



Xeriscape North Carolina

Xeriscape is a proactive approach to curbing wasteful use of a valuable natural resource.

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What is Xeriscape?

The term Xeriscape comes from the Greek word xeros, meaning dry. The concept originated in Denver, Colorado, in the early 1980s.

Because of severe drought conditions, Denver had rationed water and prohibited irrigation of lawns and yards. As a result, vegetation in yards withered, and Denver landscapers began promoting what they called Xeriscape, a landscaping approach that uses small amounts of water but maintains a traditional look.

Since that time the Xeriscape concept has been adopted in many areas of the country experiencing drought or longterm dry conditions, and actual Xeriscape practices have evolved differently in various places.

Xeriscape is most widely used in the Southwest. In some desert-like parts of the county, it is interpreted literally as dry landscaping. In Tucson, Arizona, for instance, many homeowners have abandoned irrigated lawns for natural desert landscaping.

In California, Texas, and Florida the approach is more traditional, with an emphasis on more careful planning, efficient irrigation, and use of drought-tolerant plants rather than total elimination of irrigation. However, in parts of California suffering from long-term drought and water shortages, Xeriscaping is mandatory. Developers are required to submit Xeriscape plans before building permits are issued, and the plans are rated by a point system to determine if they are acceptable.

Some cities, such as Wichita, Kansas, with no water shortage, are encouraging homeowners to adopt Xeriscape principles as a resource conservation measure and as a way to be prepared when drought conditions and water shortages do occur.

In the Southeast, where the droughts of 1986, 1988, and 1998-99 made clear the limitations of local water supplies, Xeriscape is making its debut as water-sensible landscaping. Water districts serving Atlanta, for instance, are cooperating with builders, landscapers, and nurseries in a Water Wise Council that is encouraging Xeriscape through a variety of programs, demonstration projects, and publications.

Xeriscape programs are now active in nearly all 50 states.

What are the benefits of Xeriscape?

1. It saves water.

Studies in areas of the country severely affected by long-term drought conditions have shown that traditional landscaping and irrigation practices are often very wasteful. The California Department of Water Resources discovered that many residential landscapes were being overirrigated by as much as 20 to 40 percent. A study in Marin County, California, showed that landscape water use can be reduced by up to 54 percent without adverse effects simply by the use of more efficient landscaping and watering practices. In Novato, California, where consumers are being paid conservation incentives to convert to Xeriscaped lawns, the local water district estimates that water savings can be as much as 120 gallons per landscape per day in peak-use months.

Reducing peak water demand could extend the long-term capacity of our reservoir and water treatment facility. Because water providers must plan their water storage and water treatment facilities to meet peak demand, if we reduce peak demand we can delay costly expansion at the same time we accommodate new residents and businesses in our state. In the long term, delaying expansion of water facilities will produce significant savings for all consumers. In addition, if we cut our individual water use, we will save on our water bills, although the monthly savings will be fairly small.

2. It makes our yards less vulnerable to the ravages of drought and water shortages.

The droughts of 1986, 1988, and 1998-99 have reminded us that, while North Carolina normally has plenty of water, the state is subject to periodic dry periods and drought. If a prolonged dry spell or drought should produce water shortages in urban areas, outdoor use of water – including lawn watering – would have to be restricted. Xeriscaped yards would be less affected, or perhaps not affected at all, by water use restrictions because they make much more effective and efficient use of the water that is available.

3. It allows us to develop a high-quality, beautiful landscape using ecologically sound landscaping practices.

A well-planned, established landscape that fully incorporates the seven principles of Xeriscape requires little or no synthetic fertilizer or pesticide use. This not only creates a more compatible environment for outdoor activities but also eliminates the possibility that runoff from our yards and other landscaped areas might take toxic materials or nutrients to streams and rivers. In addition, if we are able to utilize clippings and leaves from our trees and shrubs for mulch, we can help reduce the volume of solid waste going to the city landfill.

How do I Xeriscape my yard?

1. Plan

Any landscaping effort should begin with a well-planned design. A landscape architect or designer can provide valuable help with this phase, but if you want to design your own Xeriscape, there are some publications that can guide you through the basic process. One free landscape design publication is Residential Landscaping (Publication AG-248) published by the North Carolina Agricultural Extension Service. This booklet discusses (1) developing a plot plan showing the boundaries and physical features that will affect your design, (2) conducting a site analysis to determine environmental features such as soil type, seasonal sun directions, shade, and wind direction, and (3) locating and developing use areas, such as parking, storage, play and entertainment areas, to accommodate specific activities. In planning your landscape, you may also want to consider using water harvesting techniques, such as old-fashioned rain barrels.

To incorporate Xeriscape concepts into your design, some additional thought is needed. The information you generate by drawing a plot plan and doing a site analysis should be integrated to identify microclimates in your yard. Microclimates are created by differing physical and environmental conditions within the landscape. Moisture, sun, shade, air movement, and heat all contribute to create zones that have varying water requirements.

Very Low Water-Use Zones:

Very low water zones are of two kinds. Decks and paved areas require no water. These areas help provide recreational and living space and are very practical. However, for paved areas, you should consider using permeable materials such as bricks or paving stones rather than concrete or asphalt to encourage rain to soak into the ground rather than run off.

Protected areas where the exposure and shade conditions work together to inhibit evaporation are also very low water-use zones. In these areas, irrigation is needed only to establish new plants. Existing, well-established vegetation in these zones should be retained and new vegetation should be selected on the basis of minimal water use. Because very low water zones require little or no irrigation once they're established, they offer the greatest potential for saving water. Such shaded areas not only reduce water demand, they can also lower indoor temperatures and reduce summer cooling bills.

Low Water-Use Zones:

Low water zones are somewhat exposed areas that must be watered to keep plants flourishing but where water can be conserved by mulching and using an efficient low-volume irrigation system or by taking advantage of runoff from downspouts, driveways or patios.

Moderate Water-Use Zones:

Moderate water zones are exposed areas with turf or plants with higher water requirements. This zone should be kept small and should be limited to focal points, such as entrance areas, and functional areas, such as lawns.

Identifying water-use zones in your yard helps you to group plants with similar water needs together for watering efficiency.

2. Improve your soil

Since plants with deep roots continue to have access to moisture after surface soil begins to dry out, a primary goal of Xeriscape is to encourage plants to develop deep root systems. In urban areas where the soil may be compacted, it will often be necessary to physically improve your soil before you can grow deep-rooted plants. Physical improvement of soil involves tilling to break up compaction and provide aeration and adding organic matter to keep soil porous. In addition, it may be necessary to chemically improve the soil with nutrients or other materials. Landscape architects emphasize that both kinds of soil improvements are important to developing healthy, deep roots, and that heavy fertilizing will not compensate for insufficient physical soil preparation.

Before planting or installing an irrigation system, take soil samples to the N.C. Department of Agriculture Soil Testing Laboratory (919/733-2656) and have them analyzed to determine what improvements may be needed. There is no charge for the soil test. The lab recommends that you take two samples: one from your front yard and one from the back. To take a sample, remove a small amount of soil to a depth of about 4" at ten scattered spots, mix in a clean plastic bucket, and pack the soil into a soil sample box. Do not collect the soil in a galvanized container.

The soil test report will give you information on pH, nutrients, volume weight, and humic matter as well as recommendations for correcting any deficiency the analysis reveals. Since soils of the southeastern United States are rather acidic, you will probably be advised to apply lime. If your soil is deficient in phosphorus, potassium, calcium, or magnesium, recommendations will be made for improvement. However, the lab analysis is not useful for sulfur, nitrogen, and boron. You may want to add a commercial fertilizer such as sulfate of ammonia or composted manure to supply both nitrogen and sulfur.

The "volume weight" of your soil reflects density and will reveal if you have a soil compaction problem. The "humic matter" measurement indicates the amount of organic matter in your soil. Both density and organic matter content are critical factors in your soil's ability to absorb and retain moisture. Since organic matter in soils continually breaks down and dissipates, it's likely that you will need to add organic matter, such as peat moss, rotted sawdust, yard compost, or leaf mold.

Once you know what your soil needs, till the soil to a depth of about 6 inches to break up compaction, then incorporate topsoil, about four inches of an organic material such as shredded pine bark, lime 9 and needed nutrients into the top 2 to 4 inches of soil. Tilling your soil to make sure that air and water can penetrate and providing organic matter and necessary nutrients will allow your vegetation to develop a deep, healthy root system, which is the key to drought tolerance.

3. *Establish practical turf areas*

Having a water-efficient, ecologically-sound yard does not mean giving up your grass. It does mean giving some serious thought to where you use turf, the variety of turfgrass you select, and how you maintain it.

When you design your Xeriscape, limit turf to areas where it provides functional benefits and plan the shapes and locations of these areas carefully. Turf areas should be consolidated into large, relatively flat areas, with no turf along narrow paths, in median strips, along foundations, or on steep slopes. (See Xeriscape illustration on page 25.)

A study in North Marin, California, found that outside water use is strongly correlated with turf area and that the single best indicator of outside water use is turf perimeter. By minimizing perimeter, you not only reduce turf area but also achieve a layout that allows irrigation with less splash loss on adjacent nonturf areas, pathways, and pavement.

Along with minimizing turf perimeter, an important factor in conserving water in lawn areas is selecting a water-conserving, warm-season turfgrass species and cultivar. Warm-season species recommended for North Carolina are centipedegrass, zoysiagrass, and bermudagrass. Within each species are a number of cultivars with slightly different characteristics, including the transpiration rate or rate at which the grass gives up moisture to the air. Consult with your local Agricultural Extension Agent or garden center to determine which of the available cultivars are most water-conserving. Bermudagrass cultivars which perform very well as water-conserving materials are often also drought resistant. Like any plant, however, turfgrass must become well established before it can be expected to exhibit drought tolerance. More information about turfgrasses is available in *Carolina Lawns* (Bulletin AG-69) published by the N.C. Extension Service.

The key to saving water in turf areas, however, is sensible irrigation. Extension agents in Georgia found that during the height of that state's 1988 drought many lawns were suffering from root rot resulting from excess watering. The lawn watering guide in the irrigation section of this handbook can help you irrigate your turf adequately but not excessively.

Turf can help control erosion; it can contribute to temperature modification; it can reduce urban glare; and it can help control dust and mud. Turf is also useful for slowing runoff from landscape areas and can be of practical benefit in areas like swales. Grass is also functional in open recreational areas and can be maintained without heavy use of chemicals that have recently caused health concerns.

By choosing a low water-use grass variety suited to our region, fertilizing lightly, mowing high and frequently and leaving the clippings on the lawn, and managing diseases by eliminating the cause rather than applying fungicides, you can develop a lawn that will become vigorous enough to offer resistance to weeds and insects on its own. Several publications are available to help you learn to care for your lawn naturally. One is *The Chemical-Free Lawn* published by Rodale Press.

4. Select appropriate plants

Most plants have a place in Xeriscape. It is important to use healthy plants adapted to our area (that is, plants that can take hot, humid weather as well as hot, dry weather), plant them in the right place, and give careful attention to getting them well established. Encouraging the growth of deep roots by preparing the soil and using appropriate irrigation practices is crucial to helping plants establish themselves.

Water-Conserving versus Drought-Tolerant

Although the terms "water-conserving" and "drought-resistant" are often used interchangeably to refer to plants, the terms do not mean the same, and it is important to know the difference. "Drought-resistant" or "drought-tolerant" means that a plant can withstand periods of dry weather. The term "water-conserving" actually refers to the plant's transpiration rate, which is the rate at which it releases moisture into the air (much the same as perspiration).

Water-conserving characteristics are most important in selecting turfgrass. Although lawns generally demand lots of water, some turfgrass species are relatively low water users. Most Bermudagrass cultivars perform well as water-conserving landscape materials, for instance.

Drought-tolerant characteristics are most important in grouping plants in the landscape. A grouping of drought-tolerant plants, once well established, may not need irrigation at all through a normal summer. Adding a plant with high water requirements to that grouping may, however, negate the group's water-conserving benefits.

There are many trees, shrubs, and groundcovers that require little or no irrigation once they've become established. Crepe myrtles, Chinese and Japanese hollies, and junipers, once established, are extremely drought tolerant. Many bulbs, such as daffodils, crocus, star-of-Bethlehem, and allium, are very drought tolerant because they are dormant in the summer. Herbs that come from arid climates, such as lavender, sage, rosemary, and thyme, are drought tolerant. Many ornamental grasses, such as pampas grass, need little supplemental water after they've become established. There are a number of drought-tolerant annuals.

A plant guide is provided in this handbook to help you in selecting plants for dry locations in your Xeriscape; however, this guide is not designed to be an exclusive listing for Xeriscape. Rather than selecting drought-tolerant plants exclusively, you should place primary emphasis on grouping compatible plants and helping plants establish deep root systems by properly preparing your soil and using proper irrigation practices.

Getting Established

When planning your Xeriscape and buying plants to establish it, you may want to consider phasing in permanent plantings. If you plant small shrubs and trees, underplant short-term groundcovers, perennials, and annuals to protect the young trees and shrubs and provide color the first few years. In addition, if you are willing to tolerate a somewhat sparse look in your planting beds the first year or so you will be able to get permanent plantings more well-established. If you plant five-gallon plants, you will achieve a fuller look sooner. But, if you use one-gallon plants, the smaller, younger plants will develop deeper, more widespread root systems, and in three to five years will be just as large and far more drought-tolerant than five-gallon plants. Of course, this will not be true of very slow-growing species.

5. *Mulch, mulch, mulch*

A two- to four-inch blanket of mulch helps conserve water by retaining soil moisture. But mulches provide benefits in addition to water-conservation. By retarding evaporation, mulch protects plant roots from overheated soil, a factor that adversely affects many ornamentals as well as some vegetables. Mulch can reduce or eliminate weeds, which compete for moisture, nutrients, and sunlight. It can also prevent erosion, and organic natural mulches break down and decompose to improve soil texture and drainage.

Many materials can be used as mulch: peat moss, wood chips, clean straw, leaves, cocoa and pecan hulls, shredded bark, pine straw. Fine textured mulches, such as pine straw, will trap more moisture than coarse mulches. Be careful when choosing your mulch not to get material, such as hay, that contains viable seeds or you will have a multitude of unwanted sprouts throughout your landscape. The same caution applies to using uncomposted animal manures.

Composting

Although it's not necessary to compost leaves before applying them as mulch, you may wish to do so if you maintain a compost pile. Green materials, such as plant trimmings, should not be used as mulch but should be composted. One of the advantages of maintaining a compost pile to supply mulch is that you can use large chunks of material, such as tree limbs, pine cones, shrub clippings and other yard waste without having to chip or shred the materials. In a compost pile, larger pieces are broken down so that they are not unsightly in the landscape. In addition, composted material has already gone through its nitrogen-demanding decay stage and will not compete with plants for nutrients. Maintaining a compost pile will allow you to use yard waste instead of sending it to the city landfill, which can help extend the landfill's usefulness. By adding vegetable and fruit scraps, eggshells, and coffee grounds to a compost pile you can further reduce your household waste and, if you avoid washing these wastes down the garbage disposal, further conserve water. The backyard compost pile is quickly becoming a symbol of individual commitment to a sustainable lifestyle, and composting has been elevated to an art. Many publications are available to help you establish and maintain a compost pile. *Composting for Home Gardens* (Leaflet No. 100) is a free publication from the N.C. Agricultural Extension Service that provides guidelines on building and maintaining a compost pile and using compost in the yard and garden.

How to Mulch

Before mulching a plant bed, cultivate to remove all the weeds. It's easier to do this early in the season before the weeds get established. Then work a thin layer of mulch into the soil and add two to four additional inches of mulch on top.

When mulching around shrubs and small trees, it's best to make an earth basin and keep the mulch pulled back a few inches. Mulches in contact with trunks of some trees and shrubs may cause rot. Mulch the entire root zone of the plant out to the drip line.

Mulching is particularly critical for shallow-rooted plants such as azaleas, rhododendrons, and dogwoods.

6. Irrigate efficiently

Types of irrigation

Permanent sprinkler systems: Automatic sprinkler systems and permanent manual sprinkler systems consist of an underground supply pipe with sprinklers installed at intervals. Automatic systems have self-operating valves and programmable controllers that allow you to schedule water application according to season and weather conditions. Manual systems require that you open the valve, time the application, and close the valve. A good bit of technical knowledge is needed to design and install permanent irrigation systems. In addition, if your irrigation system is served by the city water supply (or any potable supply), plumbing codes require that you install an approved backflow device to prevent irrigation water from your sprinkler system from flowing back into the water supply. Landscape architects, irrigation equipment manufacturers and dealers, irrigation consultants, and the N.C. Agricultural Extension Service are sources of technical information about design and installation of these systems.

Sprinklers are best for covering relatively large, flat areas such as turf.

Drip Irrigation: Drip or trickle irrigation delivers water slowly and directly to the root zone of an individual plant. This system is installed permanently and consists mainly of a supply pipe and low-volume emitters at or under ground level. The system may be buried, particularly if it is used in a mulched area. Because it places water directly on the soil at the rate of one to three gallons per hour there is little loss of water due to evaporation or runoff. Drip irrigation is a fairly recent development, and its uses are not as firmly established as those for sprinklers. However, it seems to be particularly good for mulched areas because it can thoroughly soak the area without washing away mulch. (Simply sprinkling mulched areas lightly can induce short root growth, and shallow-rooted plants suffer in dry periods.) In addition, drip irrigation may be better for slopes, since it does not cause runoff, and for watering individual trees and shrubs.

A drip irrigation system may be controlled automatically or manually. Like permanent sprinkler systems, it requires careful planning and a good bit of technical knowledge. Because it usually operates at low pressure, some pressure-regulating device must be used, and because emitters are very small and can easily become clogged, a filter is necessary. There are many additional advantages of drip irrigation, but there are also a number of potential problems. Again, irrigation professionals and the Agricultural Extension Service are the best sources of information about drip systems.

The simplest irrigation system is a garden hose or a sprinkler fed by a garden hose. These systems require a good bit of time and labor and don't provide uniform distribution of water. But, because many urban residential landscapes are small and don't justify the cost of permanent systems, portable systems are widely used. If you currently rely on a single portable sprinkler, you can make your system more efficient by using sound irrigation practices.

Efficient irrigation practices: Regardless of the kind of irrigation equipment you use, you can increase the efficiency of your system by using the appropriate type of irrigation for the area being watered, by using some objective means of calculating how long you actually need to water, and, if you don't have an automatic system, by using a timer.

The primary principle of efficient irrigation is water thoroughly and only when it's actually needed. Let conditions, not the calendar, dictate when you water. If grass needs watering, it lies flat after being stepped

on. It may also begin to look dull and bluish-green and leaf blades will begin to fold or roll. Many plants lose their gloss and start to droop when they need water, before they start to wilt.

When you water make sure that water gets to the deepest roots. Wet the soil to a depth of six to eight inches. For most soils, this requires about one inch of water.

Sprinkler delivery rate: To determine the rate and uniformity of your sprinkler system and how long you need to run your sprinkler(s), use this easy guide:

First, determine how much water your sprinkler(s) delivers.

1. Set three flat-bottom cans or coffee mugs at various places on your lawn.
2. Turn on your sprinkler(s) for 15 minutes.
3. Measure the depth of water in each can with a ruler and determine the average water depth in the cans.

Second, find your average water depth at the top of the chart below and read the number of minutes you need to water underneath.

Average Water Depth in Cans									
3/16"	1/40"	5/160"	3/8"	1/20"	5/8"	3/40"	1"	1-1/4"	1-1/2"
80	62	50	40	30	24	20	15	12	10
Number of Minutes to Deliver One Inch of Water in Cans									

Watering in the early morning or late evening reduces evaporation loss, particularly if you use a sprinkler system. However, watering turf in the late evening may give fungus a chance to attack as the foliage stays moist all night. So, for turf, early morning watering is best. Adjust sprinklers so you don't water paved areas. Always avoid watering on windy days.

If water begins to flow off the grass onto the sidewalk or gutter, split your watering time into two blocks to allow the soil to absorb the water.

If your irrigation system consists of a garden hose and a portable sprinkler, you may wish to water trees and individual large shrubs by using only the hose or the hose with a nozzle. One of the advantages of watering trees with the hose alone is that you don't encourage disease by wetting the foliage. You should be able to soak the root zone in one spot under the canopy of a shrub or tree (do not water at the trunk) by applying three to five gallons of water. This will take a minute or less using your garden hose. It is not necessary to water the entire root system. If you thoroughly soak 25 percent of the root system, you will give the plant all the water it needs at one time.

To see if you've soaked the soil to a depth of 6 to 8 inches, push a spade into the soil several hours after irrigating. The spade will move easily through moist soil. When it becomes harder to push the spade, you know it has reached dry soil. Adjust the irrigation time to deliver the amount of water needed.

Watering Priorities: If you should have to restrict water use during dry periods or droughts, you will need to decide what to water and what not to water.

Make large, valuable and historic trees your top priority. Large oaks are particularly vulnerable to drought. Do not water around the trunk of an established tree. Water at the drip line--the farthest extent of the branches. Do not spray water on the leaves of a tree. This can lead to leaf damage and disease problems.

If you have expensive shallow-rooted ornamentals such as dogwoods, azaleas, and rhododendrons in your landscape, they should also be at the top of your list. (These ornamentals should, of course, be heavily mulched.)

Newly transplanted trees, shrubs, and plants should be watered before well-established plants. A berm of soil in the shape of a ring around the base of newly planted trees and shrubs will direct water to the root system. Perennial flowers are also shallow-rooted and should be watered if keeping them is important to you.

Lawns and annuals should be last on your watering list. Annuals are not going to be around another year anyway, and large lawns require so much water that you might have to sacrifice more valuable plants to water the lawn adequately. You can limit the amount of water you use for annuals but still enjoy color by growing annuals in containers rather than in large beds. You do have to remember, however, that containers dry out more quickly. Plants growing in a low water-use zone, that is in the shade, will need less water than plants in the sun.

7. Maintain your Xeriscape

Proper watering, weeding and pruning, mowing, and limited fertilization and pest control will keep your Xeriscape healthy and beautiful.

Mow your turf grass high (maximum height of one inch for Bermudagrass and two inches for others) and often and leave the short clippings to decompose and replace nitrogen in the soil. Every time you cut your grass, you weaken the root system to some degree, and the more you cut the top growth, the more you restrict root system development. When you remove more than 40 percent of the top growth, the roots stop growing. By mowing high you encourage the development of a deep root system, which is a key to drought tolerance and weed resistance. Higher grass also shades the soil more, acting as a living mulch.

Let weather and soil conditions indicate when your turfgrass needs water, and irrigate thoroughly when water is needed. Fertilize turfgrass lightly two or three times from late spring to early fall.

Maintain two to four inches of mulch around plants and shrubs by stirring up old mulch to increase air/water movement and then adding new mulch. Because organic matter continually breaks down, it is critical to renew mulch annually to sustain the moisture-retention capability of your Xeriscape.

Drought Don'ts: During extended dry periods when plants are under stress, avoid fertilizing or pruning them. Fertilizers can dehydrate plant roots when water is scarce. Pruning encourages new growth, which needs more water. Also, do not apply pesticides to wilted plants.

Guide to Adapted Varieties for Dry Locations

This guide is not meant to be an exclusive list of plants for Xeriscape. Most plants have a place in Xeriscape if they are located in the appropriate place and if they develop strong, deep roots.

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
<i>Vines and Ground Covers</i>					
Ajuga Reptans (Bugleweed)	E	4-8"	M	Shade	Excellent ground cover in small shaded spaces.
Aspidistra elatior (Cast Iron Plant)	E	1 1/2-2'	S	Full to Part Shade	Very coarse texture. No serious pest problems.
Asparagus densiflorus (Asparagus Fern)	E	12-18"	M	Sun to Part Shade	Good plant for naturalizing.
Celastrus scandens (American Bittersweet)	D	20'	F	Sun	Vine which is very aggressive.
Hedera Canariensis (Algerian Ivy)	E	8"- 12"	F	Sun-Shade	Aggressive groundcover.
Hypericum spp. (St. Johnswort)	E	1-4'	S	Sun or Partial Shade	Good low-growing groundcover with yellow flowers.
Liriope muscari (Big Blue Lily Turf)	E	8-12"	M	Partial Sun	Many variegated cultivars, clump form.
Liriope spicata (Creeping Lily Turf)	E	8"-12"	F	Partial Sun to Shade	Aggressive. Good for slopes in shaded areas.
Ophiopogon japonicus (Mondo Grass)	E	4"-10"	M	Partial Shade	Excellent groundcover for small spaces. Non-aggressive.
Parthenocissus quinquefolia (Virginia Creeper)	E	30'-50'	F	Sun or Shade	Aggressive vine. Beautiful fall color.
Santolina chamaecyparissus (Lavender Cotton)	E	1'-2'	S	Sun	Very fragrant. Tough plant in poor soils.
Thymus sespyllum (Mother of Thyme)	E	1"-3"	S	Sun	Herbaceous perennial. Best used in rock garden.

*Growth Rate Legend: F=Fast, M=Medium, S=Slow, R=Rapid

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
<i>Shrubs</i>					
Abelia grandiflora (Glossy Abelia)	E	4-6'	M	Sun to Partial Shade	Excellent plant for hedges or slopes. Attractive flowers.
Amorpha fonticosa (Indigobush)	D	6-20'	M	Sun	A last resort plant for a difficult location.
Aralia spinosa (Devil's Walkingstick)	D	10-20'	S to M	Sun	Grows well even when neglected.
Aucuba japonica (Japanese Aucuba)	E	6-8'	S to M	Shade	Often used near buildings on north or shaded side.
Chaenomeles speciosa (Common Flowering Quince)	D	6'- 10'	M	Sun to Partial Shade	Good early spring flowering shrub.
Berberis thunbergii (Japanese Barberry)	D	3'-7'	M	Sun	Barrier hedge-type plant.
Buddleia davidii (Butterfly Bush)	D	10-15'	F	Sun to Shade	Numerous cultivars available.
Caragana arborescens (Siberian Pea Shrub)	E	15-20'	M to F	Sun	Good for hedges and borders. Not a very popular shrub.
Ceanothus americanus (New Jersey Tea)	D	3-4'	S to M	Sun or Shade	Low compact shrub with slender upright branches.
Cornus racemosa (Gray Dogwood)	D	10'-15'	S	Shade or Sun	Good dogwood for dry soils.
Cotinus coggygria (Common Smokebush)	D	10'-15'	M	Sun	Interesting effect - good specimen type plant.
Cotoneaster apiculatus (Cranberry Cotoneaster)	D	3'	S	Sun	Excellent ground cover shrub for slopes.
Cytisus scoparius (Scotch Broom)	D	5'-6'	F	Sun	Interesting stem shape, bright yellow flowers in early summer.
Elaeagnus pungens (Thorny Elaeagnus)	D	10'-15'	F	Sun or shade	Aggressive shrub - good for massive hedge or screen.
Forsythia intermedia (Forsythia)	D	3-6'	M	Sun	Excellent yellow flowers in early spring.

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
Hamamelis virginiana (Witch Hazel)	D	5-8'	M	Sun	Aromatic - good winter interest.
Hibiscus syriacus (Rose of Sharon)	D	8-12'	M	Sun	Good summer flower.
Ilex cornuta (Chinese Holly)	E	8'-15'	F	Sun	Many cultivars to choose from.
Ilex latifolia (Lusterleaf Holly)	E	20'-25'	M to F	Sun or shade	Good 'foundation' type planting.
Ilex vomitoria (Yaupon Holly)	E	15'-20'	M to F	Sun to Partial Shade	Adaptable to wide range of conditions.
Ilex vomitoria 'Nana' (Dwarf Yaupon)	E	3-5'	M to F	Sun	Excellent small holly.
Jasminum nudiflorum (Winter Jasmine)	E	3'-4'	F	Sun or Shade	Will grow much taller if trellised. No serious pests.
Juniperus horizontalis (Creeping Juniper)	E	1-2'	S to M	Sun	Many cultivars available.
Juniperus communis (Common Juniper)	E	5'-10'	S	Sun	Many uses - typically a screen or hedge.
Juniperus conferta (Shore Juniper)	E	1-1 1/2'	M	Sun	Excellent groundcover, good on slopes. Very aggressive once established.
Ligustrum japonicum (Japanese Privet)	E	8-15'	M to F	Sun	Good screen/hedge.
Myrica cerifera (Southern Waxmyrtle)	E	8-15'	M to F	Sun to Part Shade	Excellent hedge or screen. Can be 'tree-form.'
Nandina domestica (Nandina)	E	3-5'	M	Sun	Beautiful berries in winter. Good near buildings.
Pyracantha koidzumii (Formosa Firethorn)	E	8'-12'	F	Sun	Beautiful orange berries - can be espaliered.
Photinia fraseri (Photinia)	E	8-15'	M to F	Sun	Excellent hedge material - is very popular in urban areas.
Raphiolepis umbellata (Indian Hawthorn)	E	4'-6'	M	Sun	Numerous cultivars - stiff foliage and stems.
Rhus typhina (Staghorn Sumac)	D	15'-25'	F	Sun to Shade	A large loose-open shape - beautiful fall color.

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
Rosmarinus officinalis (Rosemary)	E	2'-4'		Sun	Aromatic foliage - not a formal plant.
Tamarix ramosissima (Tamarix)	E	10'-15'	F	Sun	Prune in early spring to induce flowers on new growth.
Yucca filamentosa (Adam's Needle)	E	3'-6'	S	Sun	Coarse needle-shaped foliage.
<i>Trees</i>					
Acer buergeranum Trident Maple	D	25'-30'	S to M	Sun	Good street tree. Performs well in planters. Prefers well-drained soil.
Acer campestre (Hedge Maple)	D	45'	S	Sun	Prefers rich, well-drained soil although it is tolerant to urban conditions.
Acer rubrum (Red Maple)	D	45'	M	Sun	Excellent tree for any medium-large space.
Acer tataricum (Tartarian Maple)	D	15'-20'	S-M	Sun	Usually multi-stemmed handsome small tree. Performs well in planter. Stress tree conditions.
Albizia julibrissin (Mimosa)	D	25'-35'	R	Sun	Weak branch structure. Interesting flowers and foliage.
Aronia arbutifolia (Red Chokeberry)	D	6'-10'	S	Sun	Beautiful red berries and foliage in fall.
Betula nigra (River Birch)	D	25-40'	M	Sun to part Shade	Multiple stems - are quite popular. Interesting bark in winter.
Broussonetia papyrifera (Paper Mulberry)	D	40'-50'	F	Sun	Easy to grow on almost any location. Susceptible to many pests.
Carpinus caroliniana (American Hornbeam or Ironwood)	D	20-30'	S	Heavy shade	Performs best in shaded areas.
Castanea mollissima (Chinese Chestnut)	D	40'-60'	S to M	Sun	Burrs litter the area under tree. Should avoid using near patios, drives, etc.
Catalpa speciosa (Northern Catalpa)	D	40'-60'	M to F	Sun or Partial Shade	Very coarse texture - brittle wood.
Crataegus phaenopyrum (Washington Hawthorn)	D	25'-30'	M	Sun	Excellent specimen plant - beautiful fruit.

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
Cedrus atlantic (Atlas Cedar)	D	40' -60'	S	Sun to Partial Shade	Excellent evergreen cedar; many cultivars available.
Celtis occidentalis (Common Hackberry)	D	40-60'	M to F	Sun	Good tree for open areas - not a good "close-up" tree.
Cercis canadensis (Eastern Redbud)	D	20-30'	M	Sun to Light Shade	Beautiful flowers in spring. Many cultivars available.
Cladrastis lutea (American Yellowwood)	D	30-50'	M	Sun	Good shade tree for limited spaces.
Corylus columna (Turkish Filbert)	D	40'-50'	M	Sun	Thrives in adverse conditions.
Crataegus phaenopyrum (Washington Hawthorn)	D	25-30'	M	Sun	Excellent specimen plant - beautiful fruit.
Cupressus arizonica (Arizona Cypress)	E	30-40'	M	Sun	Do not plant in shaded areas.
Diospyros virginiana (Common Persimmon)	D	5'-60'	S to M	Sun	Beautiful bark texture. Somewhat messy fruit.
Fraxinus americana (White Ash)	D	50'-80'	M	Sun	Not as adaptable as Fraxinus pennsylvanica but has better landscape value.
Fraxinus pennsylvanica (Green Ash)	D	50'-60'	F	Sun	Can be used for a variety of functions. Many cultivars available.
Ginkgo biloba (Ginkgo)	D	50-70'	S to M	Sun	Unique foliage. Relatively pest free.
Gleditsia triacanthos (Thornless Honeylocust)	D	30-70'	F	Sun	Numerous cultivars. Susceptible to pest problems.
Gymnocladus dioicus (Kentucky Coffeetree)	D	60'-75'	S to M	Sun	Pods can become a litter problem. Late to leaf-out in spring.
Hippophae rhamnoides (Common Seabuckthorn)	D	12'-30'	M	Sun	Excellent fruit interest in winter.
Ilex x. Nellie R. Stevens (Nellie R. Steven's Holly)	E	15'-25'	F	Sun	Excellent screening plant.
Juglans nigra (Black Walnut)	D	50-75'	S	Sun	Very slow-growing tree. Valued mostly for its wood and nut crop.

<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
Koelreuteria paniculata (Goldenraintree)	D	30'-40'	M to F	Sun	Yellow flowers in summer. Somewhat weak branch structure.
Lagerstroemia indica (Crape Myrtle)	D	15-20'	M	Sun	A favorite multi-stem summer flowering small tree. Numerous cultivars available.
Liquidambar styraciflua (Sweetgum)	D	50-75'	M	Sun	Fruit can become quite a nuisance. "Rotundiloba" is becoming a popular cultivar.
Maclura pomifera (Osage- orange)	D	20'-40'	F	Sun	Not recommended for small residential setting. Thorns can be quite painful.
Magnolia grandiflora (Southern Magnolia)	E	60-70'	M	Sun to Part Shade	A favorite evergreen that needs plenty of room. Best to leave lower branches.
Morus alba (White Mulberry)	D	30-50'	F	Full Sun to Light Shade	Somewhat messy tree- large coarse leaves - abundant fruiting capabilities.
Picea pungens (Colorado Spruce)	E	30'-60'	S to M	Sun	Blue-gray foliage - many cultivars available.
Pinus virginiana (Virginia Pine)	E	15'-40'	M	Sun	Not a great ornamental but a functional evergreen screen.
Pistachia chinenss (Chinese Pistache)	D	30'-35'	M	Sun	Excellent fall color. Resistant to most insects and diseases.
Prunus caroliniana (Carolina Cherry Laurel)	E	20-30'	F	Shade	Good medium-sized evergreen tree for shaded spaces.
Prunus cerasifera (Cherry Plum)	D	15'-30'	F	Sun	Atropurpurea' is most popular variety because of purple foliage.
Pyrus calleryana 'Bradford' (Bradford Pear)	D	35-50'	F	Sun	Popular fast-growing early-blooming medium-sized tree.
Quercus acutissima (Sawtooth Oak)	D	35-50'	M to F	Sun	Nice clean oak. For lawns or large planters.
Quercus marilandica (Blackjack Oak)	D	30-40'	S	Sun	Shrubby type oak often growing in poor, sandy soils.
Quercus stellata (Post Oak)	D	40'-50'	S	Sun	A good shade tree for poor soils. Nondescript characteristics.

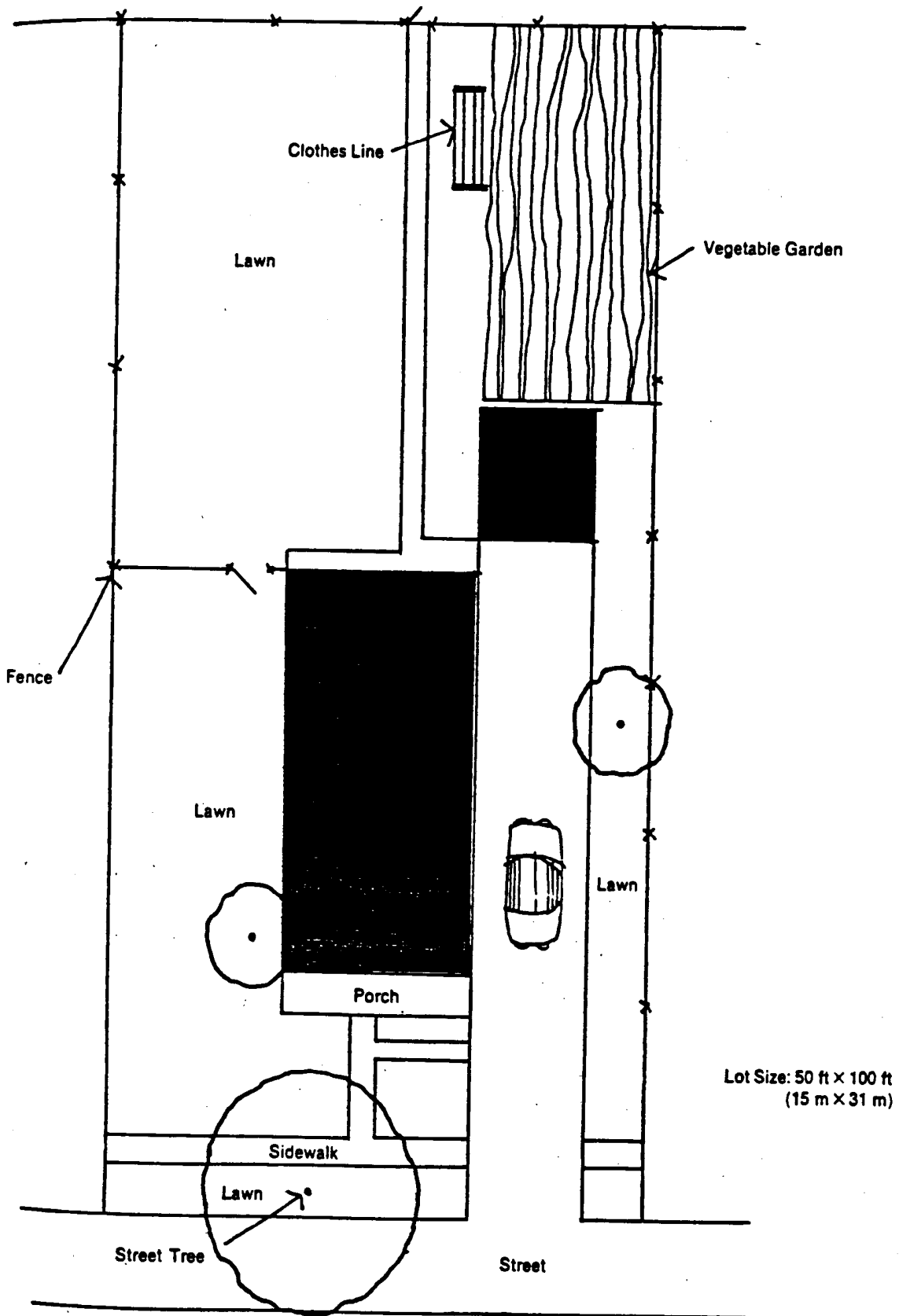
<i>Plant Name and Description</i>	<i>Evergreen or Deciduous</i>	<i>Height</i>	<i>Growth Rate*</i>	<i>Light Required</i>	<i>Remarks</i>
Robinia pseudoacacia (Black Locust)	D	30'-50'	F	Sun	Survives in worst locations and conditions. Several varieties are quite acceptable.
Sophora japonica (Japanese Pagodatree)	D	50'-75'	M to F	Sun	Good open area tree. Not recommended for small occupied spaces.
Tilia tomentosa (Silver Linden)	D	50'-70'	M	Sun	Best of lindens which tolerate adverse conditions.
Ulmus parvifolia (Chinese Elm)	D	40'-50'	M to F	Sun	Good tree for urban areas. Do not confuse with U. pumila.
Zelkova serrata (Japanese Zelkova)	D	50'-80'	M	Sun	Good all-around choice for medium-sized tree.

Herbaceous Plants Suitable for Sunny, Dry Conditions

<i>Achillea millefolium</i>	Common Yarrow
<i>Amaranthus tricolor</i>	Joseph's Coat Amaranth
<i>Anthemis tinctoria</i>	Golden Marguerite
<i>Arabis caucasica</i>	Rock Cress
<i>Arctotis stoechadifolia</i>	African Daisy
<i>Artemisia</i> spp.	Angel's Hair
<i>Asclepias tuberosa</i>	Butterfly Weed
<i>Aubrieta deltoidea</i>	False Rockcress
<i>Aurinia saxatilis</i>	Basket of Gold
<i>Catharanthus roseus</i>	Madagascar Periwinkle
<i>Celosia</i> spp.	Cockscomb
<i>Centaurea montana</i>	Perennial Bachelor's Bottom
<i>Cerastium. tomentosum</i>	Snow-in-Summer
<i>Coreopsis</i> spp.	Coreopsis
<i>Cosmos</i> spp.	Cosmos
<i>Dimorphotheca sinuata</i>	Cape Marigold
<i>Dyssodia tenuiloba</i>	Golden Fleece
<i>Echinacea purpurea</i>	Purple Coneflower
<i>Echinops exaltatus</i>	Globe Thistle
<i>Eryngium</i> spp.	Sea Holly
<i>Eschshlozia californica</i>	California Poppy
<i>Euphoria</i> spp.	Euphoria
<i>Festuca ovina</i> var. <i>glauca</i>	Blue Fescue
<i>Gaillardia</i> spp.	Blanket Flower
<i>Gazania rigens</i>	Treasure Flower
<i>Gomphrena globosa</i>	Globe Amaranth
<i>Helianthus</i> spp.	Sunflower
<i>Hemerocallis</i> hybrids	Daylily
<i>Iberis sempervirens</i>	Candytuff
<i>Kochia scoparia</i> f. <i>trichophylla</i>	Summer Cypress
<i>Liatriis scariosa</i>	Tall Gayflower
<i>Limonium</i> spp.	Statice
<i>Lonas annua</i>	Yellow Ageratum
<i>Miscanthus</i> spp.	Eulalia Grass
<i>Ocimum basilicum</i>	Sweet Basil
<i>Oenothera</i> spp.	Sundrops
<i>Opuntia humifusa</i>	Prickley Pear Cactus
<i>Pennisetum</i> spp.	Fountain Grass
<i>Phlox subulata</i>	Phlox
<i>Polygonum cuspidatum</i> var. <i>compactum</i>	Fleeceflower
<i>Portulaca grandiflora</i>	Moss Rose
<i>Potentilla</i> spp.	Cinquefoils

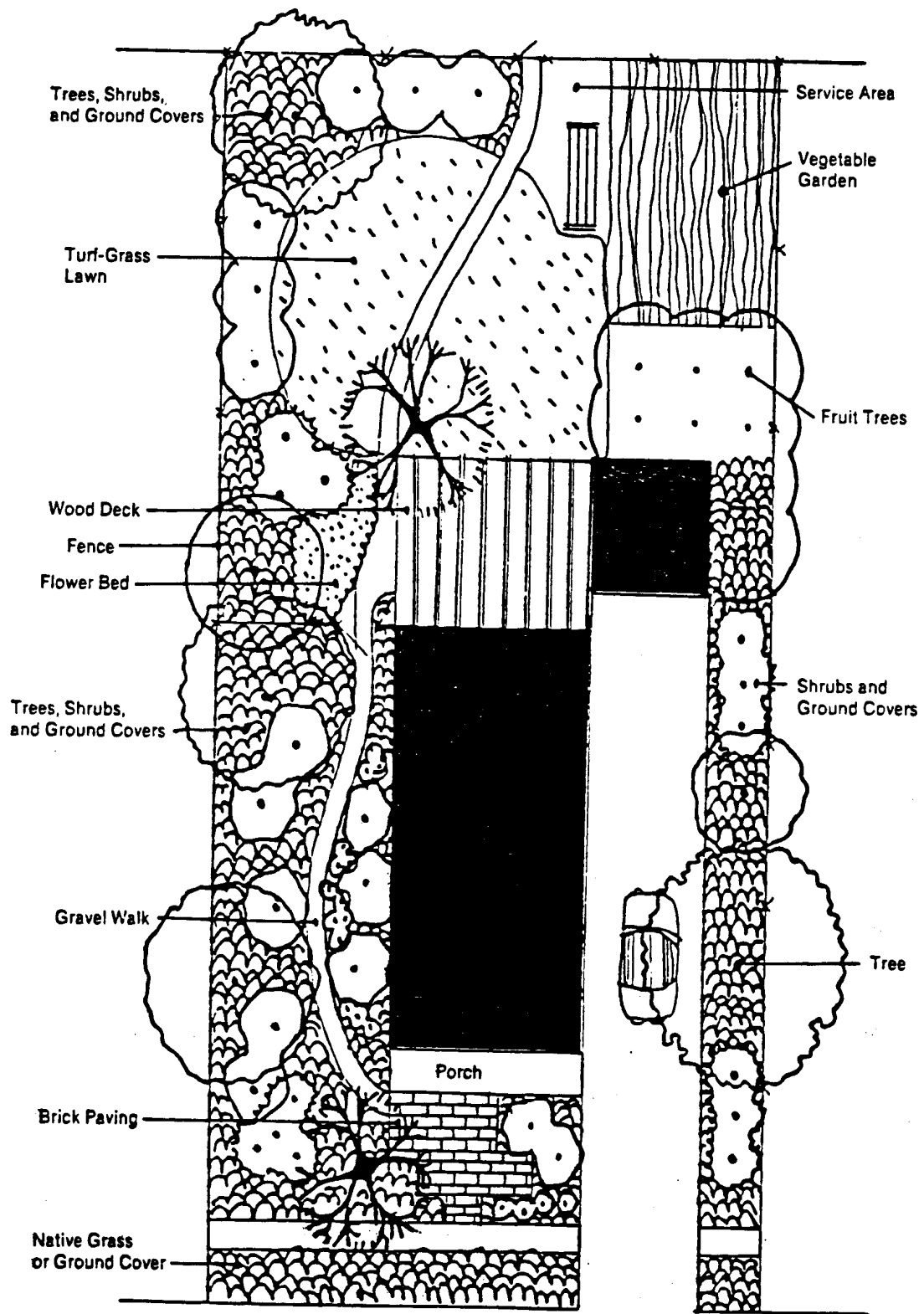
Rudbeckia spp.
Sanvitalia procumbens
Saponaria ocymoides
Sedum spp.
Sempervivum tectorum
Senecio cineraria
Stachys byzantia
Tithonia rotundifolia
Verbascum, chaixii
Xanthisma texanum
Zinnia elegans

Black-eyed Susan
Creeping Zinnia
Rock Soapwort
Sedum
Hen & Chickens
Dusty Miller
Lamb's ear
Mexican Sunflower
Mullein
Star of Texas
Zinnia



Source: California Department of Water Resources (1984)

A Traditional Landscape



Source: California Department of Water Resources (1984)

A Low-Water-Use Landscape

Resources

The National Arboretum Book of Outstanding Garden Plants

Jacqueline Heriteau, Marc Cathey

1990 The Stonesong Press

Wyman's Gardening Encyclopedia

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Herbaceous Ornamental Plants

Steven Still

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Manual of Woody Landscape Plants

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Pocketguide to Choosing Woody Ornamentals

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