will grow quickly because of the already established root system. Those stems that are less desirable may be cut to favor the more vigorous sprouts which may soon develop into a well formed tree. When all sprouts are cut or mowed, new ones appear in even greater numbers. The total effect is that of a shrubby ground cover.

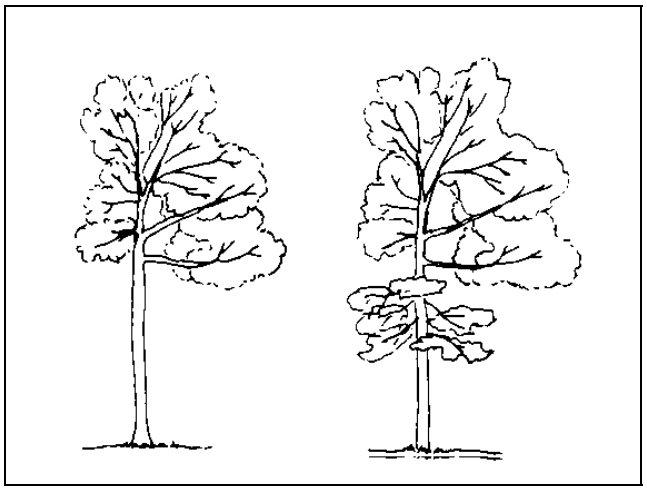

Figure 4. Turkey oak (*Quercus laevis* Walter) develops foliage along the trunk when it is released from competition of its native surroundings.

Mature laurel oaks and water oaks should not be selected. Because of their short lives, relative to the life of a building, the smart owner would not allow these species to become overmature, and would never select a mature specimen to leave on the building site. Besides living only 50-60 years, laurel, water and willow oaks are the three most susceptible alternate hosts for fusiform rust of southern pines. The alternate stage of this fungus does not seriously harm these oak hosts; however, their presence may contribute to the decline of nearby pines (Figure 2).

3. Don't leave Unhealthy Trees.

Fusiform rust is a common disease on southern pines in north Florida. Occurrence of the disease may be recognized by gall formations on the limbs and trunk (Figure 3). Generally, limb galls will pose no major problems, unless the gall is within one foot of the main stem. If the limb gall is less than one foot from the main stem, the chance is great that the disease will move into the trunk. Limb galls may be pruned to arrest the individual infection areas, but little can be done for trunk galls. Large galls on the trunk may weaken or even kill the tree. Even if the trunk-infested trees survive the stress of construction activities, they are susceptible to breakage.

4. Select Trees That Have Good Form, or at Least Those That Have Potential.

The symmetry of the crown depends greatly upon the evenness of exposure to light. Most trees, if heavily shaded on one side, will tend to grow poorly on that side. Live oak will respond favorably to a

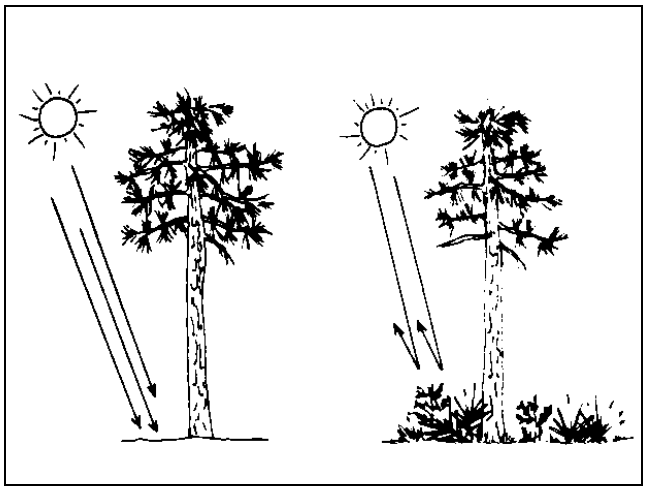

Figure 5. A combination of effects resulting from litter and duff removal activities may prove lethal to many species.

release from shade and generally will develop a symmetrical, full crown. Turkey oak, on the other hand, tends to develop new lateral branches along the majority of the trunk. The crown form exhibited by a mature turkey or southern red oak at the time of selection is the best form it will ever exhibit. Don't expect these species to respond by developing a symmetrical crown (Figure 4).

5. Leave as Much Natural Duff as Possible Around the Base of Individual Trees.

Removal of native duff and litter not only disturbs the natural nutrient cycling which is important for tree growth and survival, but the activity itself may severely damage roots that are near the ground surface. Additionally, litter removal contributes to a rise in the temperature of exposed soil, which may have lethal effects on the tree (Figure 5). Very little research has been conducted on this topic, but it is believed that soil temperatures above 95°F retards root growth and development of loblolly pine.

On some sandy sites in Florida, soils that were partially shaded by native vegetation have reached temperatures exceeding 165°F. It is highly probable that soils exposed, due to duff and litter removal, may reach temperatures that are lethal to many species.

6. Think About How the Construction Disturbances May Modify Air Currents.

This is particularly important along the coast where salt spray contributes heavily to the species composition and form of the native plant community. In many maritime communities the live oak is the dominant species, intermingled with laurel oak. Although more sale tolerant than other species, the "pruned" umbrella form of the live oak results from salt-spray dieback of young tender growth that is not protected by the mature, salt-tolerant foliage. The umbrella-like form protects the less vigorous laurel oak from being killed by salt spray (Figure 6).

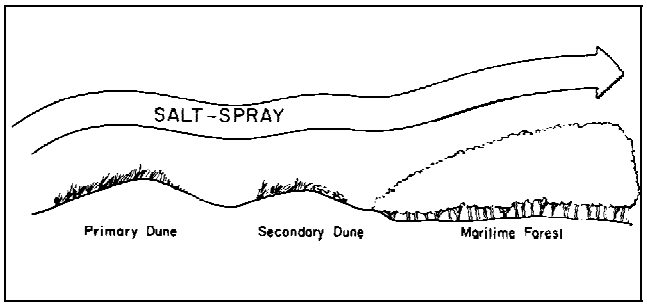

Figure 6. Salt concentrations and wind patterns play a large role in the species composition and form of coastal communities.

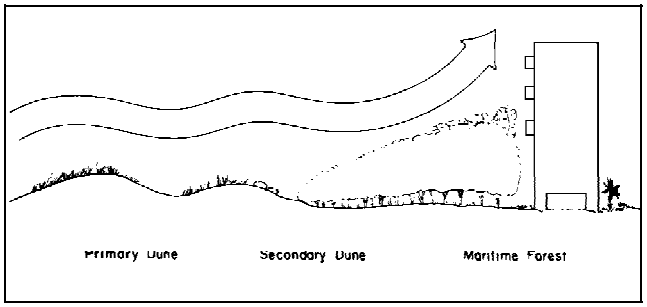

Figure 7. Crown forms altered as a result of modified salt-spray patterns.

Many developers have recognized the beauty of the maritime community, and attempts have been made to incorporate the communities into the development design. In one coastal development project, high rise condominiums were built behind the sloping canopy of the maritime forest. The presence of the building modified the salt-spray patterns. As a result, the "salt-pruned" umbrella form was changed. Rapid vertical growth obstructed the ocean view of the first floor occupants (Figure 7). The sudden growth of the live oak branches, stimulated by normal lawn maintenance activities and the modified salt-spray pattern, has caused considerable energy-consumptive maintenance problems.

7. Constructing a Concrete or Brick Tree Well to Protect Individual Trees is Risky and Costly.

The wells also require energy consumptive maintenance as long as they exist. In many cases it is necessary to construct tree-wells to protect and save individual trees from modifications in grade and drainage. Permanent wells, constructed of concrete or brick, will always consume time and energy in maintenance.

Tree wells can be constructed of non-treated, naturally durable wood that will last for several years, and at the same time eventually decrease the maintenance that would be required for permanent wells. During the initial stages the maintenance requirements would be similar to the concrete or brick wells. Over time, however, the slow decay of the wooden well will encourage a gradual fill. The gradual fill, which in many cases would imitate natural processes, allows the tree to adjust to the changing environment (Figure 8). The decaying organic matter would increase the moisture retention and nutrient-holding capacities of the soil around the tree. Eventually the well would fill to grade level, eliminating the need for time and energy consumptive maintenance.

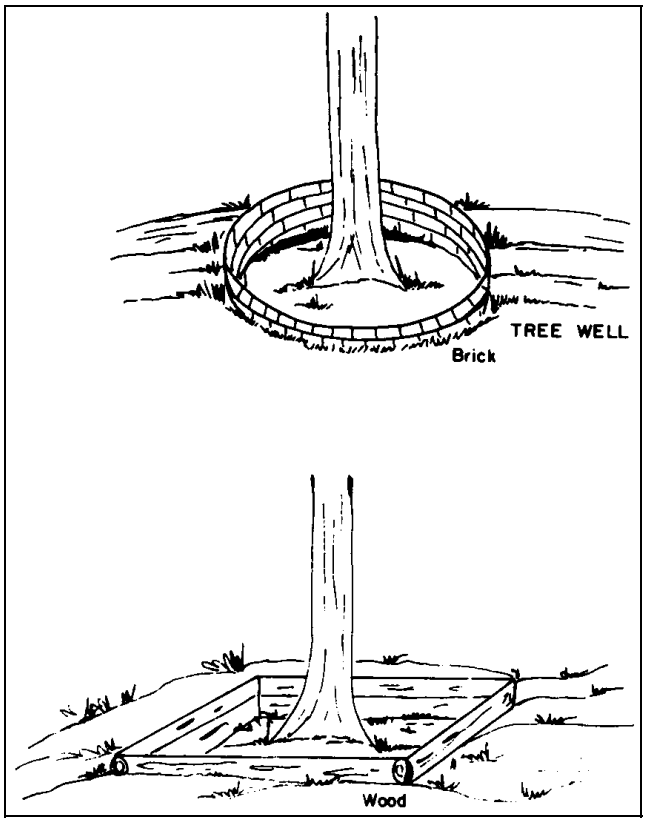

Figure 8. Over time, tree wells constructed from untreated wood will reduce maintenance and energy consumption.

SUMMARY

Landscaping with plants that would grow naturally without energy subsidy requires a minimum of supplemental care. This practice conserves energy by limiting the need for pesticides, fertilizers and water, all of which require fossil fuels for processing and delivery.

Existing vegetation can be helpful to the low-energy, low-maintenance landscaping concept. It may also be harmful and energy consumptive. The key is to use the information that is available to take advantage of the benefits that may be derived from the natural communities on each site. While the use of existing vegetation for low-energy landscaping may not be right for all sites, the concept should be evaluated before construction activities begin.

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