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Enviroscaping[1]

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HOME LANDSCAPING: HISTORICALLY

Historically, landscaping has played an important role in modifying the home environment. To survive, Native Americans and early settlers designed shelters that offered protection from the most severe conditions imaginable. Until the invention of mechanical heating and cooling systems, man was dependent upon his ability to change or modify his surroundings.

An instinct for survival may have been the driving force which taught settlers to use landscape materials to improve the effects of these harsh conditions. In southern territories, it was important to keep out the sun while encouraging cool breezes. Florida, with its moist, hot climate presented an especially difficult challenge for settlers. To encourage air flow, these early settlers designed very open homes and used trees and other landscape materials to channel tropical winds. This may explain why population centers first developed along coastal areas. These cooling coastal breezes offered a welcome relief from uncomfortably warm temperatures.

In colder climates, landscape materials were used to direct bitter winter winds. Houses were often built beneath a protective canopy of trees which provided shelter from the chilling effects of snow and rain. These early northern builders wanted to keep in the heat while fending off the cold. Small windows were carefully placed to encourage the warming effect of the sun. Choosing a good location was also important to survival. Areas which had a ready supply of mature trees and shrubs helped new communities to establish themselves more quickly. Early community planning very clearly showed colonial man's respect for nature and its forces.

LIVING IN FLORIDA: CLIMATE

Florida is the vacation capital of the U.S. providing a playground for 37 million tourists each year. The call of sandy white beaches, year round balmy breezes, and clear blue sunny days, keep visitors returning to the sunshine state. From late fall to early spring the consistently warm temperatures

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create an influx of winter visitors looking for their place in the sunshine state. Depending on the time of year, temperatures generated by the sunlight can be a mixed blessing. April to November can provide sunlight intensities which elevate air temperatures far above the human comfort zone.

Being a peninsular state, Florida is exposed to moist ocean breezes. Tropical air sweeping off of the Gulf of Mexico is heated by the sun resulting in a hot, humid climate. To further complicate high humidity levels, an average of 54 inches of rain falls per year. This moisture laden air, fluctuates little in temperature, with average annual temperatures ranging between 67-78 degrees. For Florida's permanent residents, this tropical climate is especially challenging to manage.

For much of the year and across most of Florida, winds provide a means of natural ventilation. Coastal areas depend on daily breezes for relief, but inland areas must depend on factors which direct and enhance modest wind flow.

In spite of these difficulties, Florida offers an enticing atmosphere without the wide temperature fluctuations or arid conditions that trouble many other states. From the hilly regions in the North to the tropical Keys, Florida provides many unique opportunities for using landscape materials to control the home environment.

Learning to control the effects of weather through landscaping can create a more comfortable home environment and actually reduce monthly utility bills, sometimes substantially.

Because of intense Florida temperatures, residents continually look for ways to keep out the heat and lower inside humidity. There are numerous effective planting methods that will limit the amount of heat or moisture which enters your home. Trees, shrubs, grasses and other ground covers can be highly effective in controlling these elements. To help you make your home more energy efficient, we will explore planting strategies that are specific to the hot humid climate of Florida.

As a homeowner, you should begin by making a list of specific problems you would like to correct. Does your house have particular windows which need to be shaded? Is humidity a problem around one side of your home? Maybe your back yard would be more usable if you encouraged wind movement. Is your home passively cooled? Houses that are passively cooled (no air conditioning) will require different landscape techniques than a home that uses air conditioning. You will need to ask yourself these questions so that your landscape design can be tailored to meet your specific needs.

We all know that we can't actually control the weather, but we can channel winds, cast shade, and reduce moisture near our homes. Modifying these forces creates more comfortable living conditions and can lower your utility costs as much as 30 percent.

ALTERING TEMPERATURES WITH SHADE

Research indicates that shade has a dramatic effect on ground temperatures. When shaded, ground temperatures were found to drop an average of 36 degrees in only 5 minutes. Studies have also shown that temperatures on a forest floor can be as much as 25 degrees cooler than those recorded at the tree tops. You can create similar effects in your home landscape with careful planning and design.

In Florida, shading for east and west windows and walls should be given top priority. During most of the cooling season, these surfaces receive about 50% more sunshine than those facing north and south. Observe which windows receive the most sun to determine the best place to plant shade trees.

When planning your design, keep in mind that trees planted close to the home are more effective at shading, than those planted a distance away. A tree planted 10 feet from the west wall, will shade an area four times longer than a tree planted 20 feet from that wall. The shape of a tree also influences the duration of the shade. Spreading, round and vase-shaped tree canopies will provide shade for the longest time.

Mature tree height should also be considered when selecting plants. In general, small or medium sized trees (26-30 feet) are preferred for shading sidewalls. If you select taller trees, they should be planted farther away from the home. Tall trees can be

a safety hazard when canopies begin to overhang the roof.

During the summer months, deciduous trees have a full canopy of leaves which provide shade. In the winter months, they drop their leaves allowing the warming effect of the sun through. In general, the best location for deciduous plants are on the south and southeast sides of your home. Northern Florida is known to have winters with temperatures well below freezing. To compensate for this more severe heating season, deciduous vines, shrubs and trees are good choices.

Shrubs are also useful for shading the home. When planted a few feet away from the house, they can provide extra shade and control humidity without obstructing air currents. If space is limited, trellised vines can be used to shade windows. They are useful since they can grow in more confined spaces than trees or shrubs. To provide shade along the east and west sides of the house evergreen vines are a good choice. To take advantage of the winter sun, deciduous vines, such as wisteria, should be planted on southern exposures.

Home comfort levels and energy costs can be dramatically affected by shade. Creative landscape planning with trees, shrubs and vines will help alter the climate outside your home and modify indoor temperatures.

Note: To keep air conditioning costs to a minimum, shade the outside condensing unit. Be careful to allow sufficient room for air to move around the condenser so that it can operate at peak efficiency.

CHANNELING WIND TO YOUR ADVANTAGE

Wind is perhaps the most talked about but least understood landscaping technique for saving energy. Managing breezes with landscaping is a very effective means of controlling indoor home temperatures, both winter and summer. By using trees, shrubs, vines and other vegetation, you can alter the direction of wind near your home. As a general rule, homes that use little or no air conditioning should direct air towards the house. Homes with air conditioning should place windbreaks to the south to control summer breezes.

Passively Cooled Homes

Cooling breezes are a precious commodity for Florida's passively cooled homes. Houses that use minimal or no air conditioning should concentrate on directing breezes toward windows and screened doors. To use these winds effectively, allow for cross ventilation. Operable windows should be positioned opposite each other on the north and south walls. Make certain that plants used for shade are far enough away from the house so that they don't restrict air flow. Low branching trees should be avoided (or the low branches removed) on the southeastern and or southwestern exposures because they interfere with motion.

Winter wind barriers on the north and northwest sides of the home can help to push breezes from the south back toward the house in the summer. Shrubs placed near the windows can also be effective in directing air into the house. Full evergreens with branching low to the ground, provide the greatest protection from chilling northern winds common to winter in north Florida.

Homes Designed for Mechanical Cooling

During Florida's long, hot summers, most residents find it impossible to stay cool without air conditioning. In order to keep these air conditioning costs to a minimum, outside air infiltration needs to be considered. Steady wind movement around the home during the cooling season may actually increase your energy costs by allowing warm, humid air into your home. This air enters around windows, doors and through any structural cracks. Plants can be used to slow and redirect this wind movement, helping you to keep your home cooler while you save energy.

Shrubs and trees should be positioned around the air conditioned home to steer the summer southern breezes away from the home. This practice is the opposite of what you would do for a passively cooled home. To determine where to place vegetation on your lot, observe a wind sock (or similar measure) over a period of several days in winter and in summer. Once prevailing winds are determined, landscape planning will be a breeze.

Shrubs can be used to slow wind movement and reduce the amount of warm air entering the home. The more dense and closed a shrub is, the more the wind is slowed. Mechanically cooled homes need reduced air movement to keep utility costs low. In contrast, passively cooled homes use landscape material to direct breezes into the home.

COOLING WITH GROUND COVERS

Heat waves rippling off of a sunbaked parking lot is a familiar sight during the summer. Paved surfaces absorb the sun's heat and radiate it back into the immediate environment. Research has determined that temperatures may be 15°F to 25°F hotter over asphalt or concrete. Paved areas also store heat, radiating warmth long after sundown. These surfaces around the home can contribute substantially to summertime heat loads. Planting ground covers around paved areas can help to reduce these temperatures.

Ground covers are low-growing plants which can be used to cover an area in the landscape. Turfgrass is undoubtedly the most commonly used ground cover. No other plant material can withstand as much foot traffic as turfgrass. While turf makes an excellent choice for recreational areas, it doesn't grow well in dense shade and is difficult to establish in extremely wet or dry areas. Evidence indicates that taller ground covers with their larger leaf surface, can provide even more cooling than shorter ground covers such as mowed grass. There are several alternative ground covers that adapt well to conditions unsuitable for turf. Lily turf (Liriope muscari) and mondo grass (Ophiopogon japonicus) are low maintenance ground covers which tolerate dense shade. If damp soils are a problem, day lillies are a good choice. For seaside plantings, consider beach sunflower. This plant is both highly salt and drought tolerant.

All plants are capable of modifying their environment through a process known as evaporative cooling. Plants release water through pores in their leaves. When warm winds pass over the leaf surface, surface water absorbs the heat. The warmed water then evaporates into the atmosphere, leaving behind a cooler environment. Because of lowered air temperatures around the home, air conditioning costs will be decreased.

In addition to saving time and energy, ground covers can provide a more beautiful and comfortable home environment. Through a profusion of color and texture, ground covers create interesting contrasts and provide an unifying element in a total landscape planting.

LOW ENERGY LANDSCAPE PRACTICES

To compliment their homes, most residents delight in having a lush landscape bordered by a carpet of green lawn. In the process of creating an attractive home landscape, homeowners often overuse fertilizers, pesticides and water. These practices result in accelerated plant growth and more frequent pruning, mowing, and general cleanup.

A healthy, attractive landscape can be created without resulting in excessive plant growth and with minimal pest control. To achieve a good quality landscape, you will need to follow a planned maintenance program. Moderate applications of fertilizer can improve the appearance and condition of plants, making them more disease and insect resistant. Excessive fertilization requires more human effort, contributes to ground water contamination and wastes valuable energy.

A plant's growth rate is also affected by the amount of water it receives. Excessive watering, coupled with high fertilization rates results in a rapid flush of growth and contributes to insect and disease problems. With Florida's limited potable water and mandatory water restrictions, wise irrigation practices will need to be implemented. Consider using micro irrigation and drought tolerant plant varieties where possible.

An increase in environmental awareness has caused many pesticides users to look for safer ways to manage disease and pests in the landscape. With moderate fertilizer and watering practices, you can reduce the need for frequent pesticide use. Besides the potential for ground water pollution associated with some pesticides, the manufacturing process requires large amounts of energy.

By carefully planning your landscape maintenance practices, energy can be conserved. Grass clippings are a valuable energy resource that many homeowners are throwing away. When mowing the lawn, simply let your grass clippings remain on the grass allowing them to decompose. Your lawn will recycle the clippings naturally, saving you time, money and energy. Filling plastic bags with grass clippings and other yard debris is hard work and wastes valuable space at landfills. When you leave clippings on the lawn, you will reduce these negative effects and recycle important nutrients for free. Each bag of grass clippings you throw away contains as much as 1/4 of a pound of organic nitrogen. Nitrogen is necessary to ensure healthy, attractive landscape plants. By using this free nitrogen you can decrease your fertilizer needs, saving the energy required to produce these products. Get in the habit of leaving your grass clippings where they fall. You will be rewarded with a green healthy lawn and more leisure time to enjoy it.

Energy can also be conserved by recycling yard wastes. Disposing of leaves, grass clippings and other garden refuse is often a problem for gardeners, particularly in an urban area. These garden and landscape byproducts can be turned into useful compost with little effort. Returning these organic materials to the land, perpetuates the natural biological cycle. Ecologically this is a sensible means of reusing organic wastes. A beautiful low maintenance landscape can be the result of good planning.

REFERENCES

Meerow, A. W. and R. J. Black. 1988. Landscaping to Conserve Energy for Central Florida. Florida Cooperative Extension Service Bulletin EES-37.

Meerow, A. W. and R. J. Black. 1988. Landscaping to Conserve Energy: Trees for Central Florida. Florida Cooperative Extension Service Bulletin EES-41.

Meerow, A. W. and R. J. Black. 1988. Landscaping to Conserve Energy: A guide to Microclimate Modification. Florida Cooperative Extension Service Bulletin EES-43.

Moffat, A. S. and M. Schuler. 1981. Landscape Design That Saves Energy. William Morrow and Company, New York, NY.