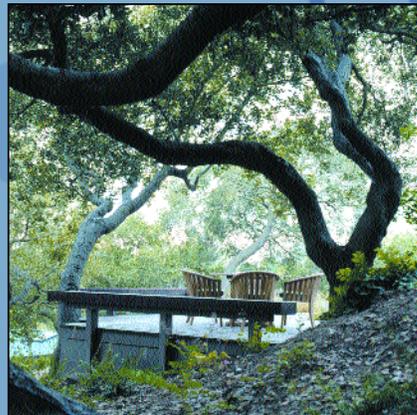


BAY-FRIENDLY LANDSCAPE GUIDELINES

*Sustainable Practices
for the Landscape Professional*



BAY-FRIENDLY LANDSCAPE GUIDELINES

*Sustainable Practices
for the Landscape Professional*

*“A thing is right
when it tends to preserve the integrity,
stability and beauty of the
biotic community.”*

SOURCE: ALDO LEOPOLD, A SAND COUNTY ALMANAC



These *Bay-Friendly Landscape Guidelines* are written for the professional landscape industry to offer an integrated approach to environmentally friendly landscaping.

The *Guidelines* are organized around seven principles for protecting the environment. By viewing the landscape through the lens of these seven principles, we can see it in a different light, such as how plant selection can create or decrease waste or how soil preparation can prevent or increase runoff. There are fifty-five practices listed under these seven principles. The practices themselves each include many examples of applications. The applications are meant to be a starting point but are not meant to be comprehensive. It is likely that there are many additional applications for each.

On the other hand, some of the practices are repeated under different principles because one practice can be integral to more than one principle. In other words, there are a number of critical practices that can protect the environment in more than one way. Using mulch, for example, reduces waste, nurtures the soil, conserves water, and creates wildlife habitat

The Bay-Friendly principles, practices, and applications included in these *Guidelines* were selected with guidance from landscape architects and designers, contractors, and experts in the many fields represented in these *Guidelines*, as well as representatives from local public agencies and the staff of StopWaste.Org.

Bay-Friendly Landscaping is a program of StopWaste.Org.

Disclaimer:
The information in these *Guidelines* is provided for consideration by landscape professionals in the course of designing, constructing and maintaining new or existing landscapes. It is presented as a public service by the Alameda County Waste Management and Recycling Board in an attempt to support environmental benefits and reduce costs. The practices in these *Guidelines* are strictly for use on a voluntary basis. They are not a substitute for the exercise of sound judgment in particular circumstances and are not intended as recommendations for particular products or services.

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Survey Says...

The results of a phone survey of Alameda County residents are quoted throughout the *Bay-Friendly Landscape Guidelines*.

Evans McDonough Company, Inc. randomly selected more than 500 single-family residents with questions about their use of, and interest in, Bay-Friendly landscaping practices. Conclusions about their opinions and practices are presented wherever you see the heading: Survey Says...

1

Introduction to Bay-Friendly Landscaping

BASIC PRINCIPLES OF NATURAL SYSTEMS

- 1** Natural systems are inherently beautiful.
- 2** Nothing goes to waste.
- 3** Inputs are limited and are primarily defined by the natural resources on site.
- 4** The more diverse they are, the more stable they are.

ADAPTED FROM: DAVID MCDONALD, *DESIGN WITH NATURE: LANDSCAPE DESIGN AS THOUGH THE ENVIRONMENT MATTERED*, SEATTLE PUBLIC UTILITIES.



PHOTO: RICHARD FOLLINS

Bay-Friendly Landscaping is...

A whole systems approach to the design, construction and maintenance of the landscape in order to support the integrity of one of California's most magnificent ecosystems, the San Francisco Bay watershed.

The Bay-Friendly landscape professional can create and maintain healthy, beautiful and vibrant landscapes by:

- ✓ Landscaping in harmony with the natural conditions of the San Francisco Bay watershed
- ✓ Reducing waste and recycling materials
- ✓ Nurturing healthy soils while reducing fertilizer use
- ✓ Conserving water, energy and topsoil
- ✓ Using integrated pest management to minimize chemical use
- ✓ Reducing stormwater runoff and air pollution
- ✓ Protecting and enhancing wildlife habitat and diversity

For public spaces, Bay-Friendly landscapes embody community values for health and safety, wildlife and the environment. For private property, Bay-Friendly landscaping addresses issues that your clients care about,

such as lowering water or garbage bills, and protecting the environment. A well-designed and maintained Bay-Friendly landscape can cost less to maintain in the long run, as well as lead to increased customer satisfaction and referrals to new clients.

As a landscape professional you can be proactive. You can be part of the environmental solution rather than waiting for more severe water conservation and pollution controls that are increasingly likely with our growing population.



PHOTO: RICHARD ROLLINS

Conventional Landscaping

Commercial, public and residential landscapes can benefit the owner and the community through their beauty, the recreation they offer, and their positive environmental effects. Trees, for example, can provide shade and reduce energy consumption, absorb greenhouse gases, reduce stormwater runoff and add to property values.

On the other hand, landscaping can cause damage to the environment, consuming fossil fuels, contributing to pollution of the soil, air and water; and burdening landfill space.

Conventional landscaping often relies on large lawns, non-native plants, abundant irrigation, and heavy use of fertilizers and pesticides. It frequently requires significant mowing, blowing, trimming and removal of plant debris.

Removing all plant debris from the site is one example of an especially damaging practice. It removes food and habitat for birds, insects and beneficial soil organisms. It mines our local soils of nutrients and degrades soil health. Often, the result is an increased dependency on fertilizers and irrigation, as well as greater stormwater runoff, erosion, pollution of the Bay and global warming.

Keeping plant debris on-site can:

- Foster living soils
- Increase the organic matter in the soil
- Improve soil structure and reduce compaction
- Retain and restore topsoil
- Create healthier plants
- Reduce the need for irrigation, fertilizers and pesticides
- Conserve landfill space
- Reduce air pollution and the emission of greenhouse gases from transporting plant debris long distances to be processed or landfilled
- Reduce greenhouse gas emissions caused by plant debris decomposing without oxygen in landfills
- Restore the soil's ability to absorb and filter water, improving water quality and reducing stormwater runoff into local creeks and the San Francisco Bay

While it may not be possible to keep all plant debris on site, there are more opportunities to reuse plant debris in our landscapes than are commonly practiced.



“To continue working with standard landscape practices is to continue to poison the earth. Reducing resource consumption and waste output are things we must learn to do. We have no choice but to adopt ecologically friendly techniques if we wish to thrive in the long term.”

— Michael Thilgen, Landscape Architect and Contractor,
Four Dimensions Landscape Company, Oakland

“Our urban landscapes are really a major cause of environmental degradation and depletion.”

— Bob Perry, Landscape Architect,
Professor Emeritus Cal Poly, Pomona



Survey Says...

Almost 90% of single-family households agree or strongly agree with the statement: “Lawn and garden products can have an impact on the water in the bay”.

Why is Bay-Friendly Landscaping Important?

Over the last two decades, there has been a significant reduction in plant debris landfilled in the San Francisco Bay Area, due in large part to residential recycling programs and because tens of thousands of households practice backyard composting. This positive trend reflects the interest of residents in recycling plant debris and reducing waste.

But more needs to be done, as tons of plant debris are still thrown away each year. Twenty-three states have banned or limited the disposal of plant debris in their landfills; however California has not and statewide, 2.7 million tons of plant debris are landfilled each year. Leaves and clippings alone are sixth out of the ten most prevalent material types in California's overall disposal waste system. In Alameda County alone 110,000 tons of plant debris are still landfilled each year, much of which passes through the hands of a professional landscaper.

Other types of waste, including plastics and hazardous wastes, are also generated by conventional landscaping practices. The horticultural industry in the US throws away almost a half-billion pounds of greenhouse film, plastic pots and plastic groundcover each year. Annual disposal of leftover pesticides used by residents costs tens of thousands of dollars for each Bay Area County — and only a fraction of the pesticides are disposed of properly.

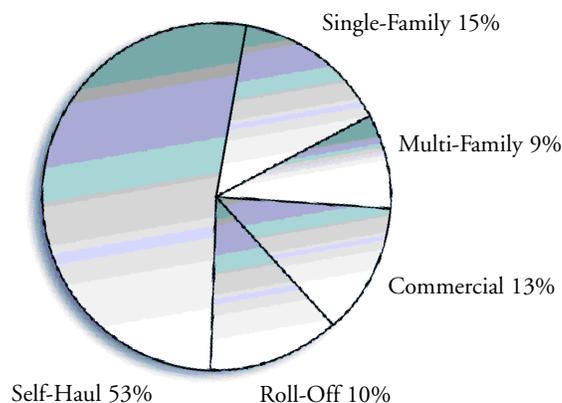
Bay-Friendly landscaping minimizes the use of plastics and pesticides, and diverts plant debris from the landfill by preventing waste in the first place through careful plant selection, watering and fertilizing or reusing plant material through grasscycling, mulch and compost.

Because generating plant debris is linked to a wide range of landscaping practices — such as watering and fertilizing — this integrated solution is essential.

“Landscape waste is an unused resource, a misapplied nutrient.”

— Geoff Hall, Co-Founder, Sentient Landscape, Inc., Sebastapol

Plant Debris Disposal



Source: Alameda County, Year 2000
109,393 tons

“For the landscaping industry to perpetuate itself, we have to answer some nagging questions. The number one question is, what are we going to do with all this waste we generate?”

— Manual L. Gonzales, Director of Training, Cagwin & Dorward, Novato

The Link Between Wastesheds and Watersheds...

Returning organic matter to the soil, in the form of plant debris, is the link between protecting our watershed and conserving landfill space.

In healthy landscapes, water from rain or irrigation percolates through soil that is rich in organic matter and alive with organisms. Living soils absorb and retain much of the water while also filtering out pollutants before the water reaches the aquifer or watershed.

For the most part, conventional landscapes no longer provide this cleansing function because...



PHOTO: ERIN AMVIEG

1. Rooftops, asphalt, cement, and other impervious surfaces, on the one hand, prevent much of the water from ever reaching the soil.
2. On the other hand, urban soils that have been mined of organic matter; compacted, eroded, and treated with chemicals are often lifeless and no longer able to function naturally — they have lost their ability to absorb much water or to filter pollutants out of the water.
3. Water from irrigation and rainfall then washes pesticides, fertilizers, plant debris, pet waste, heavy metals, spilled motor oil and other contaminants from lawns, gardens, roads and parking lots into gutters and stormdrains.
4. And once in the stormdrain, the water is not treated!
5. From stormdrains, the polluted runoff flows directly into creeks and rivers, which are themselves important resources for supporting the diverse and complex array of Bay Area natural ecosystems.
6. And, all creeks and rivers in our watershed flow to the wetlands and the San Francisco Bay, where the contaminated water again harms fish and other wildlife and can cause illness in humans.

The EPA has listed all creeks in the San Francisco Bay Area as impaired due to the pesticide diazinon.

SOURCE: PROBLEM PESTICIDES, BAY AREA WATER POLLUTION PREVENTION AGENCIES, 2001.

What is a Wasteshed?

A wasteshed is all the land in a region from which waste is collected and hauled into a common landfill.

What is a Watershed?

A watershed is all the land in a region from which water collects and drains into a common creek, river, lake or bay.

The Link between Bay-Friendly Landscaping and Global Warming

We are experiencing global warming and there is now “unprecedented certainty” that this is due to greenhouse gases that are emitted into the atmosphere when we burn fossil fuels.¹ Average temperatures are increasing, rain patterns are changing and extreme weather events, including heavy downpours and floods, heat waves and drought, are becoming more frequent.

If you professionally design, install and manage landscapes, the climate changes due to global warming will create new challenges to the way you do business, and the expertise your clients will need from you.

Conventional landscaping practices that contribute to global warming, by relying on coal, oil and natural gas for powering equipment, transporting landscape materials and waste over long distances, manufacturing pesticides and fertilizers, pumping and using water in the landscape may become increasingly subject to local, state and federal regulations, and less attractive to your clients.

Additionally, the consequences of global warming will clearly impact the landscaping expertise needed to differentiate your business in the marketplace.

You may be required to deal with the problems associated with:

- Planting and hardiness zones that are changing
- Plants that are leafing out and blooming earlier
- Birds and butterflies that are breeding and migrating earlier
- Wildlife species that are shifting their ranges

Studies indicate, for example, that increasing temperatures could make aphids capable of producing more than 1 million offspring in 2 months — up from the 300,000 that they can currently produce. Drought-stressed plants are more attractive to aphids and susceptible to disease. Tough, invasive pest plants are expected to be able to exploit new conditions and expand their spread. Plant species native to the San Francisco Bay Area may find the conditions to which they have adapted changing dramatically. It may become more difficult to help your clients provide habitat and food for wildlife, as butterfly caterpillars emerge before the leaves of their host plants, or bees arrive too early or late to feed on the flowers that provide them with food.

Put on your garden gloves and fight global warming

You can distinguish yourself in the marketplace by preparing to deal with landscape problems associated with global warming and by becoming part of the solution. The practices detailed in these *Bay-Friendly Landscape Guidelines* are effective steps toward a solution to the problem of global warming. Direct and immediate ways to reduce the impact of the landscapes you design, install or maintain, include:

- Keeping yard waste out of landfills where it decomposes anaerobically, releasing methane
- Decreasing the burning of fossil fuels by:
 - Keeping plant debris on site by grasscycling, mulching and composting
 - Using hand-powered tools or equipment powered by biofuels
 - Carpooling and careful planning of routes
 - Irrigating efficiently
 - Reducing lawn size
 - Selecting low maintenance and drought- tolerant California native plants
- Nurturing the soil to maintain its ability to store carbon, by:
 - Efficiently using natural fertilizers as a source of nitrogen
 - Building the organic matter content of the soil
 - Minimizing site and soil disturbance
 - Protecting the soil from compaction
- Planting and protecting trees

How Bay-Friendly Landscaping Reduces Greenhouse Gases

- Less organic matter transported
= less CO₂
- Less organic debris in the landfill
= less CH₄
- Reduced mowing & trimming
= less CO₂
- Fewer fertilizers & pesticides
= less N₂O & CO₂
- Reduced water consumption
= less CO₂
- Increased soil organic matter
= less CO₂

¹ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE.

Returning organic matter to the soil...

...is again key to protecting our environment. Just as managing plant debris as if it is a resource and not a waste product can be the link between protecting our watersheds and conserving our resources, so too is this approach critical to reducing the emission of greenhouse gases that contribute to global warming. Consider the practices listed on the previous page that are related to the management of landscape trimmings and grass clippings. You can provide your clients with the most advanced, comprehensive approach to fighting global warming by using sound, effective soil-building strategies.

Soil Strategies for Reducing Greenhouse Gas Emissions

Carbon Dioxide

- Minimize soil erosion
 - Maintain cover and minimize disturbance
- Build soil organic matter
 - Add compost and maintain vegetation
- Minimize soil grading and transport

Methane

- Maintain aerobic conditions
 - Limit compaction
 - Maintain subsurface drainage
 - Build organic matter with compost and healthy vegetation

Nitrous Oxide

- Verify need for nitrogen fertilizers by testing soils
- Use nitrogen fertilizers efficiently
 - Apply during times of active uptake
 - Don't leave fertilizer at the soil surface
 - Apply nitrogen during cool weather
 - Do not apply nitrogen to saturated soil or if rain is expected

Soil stores approximately twice as much carbon as that in the atmosphere. This pool of organic carbon can help offset the impact on global warming of carbon dioxide releases from other sources.

FROM: LAL, R. SOIL CARBON SEQUESTRATION IMPACTS ON GLOBAL CLIMATE CHANGE AND FOOD SECURITY, SCIENCE, 2004 IN SUSTAINABLE SITES INITIATIVE, PRELIMINARY REPORT ON THE STANDARDS & GUIDELINES, NOV. 2007.

Emissions Reductions Per Acre of Bay-Friendly Landscaping

Measure	Tons eCO ₂
Waste kept on site	2.5
Avoided transportation	1.1
Reduced shearing & mowing	.2
Reduced water needs	.2
Total	4.0



You can be the first line of defense.

Whether a site is next to a creek or miles away, your landscaping activities impact the quality of the San Francisco Bay watershed and the global climate.

The landscape you design, construct or maintain can conserve valuable resources, prevent waste and pollution, protect wildlife habitat, and reconnect your clients and the public to the beauty and value of the San Francisco Bay ecosystem.

2

Bay-Friendly Landscaping Menu of Best Practices



1 Landscape Locally



- 1. Select and evaluate the site carefully
- 2. Assess the soil and test drainage
- 3. Survey and protect flora & fauna
- 4. Consider the potential for fire
- 5. Use local, natural plant communities as models

2 Landscape for Less to the Landfill



- 1. Select appropriate plants:
 - A. Choose plants to match the microclimate & soil conditions
 - B. Choose plants that can grow to their natural size in the space allotted them
 - C. Replace sheared hedges with plants that can grow to their natural shape & size
 - D. Do not plant invasive species
- 2. Keep plant debris on site:
 - A. Grasscycle
 - B. Produce mulch from plant debris
 - C. Compost plant debris
- 3. Prune selectively and properly
- 4. Water and fertilize judiciously
- 5. Use goats for controlling weeds and creating firebreaks
- 6. Use salvaged items & recycled content materials
- 7. Reduce and recycle waste
- 8. Separate plant debris for clean green discounts

3 Nurture the Soil



- 1. Remove and store topsoil before grading
- 2. Protect soil from compaction
- 3. Defend against erosion
- 4. Amend the soil with compost before planting
- 5. Grasscycle
- 6. Mulch regularly
- 7. Aerate compacted soils
- 8. Feed soils naturally
- 9. Avoid synthetic, quick release fertilizers
- 10. Minimize the use of chemical pesticides

4 Conserve Water



- 1. Create drought resistant soils with compost & mulch
- 2. Grow drought-resistant California native or Mediterranean plants
- 3. Minimize the lawn
- 4. Implement hydrozoning — group plants by water needs
- 5. Design for on-site rainwater collection, recycled water and/or graywater use
- 6. Design and install high efficiency irrigation systems
- 7. Install a dedicated meter to monitor landscape water use
- 8. Manage irrigation according to need
- 9. Maintain the irrigation system so every drop counts
- 10. Request an irrigation audit

5 Conserve Energy



- 1. Shade buildings to moderate temperatures
- 2. Reduce the heat island effect
- 3. Shade air conditioners
- 4. Design lighting carefully
- 5. Choose and maintain equipment for fuel conservation
- 6. Specify low embodied energy materials

6 Protect Water & Air Quality



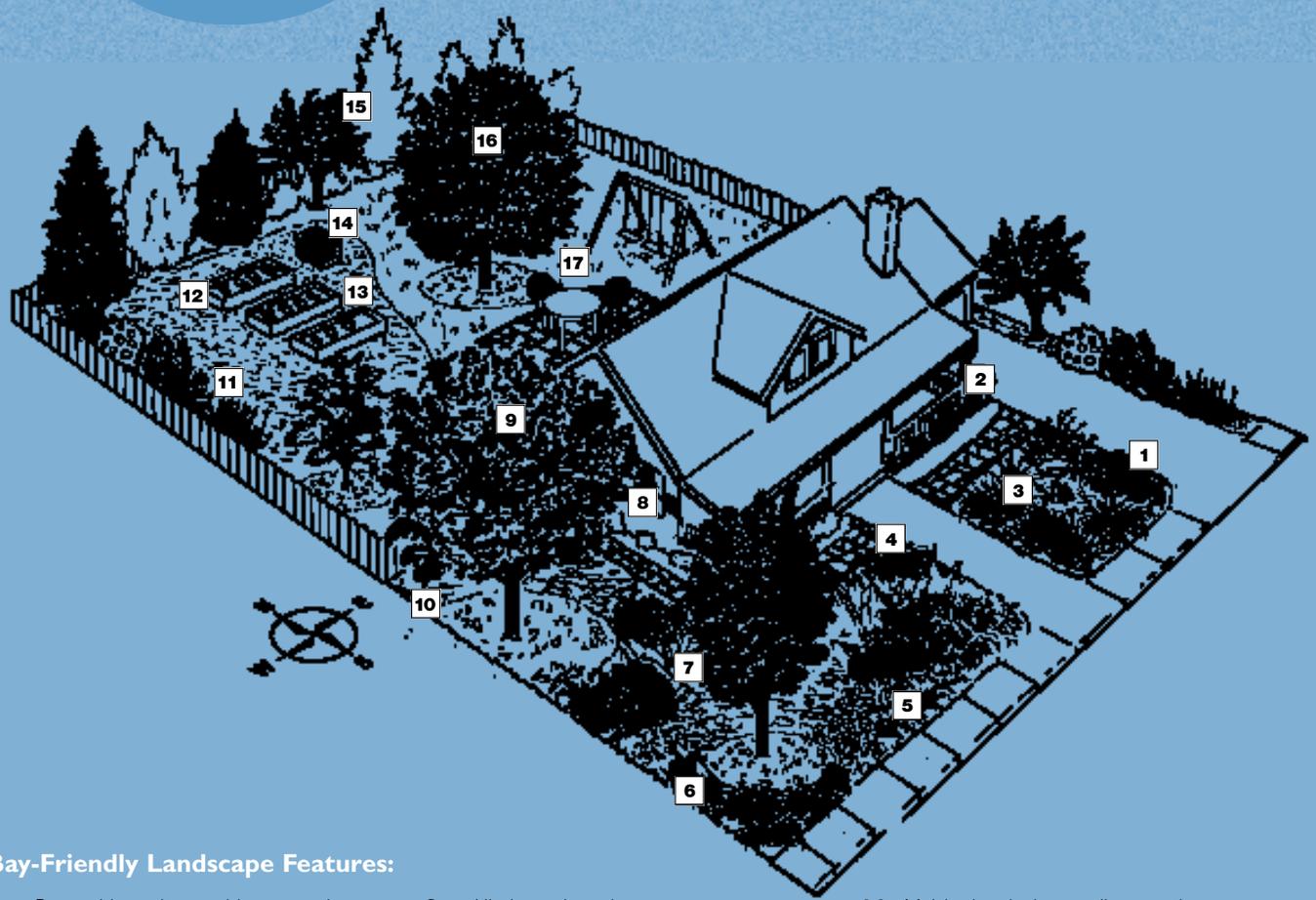
- 1. Use Integrated Pest Management:
 - A. Prevent pest problems
 - B. Train your staff to identify and monitor pest & beneficial populations
 - C. Educate your clients
 - D. Control pest problems with physical & mechanical methods
 - E. Control pest problems with biological controls
 - F. Control pest problems with the least toxic pesticide as a last resort
- 2. Eliminate high input decorative lawns
- 3. Minimize site disturbance
- 4. Choose and maintain your materials, equipment & vehicles carefully
- 5. Keep soil & organic matter where it belongs
- 6. Minimize impervious surfaces
- 7. Plant and protect trees
- 8. Maintain and manage the irrigation system carefully
- 9. Design a system to capture and treat water

7 Create & Protect Wildlife Habitat



- 1. Diversify
- 2. Choose California natives first
- 3. Provide water & shelter
- 4. Use organic pest management
- 5. Conserve or restore natural areas & wildlife corridors

3 Bay-Friendly Landscaping Principles and Practices



Bay-Friendly Landscape Features:

- 1 Permeable paving on driveway and walkway to front door
- 2 Water from roof channeled to cistern
- 3 Water for wildlife habitat
- 4 Pavers with spaces and low water use plants between
- 5 Front lawn replaced by diverse plantings with many California native groundcovers, shrubs and trees, but no invasive species
- 6 All plants given the space to grow to their natural size
- 7 Plants selected to match the microclimates
- 8 Irrigation controller waters hydrozones according to plant needs, soil moisture and weather
- 9 Deciduous trees placed to the west & southwest of the house & patio for summer cooling
- 10 Repository for leaves to collect under trees as mulch
- 11 Mulched paths keep soil covered
- 12 Drip irrigation for vegetable beds, shrubs, trees and elsewhere where feasible
- 13 Raised beds are constructed from plastic or composite lumber
- 14 Compost bin recycles plant and kitchen debris
- 15 Evergreen windbreak blocks north winter winds
- 16 Trees not topped but pruned properly
- 17 Small lawn in backyard where family will use it

1. LANDSCAPE LOCALLY



Bay-Friendly landscaping recognizes that our landscapes, whether they are commercial, institutional, residential or open space, are part of the larger ecosystem of the San Francisco Bay Area. It does not mean that the landscape must be wild and uncontrolled, but rather on the whole, it respects the natural attributes of our region and contributes to the health, diversity and sustainability of the San Francisco Bay ecosystem.

In return, many of the natural processes of a well functioning ecosystem, like nutrient cycling, can then benefit the landscape you design, construct or maintain. In addition, your clients are re-connected to nature through their landscapes, in one of the world's most renowned environments.

I. Select and evaluate the site carefully

Description

Careful selection and evaluation will reveal both the opportunities and the limits of the site. Consider the unique features of smaller zones within the site, which could mean the difference between life and death for some plants.

Applications

- Determine if the site is an urban growth boundary, a brownfield or near a sensitive ecosystem
- Visit the site and among other features, identify on a site map the:
 - Sunny, shady and partly shady areas
 - Hot spots along south facing walls and fences
 - Wet or dry spots
 - Windy or exposed areas and the direction of prevailing winds
 - Slopes
 - Frost pockets
 - Shape & size of planting areas
 - Zones with difficult access
 - Water flow
- Visit www.BayFriendly.org for a free copy of the Site Analysis template.

Benefits

This knowledge is critical to all other Bay-Friendly landscaping practices — particularly being able to select plant materials that match the site. It places the landscape in the context of the San Francisco Bay Area. In the long run, it allows you to collaborate with nature, saving you time and money.

“Many wild areas of Yosemite are more beautiful than any garden, and they don’t need regular maintenance. The other extreme is formal hedges, roses and lawns that require lots of attention and resources to maintain. We need to find a middle ground in design and maintenance of the urban landscape.”

— Nate Silin, Owner, New Growth Landscape, Oakland

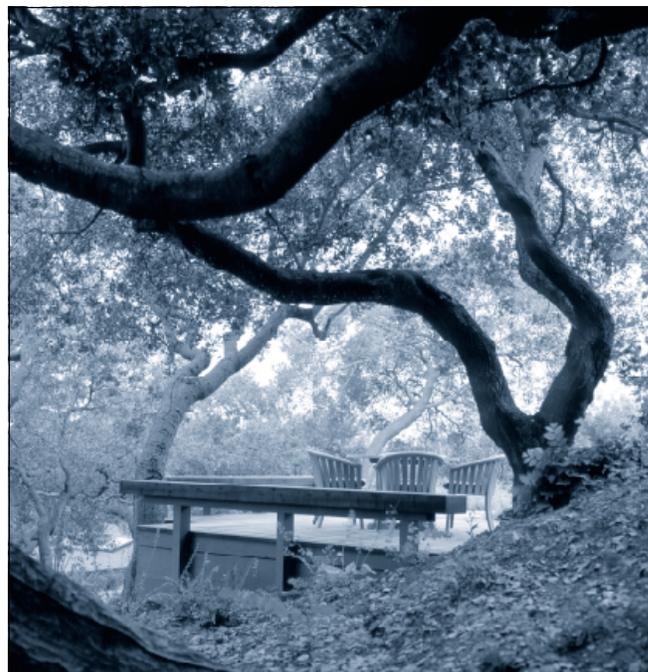


PHOTO: SUSAN REYNOLDS PHOTOGRAPHY

2. Assess the soil and test drainage

Description

Know the soil: its organic matter, fertility, texture, and structure. Identify problems such as compaction layers, poor drainage, or contamination with heavy metals, salts or toxic compounds. This knowledge will help you determine the soil quality, the types of plants it can best support and any need for supplements.

Applications

- Locate the landscape site on a soil survey map (available from the local library or the USDA Natural Resource Conservation Service at www.baysavers.org).
- Review site grading specifications.
- Visit the site and take handfuls of the soil to determine the texture by feel.

- Check for compaction zones with probes, augers or shovels. Test drainage in several spots.
- Sample the soil from different zones in the landscape - and remember that different plants have different nutrient requirements. Send soil samples for an analysis of the soil pH, organic matter, nutrients and potential contaminants.
- Identify soil characteristics on a site map.
- Do an initial soil analysis, and then annually during the transition to a Bay-Friendly landscape, and also:
 - When planning a renovation
 - When experiencing ongoing problems
- Watch the weeds. Clover, in turf, for example suggests a need for nitrogen.



PHOTO: MUNICIPAL WATER DISTRICT OF ORANGE COUNTY, LANDSCAPE MANAGEMENT FOR WATER SAVINGS BY TOM ASHL

Benefits

Understanding the soil is also critical to landscaping in an environmentally friendly manner. Plants are more likely to be placed appropriately and fertilizers used only as needed.

3. Survey and protect flora & fauna

Description

Existing flora and fauna provide insight into the ecosystem health and the landscape possibilities. Native vegetation, wildlife habitat & sensitive areas such as wetlands may need protection. Invasive species will need active control.

Applications

- Identify plant species and communities, especially California natives, invasive or endangered species and wetlands.
- Learn what wildlife inhabit or move through the site or have historically inhabited the site. Consider what they used for food and shelter. Plan for restoration.
- Ask your clients to identify plants that are of value to them.
- Become familiar with local tree ordinances and wetland or endangered species regulations.
- Develop a plan for preserving existing trees and shrubs or engage the services of a certified arborist to help you create the plan.

Benefits

Conserving or restoring local flora, fauna and habitat provides your clients with a sense of place. Native plants can make the job easier for the landscape professional.



TIPS FOR SUCCESS

Soil Texture by Feel

Take a 1 or 2-tablespoon sample of soil into your hand. Slowly add water and knead the sample until moist. Try to form the sample into a ball. Squeeze it to see if you can make a cast (an impression of your fingers). Gently stretch the soil out between your thumb and forefinger and try and make a ribbon. Note the feel of the soil as you are working it and use the table below to determine its texture:

Characteristics of Soil Sample	Soil Texture
Soil will not stay in a ball. Loose and single-grained with a gritty feeling when moistened.	Sand
A cast will form but it can't be handled without breaking and will not form into a ribbon. Soil feels slightly gritty.	Loamy sand
A short ribbon can be formed but breaks when about 1/2 inch long	Loam
A ribbon can be formed. The ribbon is moderately strong until it breaks at about 3/4 inch length. Soil feels slightly sticky.	Clay loam
The soil can easily be formed into a ribbon 1 inch or longer. Soil feels very sticky.	Clay

ADAPTED FROM: S.J. THEIN, A FLOW DIAGRAM FOR TEACHING TEXTURE BY FEEL ANALYSIS, JOURNAL OF AGRON. EDU.

4. Consider the potential for fire

Description

After the Oakland Hills fire of 1991, there is no doubt that the potential for fire in our region can be great and that landscaping is a critical factor. Understanding the topography, fuel and local weather are critical to designing and maintaining a landscape that reduces the potential for loss to fire. Plant selection is also very important to reducing the fuel load and avoiding fire ladders. Some species — “pyrophites” - ignite readily and burn intensely. Dense vegetation in hedges, screens or espaliers can be a fire hazard because the competition for limited water, nutrients and space results in a large amount of dry twiggy material.

Applications

- For sites adjacent to fire-sensitive slopes, open space or wildland: Create a Fire Mitigation Plan that identifies adjacent fire-sensitive wildland or open space or developments, exposure to prevailing winds during the dry season, steep slopes (especially south and west facing that can increase wind speed and convey heat), and vegetation type (particularly species that burn readily). Specify mitigations to these fire vectors, including the establishment of a “defensible zone” immediately surrounding the structure, that use one or more strategies for firescaping, such as:

- Emphasize plants with low fuel volume and/or high moisture content in planting plans.
- Avoid plants with high oil content or that tend to accumulate excessive dead wood or debris (pyrophites).
- Assure that trees are well-spaced and pruned to 6 feet minimum above ground, and that dense shrub plantings are separate from trees, to minimize fuel ladders.
- Plant trees and tall shrubs where limbs and branches will not reach the building or grow under overhangs as they mature.
- Avoid finely shredded bark mulch.
- Face and construct decks out of fire-resistant materials.
- Contact the local fire department for assistance in understanding the fire risk at a particular site and for additional guidance in reducing that risk, particularly for sites at the urban-wildland interface.

Benefits

Landscapes can be designed to reduce the fire hazard, with a clearer understanding of the risks, proper design and choice of plants.



Results of the 1991 Oakland Hills fire.

“I think of each garden as an organism. That means reducing inputs and not exporting things, keeping as much of the resources — like water, energy, plants, food — on-site as possible.

— Christopher Shein, Owner,
Wildheart Gardens, Oakland



TIPS FOR SUCCESS

Fire-Resistant Plants

- Most are broadleaf deciduous trees but some thick-leaf evergreens are also fire-resistant.
- Leaves tend to be supple, moist and easily crushed.
- Trees tend to be clean, not bushy, and have little deadwood.
- Shrubs are low-growing (2') with minimal dead material.
- Tall shrubs are clean, not bushy.
- Sap is water-like and typically does not have a strong odor.

SOURCE: R. MORITZ AND P. SVIHRA, *PYROPHYTIC VS FIRE RESISTANT PLANTS*, UCCE.

5. Use local, natural plant communities as models

Description

A plant community is a relatively distinct pattern of vegetation that is found in different regions of the Bay Area. Six of these local plant communities are briefly described in next section of these guidelines. It is important to also consider that species of plants within these communities overlap and that they change over time.

Applications

- Learn about local plant communities.
- Train yourself and your staff to recognize local plant communities and to evaluate the conditions under which the plants are succeeding.
- Use these communities to guide your choice in plant selection.
- Plant seeds of annuals to fill in with color and greenery while slower growing perennials get established.

Benefits

Using the local, natural plant communities as a model allows you to work with nature to create spectacular landscapes that can help replace what's so often been degraded or lost.



San Francisco Bay Area Natural Plant Communities

Many local native species are excellent landscape plants. You can imitate natural processes by using the plant community concept to organize plantings. Blending the science of ecology with the practice of horticulture, you can create landscape projects that assume some of the beautiful natural qualities of our area.

If you choose plants in response to the site conditions, the new planting will probably become established easily. There will be no need for the special fertilizing, pest control, and heavy irrigation that have been so common in the past. The plants grow easily because they're adapted to this place - they've lived here for thousands of years! If you visit our Bay Area wildlands, you will notice that a particular species might be abundant in a given area, only occasionally present in an adjacent space, and completely absent elsewhere. You may also recognize, as you move from south facing to north facing slopes or from exposed ridges to wooded canyons that certain groups of plants tend to grow together. This is because native plants have adapted over many generations to specific environmental conditions



Ecologists classify these groups of plants with terms like "biotic province," "vegetation type," "plant community," "plant association," and "series." The natural distribution of plants is very complex, with much overlapping of species, and experts disagree about the fine points of grouping and

nomenclature.

Here we use the term "plant community" to describe a group of plants that recurs with relative consistency, often dominated by a single

species. The Bay Area consists of many different places, from the cool, moist saltwater marshes close to the water to the hot and dry eastern ridges and slopes. These places support a series of distinctive plant communities — Saltwater Marsh, Freshwater Marsh, Riparian Woodland, Coastal Strand, Coastal Prairie, Northern Coastal Scrub, Chaparral, Valley and Foothill Woodland, Valley Grassland, and Redwood Forest, to name a few.

Following is a short list of representative species and a brief description of the most common plant communities of the Bay Area.

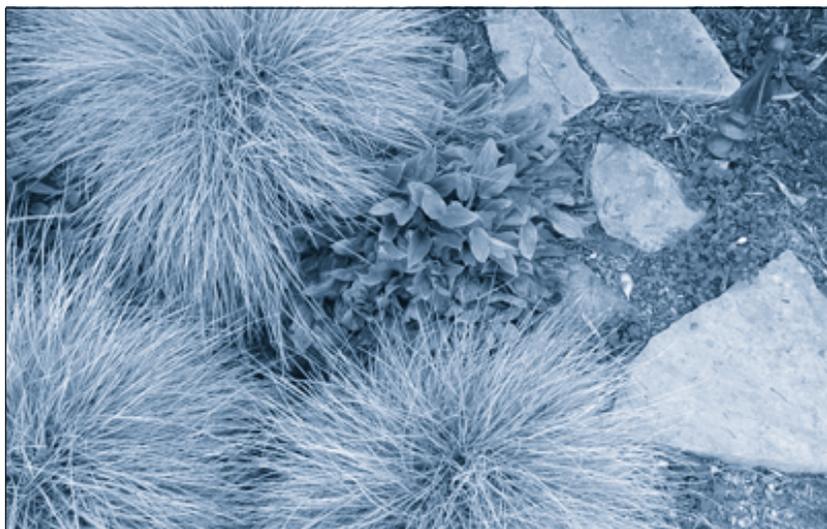


PHOTO: DAVID GILMORE

Common Plant Communities of the SF Bay Area

Coastal Prairie

Herbaceous Perennials

Achillea millefolium (White Yarrow)
Calamagrostis nutkaensis (Reed Grass)
Calochortus luteus (Golden Mariposa)
Carex tumulicola (Dwarf Sedge)
Danthonia californica (Wild Oat Grass)
Deschampsia caespitosa holciformis (Hair Grass)
Festuca idahoensis (Fescue Bunchgrass)
Iris douglasiana (Douglas Iris)
Pteridium aquilinum pubescens (Bracken Fern)
Sisyrinchium bellum (Blue-eyed Grass)

Northern Coastal Scrub

Shrubs

Arctostaphylos uva-ursi 'Pt. Reyes' (Manzanita)
Artemisia californica (Coast Sagebrush)
Baccharis pilularis ssp. *pilularis* (Dwarf Coyote Brush)
Baccharis pilularis var. *consanguinea* (Coyote Brush)
Ceanothus cuneatus (Buckbrush)
Ceanothus gloriosus (Ceanothus)
Cercocarpus betuloides (Mountain Mahogany)
Diplacus aurantiacus (Monkey Flower)
Heteromeles arbutifolia (Toyon)
Lupinus albifrons (Bush Lupine)
Mimulus aurantiacus (Sticky Monkeyflower)
Rhamnus californica (Coffee Berry)
Salvia melifera (Black Sage)

Herbaceous Perennials

Chlorogolum pomeridianum (Soap Plant)
Epilobium canum (California Fuchsia)
Heracleum lanatum (Cow Parsnip)
Scrophularia californica (Bee Plant)
Wyethia angustifolia (Mule's Ears)

Valley Grassland

Herbaceous Perennials

Calochortus luteus (Golden Mariposa)
Dichelostemma capitatum (Bluedicks)
Eschscholzia californica (California Poppy)
Nasella lepidia (Needlegrass)
Nasella pulchra (Purple Needlegrass)
Sidalcea malviflora (Checkerbloom)
Sisyrinchium bellum (Blue-eyed Grass)
Solidago californica (California Goldenrod)
Triteleia laxa (Ithuriel's Spear)
Wyethia angustifolia (Mule's Ears)

Redwood Forest

Trees

Sequoia sempervirens (Redwood)

Shrubs

Ceanothus thyrsiflorus (Blue Blossom)
Corylus comuta var. *californica* (Western Hazelnut)
Vaccinium ovatum (Huckleberry)

Herbaceous Perennials

Adiantum jordanii (Five-finger Fern)
Asarum caudatum (Wild Ginger)
Athyrium filix-femina (Lady Fern)
Oxalis oregana (Redwood Sorrel)
Polystichum munitum (Western Sword Fern)
Rubus ursinus (California Blackberry)
Smilacina racemosa (False Solomon Seal)
Tiarella cordifolia (Foam Flower)
Woodwardia fimbriata (Giant Chain Fern)

Valley and Foothill Woodland

Trees

Aesculus californica (California Buckeye)
Arbutus menziesii (Madrone)
Quercus agrifolia (Coast Live Oak)
Quercus chrysolepis (Canyon Live Oak)
Quercus kelloggii (Black Oak)
Quercus lobata (Valley Oak)
Quercus wislizenii (Interior Live Oak)
Umbellularia californica (California Bay)

Shrubs

Garrya elliptica (Coast Silktassel)
Holodiscus discolor (Ocean Spray)
Myrica californica (Pacific Wax Myrtle)
Physocarpus capitatus (Ninebark)
Rhamnus californica (Coffeeberry)
Ribes sanguineum glutinosum (Pink Current)
Rosa californica (California Rose)
Sambucus mexicana (Blue Elderberry)
Symphoricarpos albus (Snowberry)

Herbaceous Perennials

Artemisia douglasiana (Mugwort)
Dryopteris arguta (Woodfern)
Festuca californica (California Fescue)
Fragaria californica (California Strawberry)
Heracleum lanatum (Cow Parsnip)
Juncus patens (Common Rush)
Polypodium vulgare (Polypody Fern)
Rubus parviflorus (Thimbleberry)
Rubus vitifolius (Calif. Blackberry)
Satureja douglasii (Yerba Buena)
Stachys ajugoides (Hedge Nettle)
Tellima grandiflora (Fringe Cups)

Vines

Lonicera hispidula (California Honeysuckle)

Riparian Woodland

Trees

Acer macrophyllum (Bigleaf Maple)
Alnus rhombifolia (White Alder)
Platanus racemosa (Western Sycamore)

Shrubs

Cornus species (Creek Dogwood)
Rosa californica (California Rose)
Salix species (Red Willow)

Herbaceous Perennials

Athyrium filix-femina (Lady Fern)
Carex species (Dwarf Sedge)
Equisetum species (Horsetail)
Juncus effusus bruneus (Green Rush)
Mimulus cardinalis (Scarlet Monkeyflower)
Mimulus guttatus (Monkeyflower)
Oenanthe sarmentosa (Creek Parsley)
Sisyrinchium californicum (Yellow-eyed Grass)

Vines

Aristolochia californica (Dutchman's pipe)
Clematis ligusticifolia (Clematis)
Vitis californica (California Grape)

Common Plant Communities of the SF Bay Area



PHOTO: JANE HUBER

Coastal Prairie

Occupying slopes close to the Bay, this community is dominated by grasses and low herbs. Once consisting primarily of native perennial bunchgrasses and annual wildflowers, it now includes many weedy annual species brought here by successive waves of European immigration. Large portions of the Oakland and Berkeley hills were once Coastal Prairie, but have been converted to woodland in the course of urbanization.



PHOTO: RICHARD ROLLINS

Valley Grassland

Once common in interior valleys, Valley Grassland has suffered from agricultural development, introduction of invasive weeds, and urbanization. It now survives only in scattered remnants.

Valley and Foothill Woodland

Covering a large area of East Bay open space from near the coast to far inland, this community includes open Oak Savannah with grassy understory, dense Oak groves crowded with shrubs and herbs, and shady Bay Laurel woods. Valley and Foothill Woodland is particularly rich in ecological diversity.



PHOTO: EAST BAY REGIONAL PARK DISTRICT

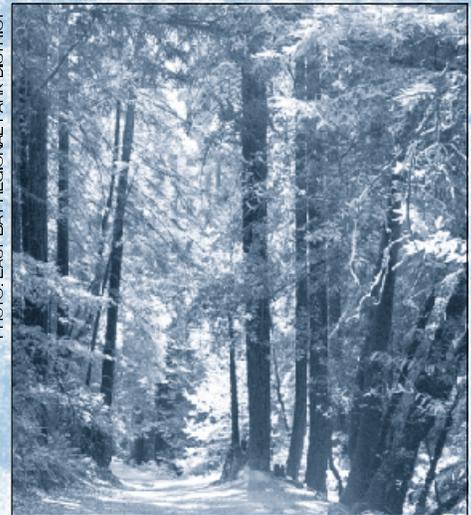
PHOTO: EAST BAY REGIONAL PARK DISTRICT



Riparian Woodland

Occurring as narrow bands in the steep mountainous ravines, broadly meandering in the flatter lands, these wet stream corridors stand in strong contrast to the surrounding summer dry hills and ridges. A specially adapted set of water loving plants lines our local creeks and rivers.

PHOTO: EAST BAY REGIONAL PARK DISTRICT



Redwood Forest

Considered by most ecologists as a subset of the North Coastal Forest, Redwood Forest exists in a shallow band across the Oakland and Berkeley hills. Redwoods are adapted to snag moisture from the summer fog with their leaves, which adds to precipitation and soil moisture. A distinctive group of understory species is adapted to the deep shade of the redwood groves.

PHOTO: JANE HUBER



Northern Coastal Scrub

(also known as "Soft Chaparral") Often found close to Coastal Prairie on west facing slopes of thin soil. Northern Coastal Scrub is also influenced by marine exposure, but is dominated by low shrubs.

FOR MORE INFORMATION ON CALIFORNIA PLANT COMMUNITIES SEE: ORNDUFF, 1974, *INTRODUCTION TO CALIFORNIA PLANT LIFE*; SAWYER AND KEELER-WOLFE, 1995, *A MANUAL OF CALIFORNIA VEGETATION*; BEIDLEMAN AND KOZLOFF, 2003, *PLANTS OF THE SAN FRANCISCO BAY REGION*.



2. LANDSCAPE FOR LESS TO THE LANDFILL

Reducing waste starts with not generating it in the first place. Selecting the right plants for the right place, as well as watering and fertilizing judiciously are important ways to reduce the tons of plant debris that end up in the landfills in the Bay Area.

Reusing plant trimmings as mulch, grasscycling, and using compost improves soils, creates healthier landscapes and in addition, keeps materials out of local landfills.

Material use is an important factor in the landscape. Using recycled content, salvaged, durable or local materials conserves resources and can reduce the amount of embodied energy that is consumed by the landscape.

Landscaping for less to the landfill will help you create a beautiful, relatively trouble free landscape that yields years of benefits for you, your client and the San Francisco Bay.

I. Select appropriate plants

A. Choose plants to match the microclimate & soil conditions

Description

Selecting the right plants is linked to understanding the site-specific conditions of the landscape. Plant selection is the foundation of environmentally sound landscaping and thus an important practice for meeting many of the other principles of Bay-Friendly landscaping.

Applications

- Select flora that is compatible with the exposure, temperature, moisture, and soil in microsites within each particular landscape site.
- Consider appropriate plant communities and how one community may succeed another with time.



PHOTO: MICHAEL THILGEN, FOUR DIMENSIONS LANDSCAPE CO.

Benefits

Plants are more likely to thrive, which reduces their susceptibility to disease and other pests and their need for fertilizers and pesticides. Water can be conserved. Callbacks and plant replacement are often reduced. Debris is not generated in the first place.



Survey Says...

75% of single-family households always or almost always recycle their plant waste. Recycling plant debris is important to your current customers — and potential new clients.

“We are trying to recycle more of our green waste on our sites. One major benefit is that we don't have to haul it off site to a dump. Second, it helps to cut down on worker's compensation claims from back injuries due to heavy tarps of material being picked up for disposal.”

— Manuel L. Gonzales, Director of Training, Cagwin & Dorward, Novato

I. Select appropriate plants

B. Choose plants that can grow to their natural size in the space allotted them

Description

Selecting a plant or plants to grow in too small a space starts a lifelong battle with the plant's genetics, thereby inviting disease and insects, generating unnecessary waste or increasing the fuel load.

Applications

- Consider the mature size and shape of the plants you choose and place them in areas that will allow them to assume their natural form.
- Avoid over-planting for instant effect.
- Select trees with a mature height of less than 20 feet for planting near power lines.

Benefits

Labor, fuel and waste are likely to be reduced, cutting your costs. Plant health and resistance to disease is fostered.



“People are focused

on how the landscape looks right after planting. This means that shrubs are planted so tightly that they can't reach maturity or flower and this leads to higher maintenance costs.”

— George Pacheco, Owner/President, Pacheco Brothers Gardening, Hayward

C. Replace sheared hedges with plants that can grow to their natural shape & size

Description

Shearing is a horticulturally unsound practice that is labor intensive and that encourages excessive new growth that can lead to unhealthy plants and increased waste. What's more, sheared hedges and screens have lots of deadwood under the dense green crown because of the lack of light reaching into the hedge. This dieback in the center of the plant increases its flammability.

Applications

- If hedges are desired, select dense species that will be able to grow to their natural shapes and sizes.
- Reduce the number of plants in the existing hedges and allow the remaining plants to grow into their natural form, if their size is appropriate to the space.
- Or recommend to your customers that sheared hedges be removed and replaced with plants that can grow to their natural form.

Benefits

Your cost for the labor to regularly shear the hedges is lowered and at the same time, fuel load can be decreased, waste will likely be reduced and your disposal bills lowered.

D. Do not plant invasive species

Description

Invasive plants used in landscaping often escape into our natural areas, where they can spread rapidly and out-compete natives, degrade wildlife habitat and increase the fuel load.

Applications

Familiarize yourself with locally important invasive species, some of which are listed on the following page, and eliminate them from the site. Sheet mulch can be very effective for weed control. Do not plant invasive species. For more information contact www.cal-ipc.org.

Benefits

The cost of later pulling these species out of the landscape, neighboring sites and wild lands is avoided. Waste is reduced and ecosystem diversity is protected.

“Using the right plant in the right spot will minimize the level of maintenance required to have a good looking landscape. This means taking into consideration the growth habits, maximum height and breadth, pests, ideal soil conditions, and water requirements associated with the plant.

— Gary Imazumi, Interim Associate Director, Grounds, Recycling and Refuse, and Pest Management Services, Physical Plant — Campus Services, University of California, Berkeley

Avoid Invasive Garden Plants of the Greater San Francisco Bay Area		
Invasive Plants		Non-Invasive Plants
Latin Name	Common Name	Instead Try
<i>Carpobrotus edulis</i>	Iceplant or Hottentot Fig	<i>Delosperma cooperi</i> (Hardy Iceplant) or <i>Osteospermum fruticosum</i> and hybrids (Freeway Daisy) or <i>Drosanthemum floribundum</i> (Showy Dewflower)
<i>Cortaderia selloana</i>	Pampasgrass	<i>Chondropetalum tectorum</i> (Cape Thatching Reed) or <i>Muhlenbergia lindheimeri</i> (Lindheimer's Muhly Grass) or <i>Carex spissa</i> (San Diego Sedge) or <i>Nolina bigelovii</i> (Bigelow's Bear Grass)
<i>Cotoneaster lacteus</i> , <i>C. pannosus</i>	Cotoneaster	<i>Heteromeles arbutifolia</i> and cultivars (Toyon) or <i>Feijoa sellowiana</i> (Pineapple Guava) or <i>Arbutus unedo</i> (Strawberry Tree) or <i>Viburnum suspensum</i> (Sandankwa Viburnum) or <i>Cistrus mitis</i> or <i>x Citrofortunella microcarpa</i> (Calamondin Orange)
<i>Cytisus scoparius</i> , <i>C. striatus</i> , <i>Spartium junceum</i> , <i>Genista monspessulana</i>	Scotch, Portuguese, Spanish or French Broom	<i>Jasminum nudiflorum</i> (Winter Jasmine) or <i>Cornus mas</i> (Cornelian-cherry Dogwood) or <i>Kerria japonica</i> (Japanese Kerria) or <i>Ribes aureum</i> (Golden Currant) or <i>Phlomis fruticosa</i> (Jerusalem Sage) or <i>Hypericum rowallane</i> (Shrub Hypericum)
<i>Hedera helix</i> , <i>H. canariensis</i> , <i>Vinca major</i>	English Ivy, Algerian Ivy, Periwinkle	<i>Campanula poscharyskiana</i> (Serbian Bellflower) or <i>Trachelospermum asiaticum</i> (Ivory Star Jasmine) or or <i>Rubus pentalobus</i> (Taiwan Raspberry) or <i>Heuchera maxima</i> and hybrids (Giant Alumroot) or <i>Asarum caudatum</i> (Wild Ginger) or <i>Helleborus foetidus</i> (Bear's Foot Hellebore) or <i>Bergenia cordifolia</i> and hybrids (Winter Saxifrage)
<i>Helichrysum petiolare</i>	Licorice Plant	<i>Salvia leucophylla</i> (Coast Purple Sage) or <i>Teucrium fruticans</i> and cultivars (Bush Germander) or <i>Phlomis fruticosa</i> (Jerusalem Sage) or <i>Artemisia 'Powis Castle'</i> or <i>Eriogonum giganteum</i> (St. Catherine's Lace)
<i>Sesbania punicea</i>	Scarlet Wisteria	<i>Calliandra tweedii</i> (Brazilian Flame Bush) or <i>Lagerstroemia</i> species (Crape Myrtle) or <i>Cassia leptophylla</i> (Gold Medallion Tree) or <i>Galvezia speciosa</i> (Showy Island Snapdragon)

ADAPTED FROM: DON'T PLANT A PEST! GIVE THEM AN INCH AND THEY'LL TAKE AN ACRE..... CALIFORNIA INVASIVE PEST COUNCIL
SUGGESTED ALTERNATIVES IN BOLD ARE CALIFORNIA NATIVE SPECIES.

Invasive



Cortaderia selloana
(Pampasgrass)

PHOTO: BRIANNA RICHARDSON, 2003

Instead Try



Muhlenbergia lindheimeri
(Lindheimer's Muhly Grass)

PHOTO: BLUESTEM NURSERY,
WWW.BLUESTEM.COM

Cal-IPC also recommends that we don't plant the following trees in the San Francisco Bay Area.

- *Crataegus monogyna* (Single seed hawthorn)
- *Elaeagnus angustifolia* (Russian olive)
- *Eucalyptus globulus* (Blue gum eucalyptus)
- *Myoporum laetum* (Myoporum)
- *Robinia pseudoacacia* (Black locust)
- *Sapium sebiferum* (Chinese tallow tree)
- *Schinus terebinthifolius* (Brazilian peppertree)
- *Sesbania punicea* (Scarlet wisteria)
- *Tamarix* species (Saltcedar)

For suggested alternatives, visit www.cal-ipc.org.

2. Keep plant debris on site

A. Grasscycle

Description:

Grasscycling means leaving the clippings on the lawn after mowing, so they decompose and release their nutrients into the soil.

Applications

- Mow often and when the grass is dry for the best results.
- Look for more details on how to grasscycle in *A Bay-Friendly Landscaping Guide to Grasscycling*. Go to www.BayFriendly.org to download a free copy.

Benefits

Leaving the clippings on the lawn after mowing saves time — one study showed that grasscycling reduced mowing time by 38%. It also saves money and reduces greenhouse gases that result from hauling the grass clippings to the landfill.



“We’ve had great success with mulching

at Cal. We’re using it as weed control, and we have evidence that it’s saving us money, plus we’re able to cut down on using pesticides.”

— Greg Harrington, Gardener,
University of California, Berkeley

B. Produce mulch from plant debris

Description

Plant debris left on the soil or chipped and then spread evenly over the surface of the soil nurtures soil organisms, and recycles organic matter and nutrients.



Hewlett Foundation site supports an Oak Savanna landscape. The leaf litter provides an interesting landscape element and a natural mulch layer.

Applications

- Avoid removing leaves as they drop from the tree — designate areas under the tree & shrub canopy, and away from hard surfaces and stormdrains as a natural leaf repository. Leaves should be picked up if they carry disease that can infect other plants, preventing low growing plants from receiving light, or if they are where they can clog stormdrains.
- Regularly chip plant debris and spread evenly over all exposed soil surfaces.
- Refer to the section *Nurture the Soil* or visit www.BayFriendly.org to download a free copy of *A Bay-Friendly Landscaping Guide to Mulch* and *A Case Study: Mulch*.

Benefits

Nutrients are recycled, habitat is created, waste is reduced, and the beneficial soil life that feeds on the organic matter jumpstarts other natural processes.

C. Compost plant debris

Description

Composting is the controlled decomposition of organic material. It turns plant debris into a beneficial soil amendment.

Applications

- Enroll yourself or your staff in a composting training program offered by many local governments.
- Encourage your residential clients to purchase a compost bin and offer to manage it for them.
- Design a site for composting client plant material.
- Go to www.StopWaste.Org to order a copy of the composting brochure or video.

Benefits

Composting on-site returns valuable nutrients and organic matter to the soil & reduces pollution associated with transporting waste, as well as disposal costs.



Survey Says...

Thousands of local residents are considering composting. When a sample of those interested in trying it were asked why they have not started composting yet, more than half said they are too busy... Why not offer on-site composting as one of the services you offer your clients?

3. Prune selectively and properly

Description

Pruning should complement the natural form and strengthen the structural integrity of the plant. It should not be used to dominate plants. The labor for this type of pruning is not a cost well spent; it never ends, weakens the plant and generates unnecessary plant debris.

Applications

- Use the standards from the American National Standards Institute for proper tree pruning, including pruning at the appropriate time of year. Do not top trees but rather remove branches at their point of origin or shorten branches back to a lateral.
- Prune when the plant is not under stress or dormant.
- Ask your client to consider replacing a tree or shrub that requires frequent pruning because it has grown too large for its space with a species that will require little or no pruning.

Benefits

Trees and shrubs are stronger and more likely to resist pests. Waste is minimized.

“Water use is an issue here in California.

Plus, when you use a lot of water and fertilizer, that translates into green growth, more clippings, and more waste. If you can tell customers, ‘Let’s just fertilize once a year,’ it reduces waste.”

— Glen Schneider, Proprietor, Glen Schneider Gardening, Berkeley

4. Water and fertilize judiciously

Description

Watering and fertilizing wisely prevents rampant plant growth that weakens the plants and generates plant debris.

Applications

There are many applications. Refer to *Nurture the Soil* and *Conserve Water* for more info.

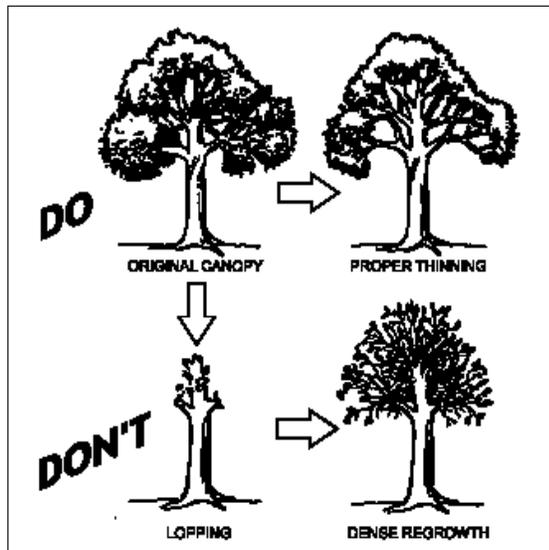
Benefits

Plants are not pushed into growth overdrive. Water damage to fences and hardscapes is minimized. Waste is prevented and disposal bills are decreased. Less maintenance translates into lower labor and fuel costs.



Damage to fencing from sprinkler irrigation.

PHOTO: THE MUNICIPAL WATER DISTRICT OF ORANGE COUNTY, *LANDSCAPE MANAGEMENT FOR WATER SAVINGS* BY TOM ASH



Prune selectively and avoid lopping. Adapted from illustration by Craig Farnsworth in *Sustainable Landscape Construction*.

Sample Contract Specifications for Pruning:

1. Trees and shrubs shall be pruned selectively only as necessary to enhance their natural shape. Topping of trees is prohibited except for safety or liability issues.
2. Hedges
 - a. Shearing new hedges into formal shapes is prohibited. Plants shall instead be selectively pruned by cutting individual branches or stems to interior lateral branches at appropriate locations, on an as needed basis.
 - b. Existing hedges that have been maintained by shearing in the past and that do not have adequate space to grow to mature plant size, can continue to be maintained by shearing, until replacement is possible.
3. Trimmings generated by pruning shall either be chipped and used as mulch on the site, or separated for plant debris recycling.

FROM BAY-FRIENDLY LANDSCAPING MODEL MAINTENANCE SPECIFICATIONS, WWW.BAYFRIENDLY.ORG

5. Use goats for controlling weeds and creating firebreaks

Description

Goats will eat many weeds that are otherwise very difficult to control — like poison oak, for example. Goats can work in areas that are too steep for human crews. They don't start fires with sparks, nor require fossil fuels to get the job done, and goats can reduce the fuel load in a short period of time. The costs of renting a herd may be lower than the costs of the labor for weeding and disposing of the plant debris.

Applications

- Consider renting a herd of goats. Ask for references of local landscapers who have used goats for controlling weeds or creating firebreaks in our area. (The East Bay Regional Park District, City of Oakland and others employ goats for vegetation control.)
- Use them with care as they eat desirable vegetation along with weeds: identify California natives and other vegetation that will need to be protected from the goats with temporary fences. Remove them from the area before they have a chance to overgraze.

Benefits

As the goats graze they reduce the fuel load, return nutrients to the soil and eliminate the need to haul off plant debris.

6. Use salvaged items & recycled content materials

Description

Salvaged materials are not remanufactured between uses. Finding and using them takes time and ingenuity but in the long run, salvaging conserves resources, can save money and adds interesting elements to the design. Recycled content materials such as plastic or composite lumber make very durable decks or raised garden beds that do not rot, crack or splinter.

Applications

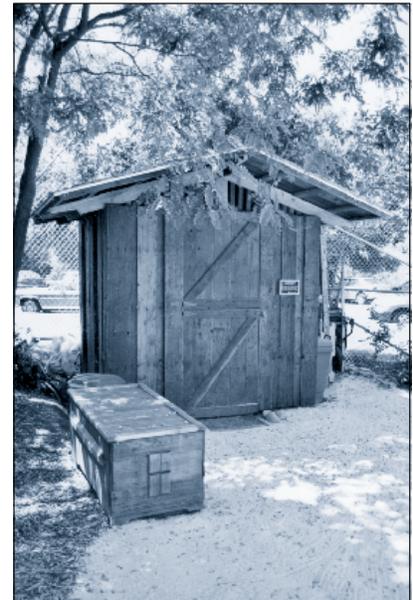
- Get creative and specify that hardscapes and other landscape structures be constructed with salvaged items. For example, use broken concrete for very attractive retaining walls and ground glass cullet for beautiful walkways.
- Find materials for reuse by contacting the CalMax website at www.ciwmb.ca.gov/CalMax or by visiting www.StopWaste.Org.
- Specify the use of recycled content materials or those made from rapidly renewable resources.
- Substitute compost blankets, berms and filter socks for plastic silt fencing.
- Purchase biodiesel or biobased lubricants for your equipment.
- Use sustainably harvested wood (FSC Certified) if plastic or composite lumber is not appropriate. Use treated wood that does not contain chromium or arsenic for any application that specifies treated lumber.
- Specify recycled aggregate (crushed concrete and asphalt) for backfill, road base or other uses.

Benefits

Lower maintenance costs can recover the added cost of plastic or composite lumber within a year. Compost provides superior erosion control to silt fencing and doesn't require disposal. Waste can be reduced, natural resources conserved, and markets for recycled products strengthened.

Description

Bay-Friendly landscapes offer many opportunities to reduce and recycle waste, both in the short term construction of the landscape and in the long term, by designing spaces for collection and storing recyclable materials.



Garden shed made with salvaged lumber from deconstructed warehouses at Oakland Army Base.



PHOTO: DAVID GILMORE

Reused concrete makes attractive benches, retaining walls, and raised planting beds.

7. Reduce and recycle waste

Applications

- Dedicate an easily accessible area to the collection & storage of materials for recycling.
- List the types and estimated quantities of materials that will be generated at the job site.
- Develop and implement a plan to reduce construction waste including plastic plant containers, land clearing waste and other landscape construction materials.
- Specify the recycling or donating of unused materials to reach a goal of reducing waste by at least 50%.
- Contact local recycling facilities and haulers to identify terms and conditions required for recycling materials.
- Select suppliers that allow returns of unused items.
- Allocate space for recycling bins and containers.

- Ask the nursery(s) where plant materials are purchased if they accept used containers or send them to the recycler for processing.
- Offer materials for reuse by contacting the CalMax website at www.ciwmb.ca.gov/CalMax or visit www.StopWaste.Org for additional information on materials reuse facilities and construction site cleanup contractors.
- Offer incentives to contractors or employees who reduce waste.
- Return wooden pallets to suppliers or take apart non-returnable wood pallets to chip for mulch.
- Donate healthy plants to local nonprofits or school gardens.

Benefits

Recycling and donating unused items reduces pressure on landfills, saves money by reducing tipping fees and provides raw materials for future projects. Donations may be tax deductible.

8. Separate plant debris for clean green discounts

Description

Most local landfills and transfer stations offer a discount for disposing of plant debris if it is kept separate from other types of waste.

Applications

If reusing and recycling on site is not feasible, take the time to separate yard trimmings from other waste. At larger sites, dedicate a bin to plant trimmings only and ask the hauler for a reduction in the collection fee.

Benefits

Your disposal costs are trimmed, and in most cases, the material is processed into mulch or compost.



TIPS FOR SUCCESS

Using Salvaged Materials in the Landscape

1. Let the materials inspire the design.
2. Locate materials early in the design process to avoid major design revisions when materials are found.
3. Maintain flexibility in the design until materials are found.
4. Use materials with interesting “stories” or cultural significance to the project.
5. At the start of a project, evaluate project sites and old buildings for materials to reuse.
6. Hire demo contractors with experience in deconstruction and salvage.
7. Require contractors to provide a plan for construction and demolition salvage and recycling.
8. Use materials for the highest use — avoid “down-cycling.”
9. Include appearance and environmental performance standards in the specifications.
10. Get the contractor on board with using salvage early in the process.

SOURCE: MEG CALKINS, *CLOSING THE LOOP: PART II*, LANDSCAPE ARCHITECTURE, DECEMBER 2002.

Each year, the horticultural industry disposes of:

- 130 million pounds of greenhouse film
- 140 million pounds of plastic pots
- 170 million pounds of plastic ground cover

FROM: TEXAS A&M

3. NURTURE THE SOIL



Soil is a complex, dynamic combination of minerals, air, water and organic matter. And although organic matter is a small fraction of the soil, it is a vital component. It includes plant and animal debris in various stages of decay as well as many living organisms — one teaspoon of a healthy soil can contain billions of beneficial bacteria and fungi.

A cornerstone of Bay-Friendly landscaping is creating and protecting conditions for a diversity of beneficial soil organisms. It is based on the principle of feeding the soil, not the plant, to encourage a thriving community — a foodweb — of microorganisms, worms and other beneficial creatures. Healthy soil is alive!

Why Does Soil Life Matter?

Living soil is teeming with bacteria, fungi, protozoa, beneficial nematodes, worms and other beneficial organisms — amazing workhorses that will carry out the following valuable processes:

- ✓ Creating soil structure
- ✓ Storing and cycling nutrients
- ✓ Protecting plants from pests
- ✓ Improving water infiltration and storage
- ✓ Filtering out urban pollutants

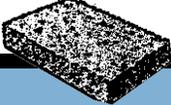
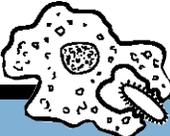


Survey Says...

80% of single-family households agree with the statement that using compost in the yard is good for the environment.

3 Principles & Practices

Functions of a Healthy Living Soil

 <p>Store water and nutrients</p> <p>Much like a giant sponge, healthy soil acts as a storehouse for water and nutrients. The slow release helps plants absorb the correct amount. As a storage reservoir for both water and nutrients, healthy soil has a greater holding capacity than soils that lack sufficient organisms, organic matter and pore spaces.</p>	 <p>Water flow and regulation</p> <p>Like the on/off function of a faucet, healthy soil regulates and partitions water flow, naturally maintaining the water cycle by slowly discharging to streams, lakes and recharging aquifers.</p>	 <p>Neutralization of pollutants</p> <p>Healthy soil is the site of intensive physical, chemical and biological activity, thus it can prevent water and air pollution. Soil rich in organic matter contains microorganisms that can immobilize or degrade pollutants.</p>	 <p>Resists pests</p> <p>Living soil has an incredible array of organisms, most of which are beneficial. The beneficial organisms protect plants from disease through predation, parasitization, competition and antibiosis. Bacteria, for example, cover leaf surfaces and block infection. Beneficial nematodes prey on harmful nematodes.</p>
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ADAPTED FROM: THE RELATIONSHIP BETWEEN SOIL AND WATER, KING COUNTY DEPARTMENT OF NATURAL RESOURCES.

1. Remove and store topsoil before grading

Description

Topsoil is a valuable resource, yet it is typically removed or mixed with subsoil during construction, beginning a cycle of high water and chemical dependency.

Applications

When grading the soil is unavoidable:

- Identify areas that are to be paved as a place to store topsoil during construction.
- Remove the topsoil (at least the top 6 inches if the topsoil is deep) before other grading and store for future use.
- Do not store in piles larger than 6 feet high.
- Protect from erosion.
- Send samples for analysis.
- Amend with 20-35% compost, depending on soil type and analysis, compost quality and plant selection.
- Re-spread after grading and construction.

Benefits

Conserving topsoil can reduce the likelihood of many problems over the long run, including stormwater runoff. It can minimize fertilizer and irrigation requirements and topsoil replacement costs.

2. Protect soil from compaction

Description

Heavy equipment can compact soil as deep as two feet below the surface of the soil. Compacted soils do not have adequate space for air or water:

Application

- Before construction begins, specify a limited construction area. Install temporary fences to restrict heavy equipment, including cars. Areas that will be paved or built over are good sites for parking equipment.
- Don't assume you need the biggest, heaviest equipment.
- If using heavy equipment, select those with flotation tires or wide tracks to distribute the load.
- On a longer-term basis, limit foot traffic, especially during the wet season.
- Do not work soil when it is too wet or too dry. Till as little as possible, and only with a clearly identified goal, such as incorporating organic matter. Loosen the soil with a fork instead of turning it over whenever possible.

Benefits

Soil structure and the soil's ability to support the microbes that cycle nutrients and filter pollutants are protected. The soil is easier to work.



Topsoil has been removed and stockpiled before building construction for later re-use in the landscape.

Why Use Compost for Erosion Control?

- Compost blankets and compost filter berms are less expensive when construction, maintenance, removal and disposal costs are considered.
- Compost blankets and filter berms provide chemical, biological and physical filtration.
- They work better than standard BMP's like silt fences or straw bales.
- Berms offer more actual filtration than coir rolls, silt fences or straw bales.
- Compost is annually renewable.
- Compost is 100% recycled.
- Compost is all organic and natural.
- It strengthens the market for compost.
- Aquatic wildlife can negotiate berms but not silt fences.
- It avoids the use of petroleum based products like silt fences.
- Construction equipment can run over it and it still works — and it is easy to fix.
- The materials can be re-used in landscaping or seeding after their use for erosion control.
- Look for specifications from the California Integrated Waste Management Board in: *Compost Use for Landscape and Environmental Enhancement Manual*.

SOURCE: ROD TYLER, WAKE UP AND SMELL THE COMPOST! PRESENTED AT INNOVATIONS IN EROSION CONTROL, WA.

3. Defend against erosion

Description

A sediment and erosion control plan that conforms to local sedimentation and erosion standards or the best management practices in the EPA's Stormwater Management for Construction Activities (whichever is more stringent) should have the following objectives:

- a. Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- b. Also prevent longer term sedimentation of streams, stormwater drains and/or air pollution with dust and particulate matter.

Applications

- Do not remove valuable trees and shrubs, especially near waterways. Protect them with fencing.
- Schedule grading for the dry season.
- Use compost berms, blankets, or socks. The EPA specifies that, depending on the length and height of a particular slope, a 1/2-inch to 4-inch layer of mature, screened compost, placed directly on top of the soil, controls erosion by enhancing planted or volunteer vegetation growth.
- Construct earth dikes or install silt fencing, sediment traps, and sediment basins.
- Terrace steep slopes.
- Hydroseed or otherwise plant to reduce bare soil, but do not over-plant for instant color. Annuals and short-lived perennials can be used to fill in areas while larger trees & shrubs become established. Cover crops provide excellent short-term cover that also adds nitrogen and/or organic matter when it is later tilled into the soil.
- Mulch regularly.
- Minimize the use of blowers.

Benefits

The likelihood of erosion is lessened, thereby conserving topsoil and protecting aquatic habitat.

4. Amend the soil with compost before planting

Description

Compost is thriving with microorganisms — one teaspoon can have more than one billion beneficial microbes. Adding good quality compost before planting turf, annuals, perennials, trees and shrubs brings life to the soil and feeds existing soil organisms. Compost is effective in improving problem soils — in particular those that are compacted, heavy clay or sandy, poor in nutrients, or lead contaminated. It is one of the most important practices for a healthy, thriving, Bay-Friendly landscape.

Applications

It is important to first assess the soil for physical and chemical problems. Refer to the section *Landscape Locally* in these guidelines.

- If topsoil has been removed and stored during building construction, mix one cubic yard of compost into 3-5 cubic yards of soil before re-spreading.
- If the topsoil has not been removed then sheet mulching is an efficient means of adding compost & other organic matter while controlling weeds. Refer to the tip on sheet-mulching on page 25 for more information.
- For turf or groundcover installations: Incorporate 1-2 inches (3 1/3 – 6 2/3 cubic yards) of compost into 1000 square feet. Mix it with the top 5-7 inches of soil.
- For preparing planting beds: Spread 2-4 inches of compost over the surface of the soil and incorporate it into the top 12-24 inches of the planting bed.

- Mixing compost into the backfill of a planting hole for trees and shrubs may not yield significant benefits. Some research indicates that young plants benefit more than mature plants. Some specialists also believe that amending backfill can create such a difference between the soil in the hole and the surrounding soil that the roots don't grow outwards — it is as if they are growing in a pot. To prevent this problem, amend the entire bed or create planting holes that are no deeper than the root ball and a minimum of 3 times size of the transplant's root ball. Rough up the sides of the hole. Mix soil from the hole with compost at a rate of 1 part compost to 3-5 parts soil (by volume) and backfill. Make the hole shallower and create a mound in heavy clay soils.
- And, consider the conditions under which the plant grows naturally. Some California natives require less fertile soils and compost may not be necessary.
- Finally, quality compost is important. Use compost made from local green and food waste to maximum feasible. Specify compost from a producer that is enrolled in the US Composting Council's Standard Testing Assurance (STA) program.

Benefits

Compost fosters a diverse, fertile, and disease suppressive soil. You and your clients may see both long and short-term benefits, including faster plant establishment, decreased fertilizer & pesticide use and lower water usage.



Mulch is placed on miles of freeway hillsides by Caltrans.

PHOTO: THE MUNICIPAL WATER DISTRICT OF ORANGE COUNTY, LANDSCAPE MANAGEMENT FOR WATER SAVINGS BY TOM ASH.

5. Grasscycle

Description

Grass clippings have about 4% nitrogen in them. When they are left on the lawn, they can meet some of the lawn's nitrogen needs, as well as supply an array of other nutrients.

Applications

- Leave the clippings on the lawn after mowing, except during the limited time of the year when the grass is too wet or too long.
- Look for more detailed information in *A Bay-Friendly Landscaping Guide to Grasscycling*. Go to www.BayFriendly.org to download a free copy.

Benefits

Nutrients in the grass clippings are made available to plants. Fertilizer requirements can be reduced by as much as 50%, thereby lowering your costs and protecting water quality.

6. Mulch regularly

Description

Mulch is any material spread evenly over the surface of the soil. Organic materials, including chipped landscape debris, are preferable over inorganic materials because they supply nutrients over time. Nitrogen 'drag' is usually not a problem, even when woody materials are used.

Applications

- Keep 2-4 inches of an organic mulch over the surface of the soil at all times, or at least until plants grow to cover the soil. Typically, larger particle size mulches are better for weed control.

- Designate less visible areas, away from stormdrains, for leaves to remain as mulch after they fall.
- Look for more detailed how-to information in *A Bay-Friendly Landscaping Guide to Mulch*. Go to www.BayFriendly.org to download a free copy.

Benefits

Mulch conserves water, enhances the growth of plants and the appearance of the landscape. It can also simplify your operations — thereby lowering your costs — by suppressing annual weed growth and reducing the need for trimming around trees and poles.



PHOTO: DAVID GILMORE

Grasscycling — leaving the clippings on the lawn after mowing — recycles nutrients and saves time & money.



TIPS FOR SUCCESS

Indicators of Quality Compost

- Dark brown color
- Sweet, earthy smell
- Small, fairly uniform particle size
- No weed sprouts
- Feedstock is no longer recognizable
- The producer can tell you the peak temperatures (and how long the compost stayed at those temperatures)
- A nutrient analysis is available from the producer upon request
- Compost is certified by the US Composting Council's Seal of Testing Assurance (STA) Program.

We'll tolerate a little leaf debris in the beds, as long as it isn't impeding plant health. Resource-efficient landscaping is healthy landscaping."

— Nate Silin, Owner, New Growth Landscape, Oakland



TIPS FOR SUCCESS

Sheet Mulching is...

...a layered mulch system. It is a simple and underutilized technique for optimizing the benefits of mulch. Sheet mulching can be used either in establishing a landscape, or to enrich existing plantings. In both cases, mulch is applied to bare soil or on top of cut or flattened weeds. Trees, shrubs, herbaceous perennials and annuals are planted through the mulch, or a small area is left open to accommodate established plants.

Sheet mulch can:

- Suppress weed growth
- Reduce labor and maintenance costs: weeds are composted in place
- Improve nutrient and water retention in the soil
- Encourage favorable soil microbial activity and worms
- Enhance soil structure
- Improve plant vigor and health, often leading to improved resistance to pests and diseases

Step 1: Prepare the site. Knock down or mow existing vegetation so that it lies flat. Remove only woody or bulky plant material. The organic matter left will decay and add nutrients to the soil. Add fertilizers and amendments to this layer if a soil analysis indicates the need. Optional: "jump start" the decay of weeds and grass by adding compost or manure at the rate of about 50 lbs/100 square feet. Soak with water to start the natural process of decomposition. It is much easier to soak the ground now, before the remaining layers of mulch are applied.

Step 2: Plant 5 gallon and larger plants.

Step 3: Add a weed barrier. The next layer is an organic weed barrier that breaks down with time. It is essential that the barrier is permeable to water and air. Do not use plastic. Recycled cardboard, a thick layer of newspaper, burlap bags or old carpets of natural fiber work well. Many paper companies offer recycled cardboard or paper in rolls of varying widths. Two or three layers may be required to achieve an adequate thickness. But, if the weed barrier is applied too thickly, the soil can become anaerobic. Overlap pieces 6-8 inches to completely cover the ground without any breaks, except where there are established plants you want to save. Leave a generous opening for air circulation around the root crown. Wet down the cardboard or paper barrier to keep it in place.

Step 4: Layer compost and mulch. The top layer mimics the newly fallen organic matter of the forest. Good materials for this layer include chipped plant debris, tree prunings, leaves or straw. They must be free of weed seeds. Well decomposed, weed-free compost is also a good material but it should be spread directly over the weed barrier and covered with bulkier materials such as chipped tree prunings, to optimize weed control. In total, the compost/mulch layer should be 2-5 inches deep. Many materials suitable for the top layer often have an attractive appearance, making sheet mulch a versatile practice.

Step 5: Plant. Punch a hole in the cardboard and place plants in the soil under the sheet mulch. Smaller plants can often be planted right into the mulch/compost layer. Add a small amount of compost around the rootball if compost has not been included in the top layer.

In most cases, the benefits of sheet mulching outweigh the costs. However, take care to prevent these potential problems:

- As with any mulch, do not pile materials up against the trunks or stems of plants to prevent disease.
- Especially during the dry season, small seedlings will need protection from snails and slugs that will seek cover under the mulch.
- Protect young trees from rodents with physical guards.



Recycled cardboard is a good weed barrier.



Sheet mulched site is ready for planting.

ADAPTED FROM: C.R. ELEVITCH AND K.M. WILKINSON. SHEET MULCHING: GREATER PLANT AND SOIL HEALTH FOR LESS WORK. PERMANENT AGRICULTURE RESOURCES AND GEOFF HALL, SHEET MULCH, SENTIENT LANDSCAPE, INC.

PHOTOS: GEOFF HALL AND KAMALA BENNETT, SENTIENT LANDSCAPE, INC.

7. Aerate compacted soils

Description

It is not always possible to remove topsoil or otherwise protect it during construction. Additionally, soils under turf subject to heavy use become compacted, which can increase the lawn's susceptibility to weeds, drought, disease and insect damage.

Applications

- Specify that soil be mechanically aerated before amending and planting.
- Reduce subsoil compaction by ripping or trenching.

- Deep tap-rooted plants can be seeded to break up compacted soils in non-turf areas. Mow before plants have gone to seed, leaving organic matter on the soil surface as mulch.
- Mechanically aerate soil under turf at least once a year: the number of times will depend on use and type. Aerating in the spring is best. Avoid doing so in the summer. Topdress with compost following aeration.
- Use power augers or water jets to create holes in compacted soil around trees and shrubs. Fill with compost.

Benefits

Root growth is stimulated and plants are more easily established. Water and fertilizer requirements may be lessened, while disease is resisted.



TIPS FOR SUCCESS

Compost Tea is...

... a water extract of mature compost. Nutrients, including a wide variety of macro and micronutrients, and beneficial microorganisms diffuse into the extract from the compost during the 'brewing' process.

Using compost tea can help re-establish a healthy soil foodweb that:

- Suppresses disease
- Cycles and retains nutrients
- Improves soil structure
- Decreases the need for pesticide & fertilizer use

Starting with a quality, fully mature, microbially diverse compost is important. Brewing includes aeration to keep the medium flushed with oxygen and the aerobic organisms alive and reproducing. Often times molasses, kelp, rock dust or other ingredients are added to enhance microbial growth. Different recipes can be effective in encouraging bacterial growth for use of the tea on vegetable crops, or fungal growth for use on fruit trees. But a diversity of organisms in the tea optimizes overall disease suppression, nutrient retention and cycling.

Compost tea is best used soon — within hours and no later than 1 day - after it is produced. It can be sprayed onto lawns, the foliage of trees and ornamentals or to the soil under them. Thorough coverage of leaf surfaces is important and the best time of day for applying to foliage is in the evening.

For more information:

www.composttea.org; www.attra.org; www.soilfoodweb.com

Equipment for Brewing Compost Tea:

EPM, Inc., www.composttea.com; Growing Solutions, www.growingsolutions.com; SoilSoup, www.soilsoup.com; Lyngso Garden Materials, www.lyngsogarden.com

8. Feed soils naturally

Description

There are important benefits to regularly adding a thin layer of good compost to the surface of the soil under turf, perennials, shrubs or trees, or drenching the soil with compost tea.

Applications

- Feed turf, especially after aeration, by topdressing with finely screened compost: one-fourth of an inch applied 2-4 times per year will show good results.
- Apply compost once or twice each year to the base of the plant or under the dripline. Be sure the compost is free of weed seeds and the plant is also mulched at an optimum thickness. You can scatter the compost over the mulch and it will settle to the surface of the soil.
- As an alternative, feed the soil around trees and shrubs with compost tea. Refer to the tip on *Compost Tea*.

Benefits

A strong soil foodweb, which makes nutrients available to the plants and protects water quality, is nurtured. Topdressing turf with compost can decrease fertilizer use by as much as 50%.

“Part of our organic maintenance package includes using compost tea, a liquid extract of high-grade compost. Foliar application replaces fungicide. The high beneficial microbe content excludes disease. We also apply it to soil for plant fertility. We are currently using compost tea on our residential construction and maintenance contracts.”



— Jake Cacciato, Superintendent, Jensen Corporation Landscape Contractors, Cupertino

9. Avoid synthetic, quick release fertilizers

Description

Synthetic, quick release fertilizers frequently wash through the soil before they are even taken up by the plants. They can also damage soil microbial populations or cause a flush of tender new plant growth that is very attractive to sucking insects. Furthermore, many well-chosen California native plants thrive without fertilizers. Most other plants do not need the quick release fertilizers that are often applied on a scheduled basis. Plant nutrient requirements can be met with compost, naturally derived fertilizers or slow-release synthetic fertilizers as a last resort.

Applications

- Kick the chemical habit: base feedings on a soil analysis or other clear indications of need, not on a calendar.
- Use compost to establish beneficial soil organisms and release nutrients over the long term.
- Sow nitrogen fixing or deep rooted cover crops, then till them in before they go to seed.
- Use blood and bone meal, fishmeal or kelp, examples of naturally derived fertilizers that release nutrients in a 1-4 month time frame.
- Use synthetic fertilizers as a last resort and select fertilizers that contain 30% or more of the nitrogen in slow release form.
- Do not use weed and feed formulations.
- Do not fertilize within 25 feet of the water's edge.

Benefits

Slow release fertilizers make nutrients available to the plants when they are needed, and are therefore often a better value. Flushes of growth that result in pest infestations or plant waste are less likely. Avoiding synthetic fertilizers can also reduce the likelihood of soil compaction, acidification and thatch build-up in lawns.

10. Minimize the use of chemical pesticides

Description

Many pesticides are toxic to microbes and other soil dwelling creatures such as earthworms. These toxins can reduce the diversity of soil life, select for resistant organisms or even increase soil pathogen density.

Applications

Learn and offer integrated pest management to your clients. If pesticides are absolutely necessary — choose the

least toxic alternative. Refer to the description of Integrated Pest Management in the section *Protecting Water and Air Quality* and visit the websites: www.ipm.ucdavis.edu or www.birc.org or www.ourwaterourworld.org.

Benefits

Minimizing pesticides reduces water pollution and helps support soil life, which cycles nutrients and promotes resistance to plant disease. Your costs may then be reduced in the long run.



TIPS FOR SUCCESS

The Organic Materials Review Institute (OMRI) is... a great resource for finding environmentally-friendly materials and products. OMRI is a national, nonprofit organization that identifies generic materials that are allowed or prohibited for use in organic crop production, including soil amendments (such as compost), fertilizers and other materials, such as acetic acid, for cleaning drip irrigation. Many of these generic materials are relevant to landscapes. OMRI also maintains a second list of products, which is a 3rd party rating of specific brand name products that meet the National Organic Standards or those that can be used with restrictions. You can purchase the general materials or products listings, or download the product catalog, or subscribe to OMRI, at www.omri.org.

Sample Contract Specifications for Nurturing Soil Health:

1. Initial soil analysis shall be performed to determine drainage and nutrient status and shall be repeated annually during the transition to Bay-Friendly landscape, when planning a renovation, or when experiencing ongoing problems.
2. A soil probe shall be used at every visit to assess water content.
3. Leaf drop shall become part of the mulch layer in the tree, shrub or groundcover areas, in an attractive manner and away from high traffic areas. Leaf drop shall not be allowed to enter the stormdrain.
4. Mulch shall be maintained under all trees and shrubs and on bare soil with a minimum 3-inch layer of organic material. To the greatest extent practicable, [company name] shall not procure mulch products that originate from forest products. When possible, [company name] shall give preference to mulch products that are produced on-site or from regionally generated plant debris.
5. Fertilizing shall be done on an as needed basis, as indicated by a soil analysis or other clear indications of need, not on a calendar basis. Naturally derived and/or slow release fertilizers are preferred.

ADAPTED FROM: LANDSCAPE MAINTENANCE PRACTICE FOR WATER AND GREEN WASTE EFFICIENCY, MUNICIPAL WATER DISTRICT OF ORANGE COUNTY.



4. CONSERVE WATER

California's climate includes long dry summers and the periodic failure of winter rains — water is a precious and often scarce resource. With projected population growth, it is estimated that by 2020 the state will face annual water shortages, even during years of regular rainfall.

Yet one-third of all urban water is applied to landscapes. What's more, much of this water is used in excess or at the wrong time of year: residential properties are regularly over-watered by 30-40%.

Water-wise landscaping is, however, more than efficient irrigation and xeriscapes. It also means augmenting the water holding capacity of the soil to create drought resistant soils. Water-wise landscaping makes use of alternatives to potable water such as recycled water, graywater, or captured rain. And, it relies on the latest in irrigation controller technology for the most efficient application of water possible. The landscape professional can offer the following critical expertise in conserving water:

1. Create drought resistant soils with compost & mulch

Description

A robust, living soil, with sufficient organic content, is the foundation of a water conserving landscape: 1 cubic foot of soil holds roughly 1.5 quarts of water for each 1% of organic matter. The amount of irrigation water required for a landscape thus varies significantly with soil quality.

Applications

- Know the soil texture.
- Incorporate 2-4 inches of compost into the top 6-12 inches of soil to reach a target soil organic matter of 3.5% under turf and 5% in planting beds.
- Topdress with compost around shrubs and trees, and on turf.
- Regularly apply mulch to all exposed surfaces to encourage living soils and reduce evaporation.
- For additional practices see *Nurture the Soil* in these guidelines.
- Finally, consider applying high quality mycorrhizal inoculants, available as root dips, mixes, tablets and solutions.

Benefits

Compost can increase permeability and water-holding capacity, thereby reducing the need for irrigation and lowering water bills.

2. Grow drought tolerant CA native or Mediterranean plants

Description

California native plants have evolved with local ecosystems and adapted to our soils, wildlife and climate — including no rain for 6 months of the year. Many natives, as well as many Mediterranean species, tolerate dry summers without watering once they are established.

Applications

- Keep in mind that California's climate and soil can vary significantly, as can native plant species. Not every native is drought tolerant: some, like *Salix* spp. (Willows) and *Populus fremontii* (Cottonwood), need moist soil. Select the native species that match the site soil and microclimate and if possible, choose local ecotypes.

- Or select plants from Mediterranean climates that also thrive with little irrigation.
- Plant in fall so the plants can establish their root system during the rainy season and require less water their first dry season.
- Water drought tolerant species for their first one or two summers, until they are established.
- Minimize high water use ornamentals.

Benefits

Appropriately sited native or Mediterranean type plants often require less soil preparation, watering, mowing, fertilizing and spraying, which can reduce your operating costs. CA native species are relatively easy and inexpensive to implement on a trial basis. Using local natives reduces the risk of spreading non-local plant species.



PHOTO: RICHARD ROLLINS

Landscaping with natives and Mediterranean plants require little or no irrigation once established and provide a sense of the seasons.

3. Minimize the lawn

Description

Lawns are useful for recreation or places where family members and employees can relax. But turf requires frequent watering to stay green during our long dry season.

Applications

- Recommend to your clients that they replace decorative lawns with water conserving California native groundcovers or perennial grasses, shrubs and trees.
- If lawns are desired, limit turf to no more than 25% of total irrigated areas. For residential clients, suggest the lawn be limited to a small part of the backyard where it is more likely to be used for play and relaxation.
- Do not plant turf in areas or medians less than 8 feet wide — it is too hard to irrigate efficiently.
- Avoid planting turf on slopes greater than 10%, in irregular shapes, or in bioswales, and instead specify a turf alternative such as *Carex pansa*.

Benefits

Water and energy can be conserved. For example, reducing the size of a 1,000 square foot lawn that gets 1 inch of water per week to 500 square feet can save approximately 10,000 gallons of water per dry season. Your clients' water bills and your labor for mowing may also be reduced. Chemical use may be decreased and water quality protected.

4. Implement hydrozoning — group plants by water needs

Description

Different plants have different water requirements. Dividing the landscape into low, medium and high water use zones prevents over-watering.

Applications

- Group plants by water and light needs (dry shade, dry sun, wet sun, wet shade).
- Place thirstier plants in relatively small, highly visible areas and if possible, in spots that naturally collect water.
- Plant a large perimeter area with drought adapted species.
- Plan to discontinue irrigating those California natives that do not tolerate water in the summer after they are established — and be sure to separate them from plants that will need ongoing irrigation.
- Create and identify irrigation zones on plans, based on the plants' water requirements, exposure, and soil water holding capacity. Include a summary table of the square footage of each hydrozone in construction documents.
- Separate valves and circuits for individual hydrozones. In particular, put turf on its own valve.

Benefits

Water use can be more easily matched to the plant requirements. This fosters resistance to pests as well as conserves water. Plant mortality is reduced, saving time and money.

5. Design for on-site rainwater collection, recycled water and/or graywater use

Description

Rainwater can be channeled through gutters and downspouts to a storage unit. During a 1-inch rain, 625 gallons of water can be collected from 1,000 square feet of roof. Stored water can then be used for irrigation.

Recycled water refers to wastewater that has been treated at a regional facility, of a quality suitable for landscape irrigation but not human consumption. It is becoming increasingly common in California. Graywater is wastewater from sinks, showers, bathtubs and washing machines that is not contaminated by human waste. Not suitable for drinking, it is an intelligent resource when used for subsurface irrigation of the roots of trees and shrubs.

Applications

- Encourage the building architect, if possible, to pre-plumb for graywater conversion.
- Conserve water by channeling rain from the roof to planters, swales and other landscaped areas.
- Raise stormwater inlets in planting areas to allow rain to soak in.
- Design, install and operate recycled water irrigation systems (dual distribution systems) to allow for the current and future use of recycled water; especially for decorative water features.
- Learn to use recycled water appropriately: poor drainage and incorrect watering can cause problems, just as is true for non-recycled water.
- Check with local building code for graywater policies and requirements.
- Use graywater for subsurface irrigation only. Educate your clients to use biodegradable soaps.

Benefits

The use of treated, drinkable water to irrigate lawns and gardens can be reduced. Groundwater is recharged.

PHOTOS: THE MUNICIPAL WATER DISTRICT OF ORANGE COUNTY, LANDSCAPE MANAGEMENT FOR WATER SAVINGS BY TOMI ASH



Landscape before and after an upgrade that reduced lawn size, increased diversity, improved property values, cut water bills by 50% and reduced maintenance costs by 20%.

6. Design and install high efficiency irrigation systems

Description

Drip and bubbler irrigation technologies apply water accurately, to the plant root zones, at the rate that it can infiltrate. Low flow sprinkler heads apply water uniformly and slowly and improve the efficiency of turf and groundcover irrigation. Both minimize overspray and evaporation and reduce runoff. Drip is often more appropriate than overhead in areas that are narrow, odd shaped, densely planted, or in parking lots and medians.

Applications

- Be pro-active, not reactive with customers. Provide them with recommendations to improve their irrigation efficiency to achieve 70% or greater distribution uniformity in turf areas and 80% in all other landscaped areas.
- Install a weather based, self-adjusting irrigation controller that has certified by the Irrigation Association (www.ia.org), and has, at a minimum, a soil moisture or rain sensor shutoff.
- For large commercial or municipal sites, select controllers that can detect and respond to problems like a broken sprinkler head.
- Rediscover drip. Several types of drip systems exist: select the right system for the specific job. Using 'in-line emitters' or 'subsurface' drip improves efficiency.
- Irrigate turf areas with subsurface irrigation or equipment that has a precipitation rate of 1 inch or less per hour as specified by the manufacturer and use stream rotator heads instead of standard spray heads.
- Use matched precipitation rate nozzles within each control valve and circuit.
- Design a system based on a water use budget of no more than 70% of reference ET and have this budget and your irrigation plans reviewed by a representative of your water supplier or a trained irrigation specialist.
- Check with your local water supplier for rebates.

Benefits

High efficiency systems not only limit evaporation and runoff, but also prevent disease and minimize weed growth. Water bills can be lower and water quality protected.



PHOTO: GINDY NELSON

7. Install a dedicated meter to monitor landscape water use

Description

Separate irrigation meters, although they can be expensive, allow for the monitoring and evaluation of water use in the landscape. EBMUD is requiring them on all new water service for landscapes greater than 5000 square feet, with single-family residences being the only exception.

Applications

- Specify the addition of a separate water meter for landscapes larger than 5000 sq. ft.
- Combine with a 'smart' or automatic, self adjusting irrigation controller(s) for a sophisticated understanding of water use.
- Read the irrigation meter to check for leaks and maintain a water budget.
- Provide detailed feedback to your customers about their water use or conservation achievements.
- If a dedicated water meter is not possible, install a submeter to track the irrigation portion of a mixed use water meter.

Benefits

Monitoring the landscape water use more precisely can demonstrate and support water conservation. A separate meter can also reduce your client's sewage bill since it is based on water use in buildings.

8. Manage irrigation according to need

Description

Watering requirements will vary with soil, plant, climate, exposure and season. If the irrigation system is not timed by a weather based controller, management of the irrigation requires particular attention and expertise.

Applications

- Become familiar with CA Irrigation Management Information System (CIMIS).
- Base irrigation on:
 - The watering needs of the plant material, in inches per week.
 - How fast the water is being applied. Sprinklers apply water in inches per hour; drip in gallons per hour
 - The soil types and slope. Apply water slowly or intermittently on slopes or clay soils, so that it can soak into the soil.
- If the system does not include a soil moisture sensing device, use a soil probe to check soil moisture before irrigating and watch the plants for signs that they need water.
- Avoid watering during the warmest and windiest times of the day.
- Water deeply enough to soak the root zone.
- If you have installed an irrigation system but will not be managing it, provide the property owner with precipitation rate for each valve zone, maximum runtimes for July 3, location of irrigation supply shut off, maintenance checklist, distribution uniformity and internet address for watering index information.

Benefits

Appropriate watering moderates plant growth, promotes plant health and reduces replacement costs, as well as the need for pesticides and pruning. Your costs and your clients' water bills can be reduced.

9. Maintain the irrigation system so every drop counts

Description

Every drop of water that is supplied to the landscape by irrigation should be protected from loss due to evaporation, overspraying or runoff. Irrigation systems that do not leak, overspray or gush water are critical to conserving water.

Applications

- Mulch to reduce evaporation.
- Keep the rain shut off device in working condition.
- For overhead spray systems, check and adjust the system regularly for:
 - Matched precipitation rate (MPR) nozzles
 - Low, buried sprinklers
 - Incorrect nozzles
 - Overspray
 - Head to head coverage
 - Improper pressure
 - Leaks near unusually tall, green vegetation, muddy or eroding spots
- Repair leaks and broken sprinklers immediately. Use originally specified materials or materials of superior quality and efficiency.
- Keep in mind that it may take more diligence with drip systems to notice leaks and troubleshoot other problems.
- Become IA certified. Contact the Irrigation Association at www.irrigation.org.

Benefits

Properly maintained irrigation systems not only save water but can also avoid unnecessary plant, fencing and asphalt replacement costs and increase property values. They can also decrease the use of energy for pumping and moving water, which in turn reduces greenhouse gas emissions.

It is estimated that overwatering causes 85% of all landscape problems.

SOURCE: A CONSUMER'S GUIDE TO WATER CONSERVATION, AMERICAN WATER WORKS ASSOCIATION

10. Request an irrigation audit

Description

FREE water use surveys for landscapes, offered by many local water districts provide your commercial or homeowners association customers with practical information for improving landscape quality and reducing water costs. Utility company staff will demonstrate how to use irrigation equipment efficiently.

Applications

Your local water district is often a good source for information on water conservation. Many offer free irrigation audits of existing landscapes. An audit includes landscape area measurements and an analysis of distribution uniformity, irrigation scheduling, and overall system performance.

Benefits

Additional practices for conserving water may be identified. You can then demonstrate to the clients how your skills can save them money on their water bills. Customer satisfaction will be increased.

“I believe we can reduce urban landscape water use by 50%. Irvine has seen water use decline from 4.4 acre-feet per acre in 1990 to 1.9 acre-feet per acre in 2003.”

SOURCE: TOM ASH, LANDSCAPE WATER USE: WHAT TO KNOW & WHAT TO DO NOW, ECO-LANDSCAPING: PROFITING FROM A GREEN FUTURE, 2004.



TIPS FOR SUCCESS

Rebates for Irrigation Upgrades

Many water districts offer free commercial landscape irrigation audits and irrigation upgrade programs.

Customers of East Bay Municipal Utility District (EBMUD), for example, may qualify for rebates of 50% of the material costs of installing water-efficient irrigation equipment for existing irrigation systems, up to \$10,000 per site, \$5,000 per account (meter). Sites must have had a site survey to participate in the program.

Contact your local water supplier, or EBMUD at (510) 287-0591 or visit their website at www.ebmud.com, for information on how to apply for rebates.

See *Conserve Water* in the Resource Section of this book for a listing of water districts in the Bay Area.

“We ask to see our clients’ water bills, and show them what we can do to save them money.”

— George Pacheco, Owner/President, Pacheco Brothers Gardening, Hayward



Irrigation water running into the street contributes to excessive water bills and damage to pavement.

PHOTO: DAVE LANGRISH, EBMUD



5. CONSERVE ENERGY

The need to conserve energy is as important to Bay-Friendly landscaping as the need to conserve water. Both are increasing concerns in California as energy shortfalls and droughts continue to occur throughout the West. Energy and water are related — it takes a lot of energy to supply water to our landscapes.

Conventional landscapes also directly consume large amounts of fossil fuels. Nationally, forty million lawnmowers consume 200 million gallons of gasoline per year, representing a huge investment of energy for this one landscape maintenance task. What's more, the US EPA estimates that the few ounces spilled during each refueling of lawn and other garden equipment — during the summer only — totals 17 million gallons of gasoline nationwide. And energy use means releasing greenhouse gases that are contributing to global warming.

Landscape designers, installers and professional maintenance staff can play an important role in conserving energy. Include these Bay-Friendly, energy conserving practices in your design or service program:

I. Shade buildings to moderate temperatures

Description

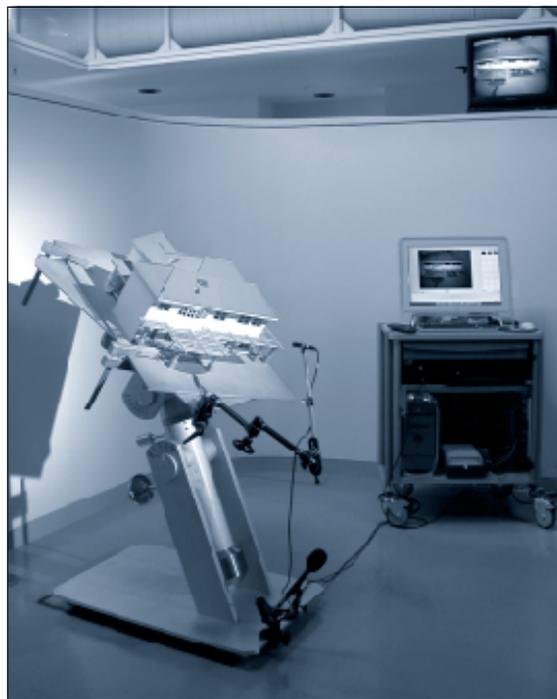
Trees conserve energy by shading, cooling the air through evapo-transpiration and reducing the velocity of wind. Selecting and placing trees to shade adjacent buildings in the summer or protect them from the prevailing winter winds can moderate building temperatures.

Benefits

When properly placed, mature trees can reduce the interior temperature of a building by as much as 20 degrees, reducing summer cooling costs by 25-40%, and reducing greenhouse gas emissions.

Applications

- Plant trees to the west of a building for maximum shading benefits. Avoid planting trees that block solar collectors or in front of south facing windows that allow the low winter sun to warm a building, especially in cooler regions of the Bay Area.
- Large deciduous trees will be of greater value for summer cooling and winter solar gain.
- Select evergreen trees for windbreaks.
- Select trees that are appropriate for the soil type, water use and exposure. If possible, select trees that have low water requirements.
- Plant larger trees at least 20 feet from the foundation. Plant smaller trees a minimum of 10 feet from the foundation.
- For more info go to the following websites: <http://cufr.ucdavis.edu> and www.pge.com.



COPYRIGHTED BY PACIFIC GAS AND ELECTRIC COMPANY
PHOTO PROVIDED BY PACIFIC ENERGY CENTER STAFF

This model demonstrates the shading effects of design, landscape, and orientation during three seasons of the year. To schedule use of the heliodon contact www.pge.com/pec/heliodon.

2. Reduce the heat island effect

Description

Parking lots and streets are significant sources of heat and pollutants (parked cars emit hydrocarbons that contribute to the formation of ground level ozone), as well as often being unattractive. Trees reduce the amount of heat stored in, or reflected from, paved surfaces which can contribute to increased building and car temperatures.



PHOTO: THE OFFICE OF CHERYL BARTON

Light colored, stabilized, compacted soil, in lieu of asphalt was used to surface this parking lot, reducing heat island gradients by 30%.

Applications

- Check with your local municipality for minimum tree requirements in parking lots: then specify more.
- Select and plant trees that are appropriate for the site in terms of soil type, water use and exposure.
- Choose as large a tree as possible but be sure it will be allowed to grow to its natural shape and size in the allotted space.
- Use open grid paving.
- Also, select light colored, reflective paving materials.
- And consider shading paved areas with photovoltaic arrays.

Benefits

Patios & cars can be much more comfortable in the summer. Air quality can be improved. Costs of cooling adjacent buildings may be lowered.

3. Shade air conditioners

Description

Limiting the sun that shines directly on an air conditioner will keep it cooler and running more efficiently.

Applications

- Choose a shrub or tree that will match the soil and microclimate.
- Or build a freestanding arbor with deciduous vines to provide shade.
- Do not obstruct airflow around the unit.

Benefits

The air conditioner runs more efficiently, which will reduce your client's utility bill.

What Large Trees Mean:

- More shade = More energy savings.
- Cleaner air = Better health and fewer hospital visits.
- More stormwater = Lower costs for management stormwater controls.
- More shaded streets = Longer time between resurfacing.

SOURCE: CENTER FOR URBAN FOREST RESEARCH, DAVIS, CA, 2003

“Compared to a small-stature tree, a strategically located large stature tree has a bigger impact on conserving energy, mitigating an urban heat island and cooling a parking lot.”

— James Geiger, Center for Urban Forest Research, Davis



TIPS FOR SUCCESS

Shade Effectiveness in Parking Lots

Parking lots are thermal hot spots. Many cities in California have ordinances that require shading of paved area by trees. Implement the suggestions below to ensure that you maximize shading:

- Become familiar with local ordinances and their recommended tree lists.
- Include only trees that are on the local ordinance's recommended tree list.
- Be sure crown diameters on parking lot plans are not overstated.
- Do not allow smaller-size substitutions after the plans have been approved.
- Follow-up to ensure trees are actually planted, as well as not removed after planting, especially at sites near store fronts where trees could obstruct signs.

ADAPTED FROM: FACT SHEET #3: MAKING PARKING LOTS MORE TREE FRIENDLY, CENTER FOR URBAN FOREST RESEARCH, PACIFIC SOUTHWEST RESEARCH STATION, USDA FOREST SERVICE, DAVIS, CA, 2002.

4. Design lighting carefully

Description

Outdoor lighting consumes a large fraction of the electricity used in the United States. Site lighting can be designed to use less energy and minimize light pollution and trespass.

Applications

- Identify lighting goals and determine lowest acceptable levels.
- Use only fluorescent, high-intensity discharge (HID), or low pressure sodium lamps.
- Specify Energy Star, photovoltaic or 12-volt for 100% of outdoor building and site fixtures.
- For security, use lights with a photocell or motion sensor lights instead of all night illumination.
- Specify that all exterior luminaries emit no light above horizontal OR are Dark Sky certified. Visit www.darksky.org for a list of fixtures approved by the International Dark Sky Association.
- Prevent light trespass by selecting and placing fixtures that will not spill light onto neighboring properties.

Benefits

Power and energy use can be decreased. Lower operating costs can often recover higher initial purchase costs of newer more efficient lamps.

5. Choose and maintain equipment for fuel conservation

Description

Equipment is most often selected for its speed, cost and ease of use. However, reducing fossil fuel consumption is one of the most important practices the landscape professional can do to protect the environment, while lowering the cost of operating the equipment.

Applications

- Use hand powered equipment when possible and take pride in the quality of the work.
- Minimize the use of gas-powered blowers.
- When using machinery, choose the smallest, most fuel efficient, lowest emission machinery required to get the job done.
- As you upgrade your equipment & vehicles, select for fuel economy and low emissions. Select vehicles that operate on biodiesel — or convert existing vehicles.
- Keep every piece of equipment and vehicle tuned.
- Recycle plant debris on site to minimize fuel consumption for hauling.
- Require employee carpooling to sites and plan maintenance routes carefully.
- Track the gallons of gas your business consumes and set goals to reduce that consumption.

Benefits

Manual labor may make the most economic sense for many landscape operations. You can cut the cost of fuel while protecting the health of your staff, and local air and water quality.

6. Specify low embodied energy materials

Description

Embodied energy is the energy consumed by all the processes associated with the production of an item, from the acquisition of natural resources to the delivery of the final product. The single most important factor in reducing the impact of embodied energy is to design long lived and adaptable landscapes. Transporting items the least distance reduces fuel consumption and air pollution and supports local economies.

Applications

- Consider the source and embodied energy of all materials in the landscape, including stone, gravel, plants, lumber, furniture, etc. Use local stone, for example, rather than limestone shipped from the Midwest.
- Select smaller container stock to increase the number of plants per delivery. Smaller plants also transplant better.
- Use recycled and less highly processed materials, and avoid petroleum-based products, including synthetic fertilizers.

Benefits

Buying locally produced and low embodied energy products often reduces the cost of an item, as well as the hidden environmental costs of transporting materials, such as pollution.

“We use so much fossil fuel that the energy that is used consumes more oxygen from the atmosphere than the landscapes actually provide.”

— Bob Perry, Landscape Architect, Professor Emeritus, Cal Poly, Pomona

6. PROTECT WATER AND AIR QUALITY



Bay-Friendly landscaping can help protect our *water* from pollution by:

- ✓ Increasing on-site infiltration and reducing runoff
- ✓ Reducing contaminants in runoff
- ✓ Increasing the soil's ability to remove pollutants from runoff

In an undisturbed landscape, only 15% of the rainwater leaves the system through surface water runoff. More than one-third moves into the soil where living, biologically diverse organisms break down and naturally filter out pollutants, before it reaches groundwater or our waterways.

As land is developed into residential or commercial landscapes, roads and parking lots, major changes occur:

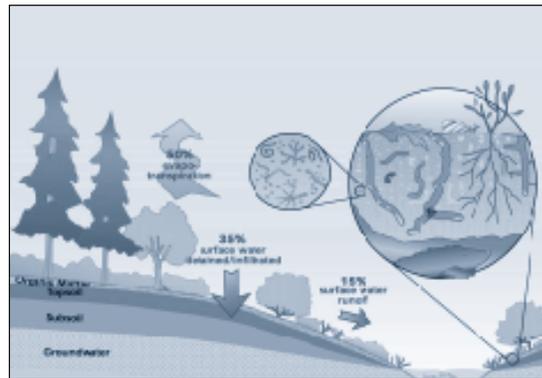
- More water runs off the surfaces — as much as 70% of all rain and irrigation water runs into waterways without moving through soil.
- The soil supports less microbial life and is less able to filter harmful chemicals out of the little water that infiltrates and moves through soil.

What happens next? Flash floods scour creek banks. Erosion of channels is greatly accelerated. As little as 10% impervious surface causes significant degradation of streams.

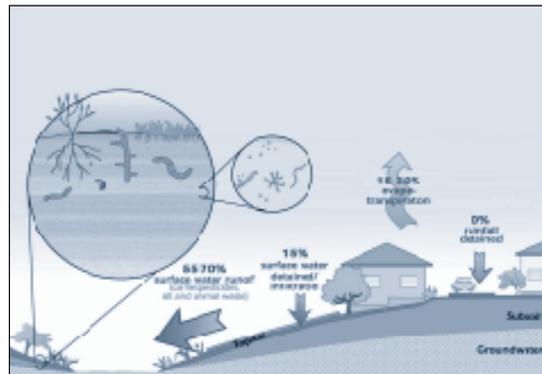
Pollutant load also increases. An acre of parking lot collects as much as 4 gallons of oil, gasoline and diesel fuel each year. When it rains and water runs off the parking lot, these toxic compounds are discharged into local creeks where they may eventually enter the Bay. Other pollutants include trace metals, pesticides, nutrients from fertilizers and pet waste, trash and suspended soil particles from poorly vegetated ground.

Stormwater runoff, from both residential and commercial sites, thus becomes a large source of pollution.

At the same time air pollution from power equipment used in conventional landscaping takes an enormous toll on our environment. Gas powered garden tools emit 5 percent of the nation's air pollution. Plant debris is hauled to the landfill in vehicles that pollute the air; and once there, the materials decompose without oxygen and in the process emit greenhouse gases.



Healthy, Undisturbed Soils. A healthy vibrant soil structure teeming with micro and macro organisms. The presence of abundant organic material allows the soil to hold and retain water, and bind and degrade pollutants.



Unhealthy, Disturbed and Paved Soils. A soil structure impacted by human activity with limited organic life. Erosion and surface water run-off are high.

SOURCE: THE RELATIONSHIP BETWEEN SOIL AND WATER, KING COUNTY DEPARTMENT OF NATURAL RESOURCES.

3 Principles & Practices

Bay-Friendly landscaping can help protect our *air* from pollution by:

- ✓ Reducing fossil fuel consumption
- ✓ Recycling plant debris on site
- ✓ Planting trees to remove CO₂ and absorb air pollutants

Make the connection between Bay-Friendly and reducing the emissions that cause global warming — and distinguish yourself in the marketplace.

Integrated Pest Management (IPM) is a holistic approach to controlling insects, plant diseases, weeds, and other pests. IPM programs integrate the use of many environmentally-sound strategies for managing, but not necessarily eliminating, pests. First and foremost, IPM seeks to prevent pests by fostering a healthy environment in which plants have the strength to resist disease and insect infestations and to out-compete weeds. An IPM approach requires an understanding of the life cycles of pests and beneficial organisms and regular monitoring of their populations. If a pest problem is identified, IPM then considers all viable solutions and uses a variety of techniques to control pests, rather than turning only to pesticides. The least toxic pesticides are used as a last resort only. IPM offers a great opportunity to market your skills to your clients by providing the following services:

I. Use Integrated Pest Management

A. Prevent pest problems

Description

Applying the best landscape design, construction and management practices to prevent pests is always preferable to trying to control them after they become established.

Applications

Design to prevent pests by:

- Choosing a diversity of species that are well suited to the site.
- Selecting resistant varieties and local native species, including species that attract beneficial insects.
- Placing plants at proper distances from buildings, giving them space for adequate air circulation and room to reach their natural size and shape.
- Avoiding over-planting for instant color.
- Including compost in the soil specifications

Prevent pests during landscape construction and maintenance by:

- Selecting plant material that is free from disease and insects.
- Planting at the right depth.
- Watering thoroughly but not over-watering.
- Sheetmulch, see page 31.
- Keeping mulch on the surface of the soil at all times.
- Using slow release fertilizers if soil tests indicate their need, and not over-fertilizing.
- Pruning judiciously — severe pruning stimulates new growth, stresses plants and encourages pests and disease.
- Eliminating noxious weeds before they go to seed or spread uncontrollably.

- Cleaning equipment after use.
- Inspecting and removing invasive plant parts or seeds from your clothing, tools and vehicle before leaving an infested site.
- Cleaning up wood, fruit and other plant material that is infected with disease — compost the debris only if you have the experience to get the compost pile to temperatures over 135° F for an extended period.

Benefits

A healthy, diverse landscape that prevents pests in the first place is critical to eliminating the need for pesticides, thereby reducing pollution and protecting the health of the San Francisco Bay.

IPM for Weed Control

Prevent weeds first:

- Purchase only weed free plants and compost
- Use drip irrigation to apply water only to desired plants
- Use mulch to suppress weeds. Sheet mulching is an effective strategy that layers cardboard, compost and then coarse mulch (see page 31).

Monitor weeds:

- Create a map that locates the species and density of weeds

Try cultural, mechanical & physical controls before reaching for the herbicides:

- Flame weeders use a targeted flame to kill weeds and are very effective for controlling weeds in sidewalks and other hardscapes.
- Boiling water, hot foam and high pressure steam both work to kill weeds and are a better option in areas where an open flame may be hazardous.

Select herbicides as a last resort & use the least toxic:

- Corn gluten meal is a pre-emergent herbicide that also acts as a fertilizer. The timing of the application is important, if it is used after weeds have started growing, they will actually benefit from its fertilizing properties.
- Horticultural vinegar, or acetic acid, is also effective at killing certain weeds. Use with caution since acetic acid greater than 5% can cause skin irritation or eye damage.
- Herbicidal soaps are highly refined soaps that can penetrate the waxy coating on plant leaves, causing them to dry out. Some of these products also contain essential oils that enhance their herbicidal properties.

ADAPTED FROM QUARLES, WILLIAM, *SAY GOOD-BYE TO WEED WORRIES*, FINE GARDENING, 80, PP. 48-51 AND BEYOND PESTICIDES FACT SHEET: *LEAST TOXIC CONTROL OF WEEDS*.

I. Use Integrated Pest Management

B. Train your staff to identify and monitor pest & beneficial populations

Description

A critical part of an integrated pest management program is “watchful waiting”—observing the site at regular intervals in order to understand whether populations are increasing or decreasing and what harm pests are doing. It is likely that most organisms in the landscape are actually beneficial. Living soils, for example, can support billions of beneficial organisms, which suppress the fewer disease-causing organisms. Many insects naturally feed on other pest insects—some even feed on weeds. Insects provide food for birds, reptiles and amphibians. Raptors and snakes eat rodents. Immediately pulling out the big guns in the form of pesticides will kill the beneficial organisms along with the pests, which can lead to more problems as the balance between the two is disrupted.

Applications

- Provide your staff with the time and resources to learn to identify both pest and beneficial organisms.
- Check plants often for vigor and signs of pests.
- Train your residential clients to monitor and record pest populations.
- Clarify which problems are the result of pests and not other factors, such as overwatering.
- Evaluate the results of any treatments.
- Check regularly with the University of California (www.ipm.ucdavis.edu) or subscribe to the *IPM Monitor* from the Bio-Integral Resources Center (www.birc.org) for up-to-date resources and information.

Benefits

Your staff enjoys greater job satisfaction as they learn additional, valuable skills. Beneficial organisms are given the opportunity to control pests. If a problem does develop, you can catch it just as it is reaching a level that needs control.

C. Educate your clients

Description

Many clients have unrealistic standards of absolute pest control and will require education. Landscapes can tolerate certain levels of pests without causing significant or even noticeable damage. Small populations of pest organisms are necessary to establish healthy populations of predators.

Applications

- Educate your clients about the role of beneficial organisms and ask them to consider some damage as a sign of a balanced, thriving ecosystem. Encourage them to raise their threshold of acceptable damage.
- Ask yourself and your clients if treatment is even necessary before developing a strategy for managing a pest problem.
- Fact sheets on alternative pest control strategies are available at www.ourwaterourworld.org or from the UC Statewide IPM Program at www.ipm.ucdavis.edu or the Seattle Green Gardening program at www.ci.seattle.wa.us/util/proipm/default.htm.
- In the case of ongoing pests, advise your clients that removing a particular problem plant may be the best solution.

Benefits

Insects and other pests can be accepted as an integral component of any ecosystem, in which case they are not controlled until they cause an unacceptable level of damage. The need for pesticides may be reduced or eliminated.

D. Control pest problems with physical & mechanical controls

Description

When pests are identified as the source of unacceptable levels of damage, physical barriers or mechanical techniques for excluding or removing pests should be implemented as a first line of control.

Applications

- Learn about and specify sheet mulching to prepare the soil and control weeds.
- Weeds can also be controlled by using drip irrigation and a minimum 2-inch layer of coarse mulch.
- Flame seedlings.
- Hoe or pull established weeds.
- Spray aphids with a strong jet of water.
- Use sticky traps around tree trunks to keep ants and other insects away.
- Hand-pick large adult insect pests and larvae as they appear.
- Remove dead or diseased plants or plant parts—hot composting the debris will kill disease-causing organisms.

Benefits

Pests can be kept at acceptable levels thereby reducing the need for pesticides. Pollutants are kept out of stormwater in the first place.

In a study conducted for the Bay Area Stormwater Management Agencies Association in California, 75% of people surveyed indicated a willingness to try less toxic alternatives to manage household pests if they were available. They ARE!

I.E. Control pest problems with biological controls

Description

Biological control is the use of living organisms to control pests. Knowing the life cycles of the pest and its enemies is important to maximizing the efficiency of any biological control.

Applications

- Encourage beneficial insects by planting a wide variety of plants that flower throughout the year.
- Introduce natural predators, parasites and beneficial microbes. Parasitic nematodes are effective for control of pests. *Bacillus thuringiensis* (Bt) is a bacterium that kills caterpillars, including those of non-pest moths and butterflies. (Do not use Bt in a butterfly garden.) Compost tea introduces large and diverse populations of microbes that can suppress some leaf and root diseases.
- Buy all biological controls from a reputable source.
- Do not use pesticides, especially broad spectrum pesticides, when using beneficial organisms.
- Goats, used with care, can be an excellent means of controlling poison oak, blackberries and other vegetation and in the process, returning nutrients to the soil.

Benefits

Beneficial organisms feed on or parasitize pests, potentially reducing the cost of purchasing and applying pesticides. Your staff will not be applying dangerous pesticides, which may reduce your liability.

Pesticides to Avoid:

- Metaldehyde
- Pyrethroids
- Disulfoton
- Bifenthrin
- Carbaryl
- Cypermethrin
- Malathion
- Cyfluthrin
-
- Permethrin

Use with Caution:

- Pyrethrins
- Imidacloprid
- Fipronil

SOURCE: KELLY MORAN & MARY LOUISE FLINT,



“I grew up in the nursery business. The older generation had a lot of health issues, a lot of cancer. For ourselves and our own health and safety, we should try to eliminate toxics. Why should a beautiful landscape be purchased with the health of the people who work on it?”

— Glen Schneider, Proprietor, Glen Schneider Gardening, Berkeley



TIPS FOR SUCCESS

Attracting Beneficial Insects

Attract these beneficial insects	By planting these species
Bigeyed bug	Native grasses <i>Polygonum</i> sp. (Silver Lace Vine)
Hoverflies	<i>Achillea</i> sp. (Yarrow) <i>Asclepias fascicularis</i> (Narrowleaf Milkweed) <i>Baccharis</i> sp. (Coyote brush, Mulefat) <i>Ceanothus</i> sp. (California Lilac) <i>Eriogonum</i> sp. (Buckwheat) <i>Prunus ilicifolia</i> (Hollyleaf Cherry)
Lacewings	<i>Ceanothus</i> sp. (California Lilac) <i>Prunus ilicifolia</i> (Hollyleaf Cherry)
Lady beetles	<i>Achillea</i> sp. (Yarrow) <i>Asclepias fascicularis</i> (Narrowleaf Milkweed) <i>Atriplex</i> sp. (Quailbush, Saltbush) <i>Ceanothus</i> sp. (California Lilac) Native grasses <i>Rhamnus californica</i> (Coffeeberry) <i>Salix</i> sp. (Willow)
Minute pirate bug	<i>Achillea</i> sp. (Yarrow) <i>Baccharis</i> sp. (Coyote brush, Mulefat) <i>Eriogonum</i> sp. (Buckwheat)
Parasitic & Predatory Wasps	<i>Achillea</i> sp. (Yarrow) <i>Aesclepias fascicularis</i> (Narrowleaf Milkweed) <i>Eriogonum</i> sp. (Buckwheat) <i>Myoporum</i> sp. (Boobialla)
Tachnid flies	<i>Achillea</i> sp. (Yarrow) <i>Eriogonum</i> sp. (Buckwheat) <i>Heteromeles arbutifolia</i> (Toyon) <i>Myoporum</i> sp. (Boobialla) <i>Rhamnus californica</i> (Coffeeberry)

ADAPTED FROM CORNFLOWER FARMS WILDLAND/AGRICULTURE CATALOG, 2006

I.F. Control pest problems with the least toxic pesticide as a last resort

Description

The least toxic and least persistent pesticide is used only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. The goal is to reduce the population of the pest organisms with the least toxic pesticide that will control the pest but not harm the organisms or the environment.

Applications

- Do not use pesticides on a prescheduled basis.
- Learn the life cycle of the pest to maximize pesticide efficiency.
- Consider naturally occurring pesticides before synthetic. For example, soaps and oils can be used for control of aphids and other insect species. Sulfur controls fungal diseases. Corn gluten is available as a pre-emergent weed control. Acetic acid based sprays are becoming available for use on weed seedlings.
- If synthetic pesticides are identified as the last resort: choose the least toxic and the least persistent.
- Do not assume a high percentage of inert ingredients means the product is not hazardous.
- Do not use broad-spectrum, synthetic chemical pesticides.
- Spot spray weeds or use an ultra low volume sprayer to apply the absolute minimum amount.
- Keep pesticides out of gutters, stormdrains, and off sidewalks, driveways and other hard surfaces, and dispose of leftover product properly.

Benefits

Using the least amount of the least toxic pesticide helps to protect water quality and demonstrates your commitment to the health of your clients and staff, the community and the Bay.

2. Eliminate high input decorative lawns

Description

Installing large turf areas solely for their looks is resource inefficient. One study estimated that over a 20 year period, the cumulative cost of maintaining a prairie or a wetland totals \$3,000 per acre versus \$20,000 per acre for non-native turf grasses.

Applications

- Plant groundcovers, shrubs, or trees, instead of turf.
- Replace lawns, especially those on steep slopes, in shady areas or near creeks and wetlands with native plant meadows or grassy swales that treat stormwater and resemble native grasslands.

Benefits

The need for irrigation, synthetic fertilizers and pesticides can be reduced or eliminated, thus protecting water quality.



PHOTO: TAMARA SHULMAN



“Grasses are really a huge, flexible family.

Native and non-native grasses can be planted to match site conditions in ways that mimic natural grasslands and don't use a lot of resources. You don't have to mow them. They can become meadows.

— Michael Baefsky, Landscape Ecology Consultant, Baefsky & Associates, Orinda

3. Minimize site disturbance

Description

In general, soil should have 100% plant or mulch cover, since exposed soil surfaces are highly susceptible to runoff and erosion, especially along slopes and waterways. Often, natural hydrological features are destroyed by grading and with the exception of a few large trees, native vegetation is typically removed from a site before building or landscaping. Doing so exposes the soil to erosion, and the resulting loss of topsoil depletes the soil of its organic, living component and clogs waterways. It turns nature on its head by turning a valuable resource into a pollutant.

Applications

- Design and implement a plan to defend against erosion, as described in *Nurture the Soil*.
- Retain natural topographic features that slow and store storm flows and/or do not increase steep continuous slopes.
- Limit overall cut and fill through efficient road design and lot layout.
- Limit clearing to road, utility building pad, landscape areas and the minimum area needed to maneuver.
- Use mulch regularly. Place it in a way that keeps it out of stormwater.

Benefits

Vegetation, topography and hydrology is undisturbed and erosion is prevented. Sediment does not clog waterways.

4. Choose and maintain your materials, equipment & vehicles carefully

Description

Lawn mowers, chain saws and leaf blowers emit significant amounts of pollutants. According to the US EPA, a gas-powered lawn mower emits 11 times the air pollution of a new car, per hour of use. In addition, operators are typically positioned where exposure to toxic emissions is greatest.

Applications

- Upgrade to low emission equipment.
- Inspect and maintain all equipment to keep it performing optimally. Repair oil leaks immediately.
- Don't repair equipment on site.
- Dispose of spent oil properly
- Refuel carefully. Do not refuel near a creek or drainage area.
- Consider your routes and always carpool to sites.
- Specify low or zero VOC paints, sealants, solvents and adhesives.
- Use sustainably harvested wood (FSC Certified) if plastic or composite lumber is not appropriate. Use treated wood that does not contain chromium or arsenic for any application that specifies treated lumber.

Benefits

Fuel consumption is minimized. Air, water and noise pollution can often be reduced. Worker and community health will be protected.

5. Keep soil & organic matter where it belongs

Description

Organic matter, added to the landscape in the form of mulch or compost, supports soil microbial life, which filter out pollutants. But it can become a pollutant when it enters the stormdrain.

Applications

Amend soil with compost as described in the section *Nurture the Soil*. But be sure to keep organic matter from being washed or blown into the gutter or stormdrain where it could become a pollutant by:

- Using compost filter socks around stockpiled organic matter.
- Storing it away from creeks and stormdrains.
- Sweeping every day during construction.
- Minimizing the use of blowers and using them carefully so you are not removing topsoil.
- Switching to gravel or cobblestone mulch in areas of high surface water flow.
- Keeping fallen leaves, grassclippings, and other plant materials away from storm drains, creek banks, and the shoreline.

Benefits

Organic matter does not become a pollutant but rather, increases the soil's ability to remove pollutants, thereby protecting our watershed. It also increases the soil's pool of sequestered carbon dioxide.

Why calendar-based spraying doesn't work:

- Over 2/3 of plant problems are not caused by any living pathogen. More often than not, the problem is from improper soil conditions, watering or fertilizing practices and other cultural problems.
- If a pathogen or other pest is present, it must be treated at the correct point in its life cycle. Pest organisms do not grow on a regular calendar basis. It is likely the timing of spraying based on the calendar would be too early or too late to be effective.
- Timed sprays endanger the beneficial organisms. Healthy landscapes with a diversity of birds, insects, microbes and other organisms can often keep pest populations under threshold levels, making chemical treatment unnecessary.

ADAPTED FROM: *PROIPM FACT SHEET*, GREEN GARDENING PROGRAM, SEATTLE, WA.

6. Minimize impervious surfaces

Description

Watershed quality decreases rapidly when the total impervious area exceeds 10%. Yet typical single-family housing projects have 25-50% impervious surfaces. Asphalt and concrete for parking lots and driveways can be formulated to be porous. Crushed rock and mulch add a striking element to the design while allowing water infiltration. Pervious pavers which can include low growing groundcovers or gravel also facilitate water infiltration into the soil.

Applications

- Keep impervious surfaces to a minimum: Use porous surfaces, including permeable paving, and maximize landscaped area to encourage infiltration.
- Avoid contiguous impervious surfaces. Do not directly connect impervious areas to the stormdrain.
- Decrease parking lot sizes by narrowing the aisles between rows and increasing the ratio of compact to full size spaces. For more information contact the Center for Watershed Protection at www.cwp.org.
- Remove all unnecessary impervious paving. Go to www.StopWaste.Org or check with your local hauler for more information on where to recycle asphalt & concrete.

Benefits

Increasing porous surfaces decreases runoff, protects the biology of the San Francisco watershed and contributes to the restoration of our local streams, creeks and wetlands.



PHOTO: DAVID GILMORE

7. Plant and protect trees

Description

Trees can intercept significant amounts of rainfall each year and thus help control stormwater runoff. The Center for Urban Forest Research estimates that the the continuous tree canopy in Oakland intercepts 4 inches of rain over one acre in a typical year — about 108,000 gallons. Their root growth also increases the ability of soil to take in rainfall.

Applications

- Select trees that match the microclimate and soil characteristics.
- Select California natives or other low water use species.
- Specify large stature trees in as many appropriate places as possible.
- Plant in groves and hydrozones.
- Provide adequate soil volume, amended as per a soil analysis.
- Inspect tree health regularly.
- Maintain and prune appropriately.
- Design the landscape to protect 80% or more of existing, mature, healthy trees and include penalties for destruction of protected trees in the construction contract.

Benefits

Appropriately planting more trees decreases runoff and protects water quality. Trees also absorb air pollutants, thus protecting air quality. Dollar for dollar, larger trees deliver 8 times the benefits of smaller trees.

“In the City of Berkeley’s Parks, Recreation and Waterfront Department we do not use any pesticides. As an Arborist, I mainly deal with tree issues, and with most insect problems I face, the insect is gone in a week or so. It’s like having a cold. It passes.”

— Jerry Koch, Arborist, Parks Recreation & Waterfront Department, City of Berkeley



TIPS FOR SUCCESS

Pervious Concrete

Pervious concrete is a high cement content mix manufactured with a low water-cement ratio and without fine aggregate that:

- Meets NPDES regulations
- Provides for groundwater recharge
- Has the same structural integrity as conventional concrete

When compared to a conventional asphalt parking lot requiring stormwater system tie-in and first flush pollution measures, pervious concrete parking lots are by far the lower initial cost solution.

SOURCE: *PERVIOUS CONCRETE*, CONCRETE PROMOTION COUNCIL OF NORTHERN CALIFORNIA, WWW.CPCNC.ORG.

8. Manage and maintain the irrigation system carefully

Description

A poorly maintained irrigation system wastes water, adds to surface runoff, and damages property.

Applications

- Match watering schedule to plant needs, soil type, slope and season.
- Eliminate leaks and spraying onto sidewalks immediately.
- Install rain shut-off devices.
- Upgrade to new technology irrigation controllers that adjust watering schedules to reflect weather conditions or soil moisture and include a rain shut-off device.
- Refer to applications in the section *Conserve Water*.

Benefits

Water will be conserved, runoff reduced and your customer may save money on water bills, while protecting the San Francisco Bay watershed.



PHOTO: RICHARD ROLLINS

Rain is directed into landscape beds. Rock cobble around stormdrains prevents mulch from entering the drain.

9. Design a system to capture and treat water

Description

Catching, slowing and retaining water will promote infiltration and removal of pollutants, as well as minimize stormwater runoff. It can also add beauty and value to the landscape. Studies indicate that home values and leases of commercial buildings are higher if the building overlooks, or the home is within 300 feet of a water element.

Applications

- Limit grading to protect existing patterns of drainage and retain natural topographic features that slow and store storm flows.
- Incorporate design measures and treatment controls, such as landscape beds, detention basins, ponds, stormwater wetlands and/or vegetated swales, that are sized to treat at least 85% of average annual runoff.
- Divert rain water from all down spouts to planters, swales or landscaped areas. Capture and filter runoff from parking lots into islands or planter strips or other treatment controls.

- Design bioswales with flat bottoms of at least 18 inches across, and/or rock cobble at points of concentrated flow.
- Specify turf alternatives for bioswales.
- Plant a 24 inch buffer zone between areas receiving spray irrigation and impervious surfaces to keep over-spray and runoff out of stormdrains.

Benefits

Stormwater runoff is reduced while water recycled on site fosters the removal of pollutants and encourages biodiversity. Downstream engineering costs are decreased. Property values can be increased.



PHOTO: RICHARD ROLLINS

Site water flows to a bioswale, enhancing on-site infiltration and reducing contaminants.



TIPS FOR SUCCESS

Using Dry Wells to Capture Water from Downspouts

Directing roof runoff to dry wells is a good way to reduce the amount of potable water used for landscape irrigation. Use of dry wells can improve stormwater quality, increase groundwater recharge, decrease runoff volume and peak flows, and decrease flooding potential. The captured water can be reused for watering gardens, lawns and trees. To construct a dry well, dig a hole in the ground — sized according to the amount of rooftop runoff received (typically 4 to 5 feet square and 2 to 3 feet deep, with a minimum of 1 foot soil on top) — and fill with an open graded aggregate. The roof downspout is directed to the dry well which allows the water to infiltrate after a storm. Dry wells must be located at least 10 feet from any building to protect the foundation. Dry wells are less effective in soils with poor drainage. For more information, see "Roof Runoff Controls, SD-11," from the 2003 California Stormwater BMP Handbook: New Development and Redevelopment, www.cabmphandbooks.com.

7. CREATE & PROTECT WILDLIFE HABITAT



Plant and animal diversity is one of the many factors that make the San Francisco Bay Watershed unique and beautiful. More than 1,500 local plant species bloom throughout the year, supporting hundreds of native pollinators, beneficial insects and other organisms that can reduce the need for pesticides. Birds & butterflies are attracted, bringing with them beauty, song and interest to a landscape.

Biodiversity is crucial to the health and resiliency of the local landscape, the Bay area ecosystem and its inhabitants. Yet the loss of habitat is threatening local biodiversity. The population of the Bay Area is growing and expected to continue to do so. With increased populations comes development, which is too often done without regard for wildlife habitat.

And although we tend to rely on parks and open space for preserving wildlife habitat, both residential and commercial landscapes can also play an important role. Developed landscapes can provide food, water, shelter and nesting sites for birds, butterflies, beneficial insects and other creatures, thus helping to conserve valuable wildlife resources and restore damaged ecosystems. Small spaces or corridors, patched together over the entire Bay Area, add up to a great opportunity for encouraging and protecting wildlife.

Offer your skill and expertise to your customers through the following practices for creating wildlife habitat:

I. Diversify

Description

A diverse landscape includes annuals, biennials and perennials of many different sizes, shapes, colors and textures. It includes evergreens and deciduous plants, species that bloom at different times of the year and those that bear fruit or berries. And it includes plants that occupy different canopy levels and root zones.

Applications

- Educate your customers and encourage them to embrace diversity.
- Start with a trial zone, then plan for increasing diversity throughout the landscape over time.
- Recommend to your clients that they convert a lawn that no one uses, or that they replace part of it with a diverse border.
- Select a rich array of plant species that includes many, if not all, California natives.
- Specify layers of groundcovers, shrubs and trees that provide a variety of nesting sites or flower and bear fruit at different times of the year. Refer to the *Tips for Success: Flowering Periods of Beneficial Insects Plants* in this section.
- Do not plant invasive species as they often damage or destroy habitat.



PHOTOS: KIVAN LAM

- Remove weeds: extra effort to clear invasive species now will save labor later.

Benefits

Biodiversity is fostered. A diverse landscape may resist disease and insect pests better than those with little variety, while providing a higher habitat value. A single insect or disease infestation is less likely to be devastating.



Survey Says...

More than 1/2 of single-family households with yards or gardens are interested in creating habitat for birds and pollinators in their yard.

2. Choose California natives first

Description

California native plant species are critical to creating wildlife habitat because local fauna are adapted to them. Research indicates, for example, that indigenous bees prefer native plants over exotic species. The best natives for Bay Area landscapes are local and they are especially important to consider for sites that interface with wild lands. Other California native plants that match the microclimate can also be good choices.

Applications

- Select a variety of appropriate California native species that match the microsites of the landscape.
- Group flowering species in dense stands of at least 16 square feet, rather than plant in isolated single plants, to attract native pollinators.
- Let some plants go to seed for food for wildlife — don't immediately deadhead everything in the garden.
- Consider grouping native plants in communities (refer to pages 17-19).

Benefits

Many natives flourish in the San Francisco Bay Area, often with less water, fertilizers and maintenance. Local wildlife is fostered.



TIPS FOR SUCCESS

Sources of California Natives

Although there are more than 1,500 plants native to the Bay Area, they are only recently becoming popular in the nursery industry. Look for them, or other California natives at the following nurseries:

Albright Seed Company
Carpinteria, (805) 684-0436
www.albrightseed.com

Bay Natives
San Francisco, (415) 285-2240
www.baynatives.com

California Flora Nursery
Fulton, (707) 528-8813
www.calfloranursery.com

Canfield Native Nursery
Sebastopol, (707) 823-3776

Central Coast Wilds
Santa Cruz, (831) 459-0655
www.centralcoastwilds.com

Clyde Robin Seed Company
Castro Valley, (510) 785-0425
www.clyderobin.com

Comflower Farms
Elk Grove, (916) 689-1015
www.comflowerfarms.com

Elkhorn Native Plant Nursery
Moss Landing, (831) 763-1207
www.elkhornnursery.com

Greenlee Nursery
Chino, (909) 393-6544
www.greenleenursery.com

Matilja Nursery
Moorpark, (805) 523-8604
www.matiljanursery.com

Mostly Natives Nursery
Tomales, (707) 878-2009
www.mostlynatives.com

Native Revival Nursery
Aptos, (831) 684-1811
www.nativerivival.com

North Coast Native Nursery
Petaluma, (707) 769-1213
www.northcoastnativenursery.com

O'Donnell's Fairfax Nursery
Fairfax, (415) 453-0372

Pacific Coast Seed
Livermore, (925) 373-4417
www.pcseed.com

Rana Creek Wholesale Nursery
Carmel Valley, (831) 659-2830
www.ranacreeknursery.com

Seedhunt
Freedom
www.seedhunt.com

Sierra Azul Nursery & Gardens
Watsonville, (831) 763-0939
www.sierraazul.com

Suncrest Nurseries, Inc.
Watsonville, (831) 728-2595
www.suncrestnurseries.com

The Watershed Nursery
Berkeley, (510) 548-4714
www.TheWatershedNursery.com

Also ask your current nursery — they'll supply more local CA natives if they know of the interest.



PHOTO: KAMALA BENNETT, SENTIENT LANDSCAPE, INC.

Logs and large stones provide shelter for beneficial soil organisms and small reptiles while adding an interesting element to the landscape.

3. Provide water & shelter

Description

Providing nesting sites, shelter and clean, fresh water is also essential for encouraging wildlife. But care must be taken not to create breeding sites for mosquitoes.

Applications

- Place a birdbath in the garden. Remind your customers to change the water every few days to keep mosquitoes from breeding.
- Learn an organic approach to landscape maintenance from the *Standards for Organic Land Care: Practices for Design and Maintenance of Ecological Landscapes*, from the Northeast Organic Farming Association, www.nofamass.org.
- Select groundcovers, shrubs, and trees that provide a variety of nesting sites.
- Specify rockwalls and boulders as design elements that also provide habitat.
- Install bird and bat houses in locations that are secure and away from a lot of activity.
- Snags are dead trees left in place. Consider leaving wood materials or downed trees if they don't threaten structures or parking areas or create a fire hazard.

Benefits

Water and shelter supports wildlife and adds interesting elements to the landscape.

4. Use organic pest management

Description

Pesticides do not kill only the target pest species. Birds, bees, butterflies and other creatures are also vulnerable — in many cases they are more sensitive to the toxins than the pests. Eliminating or at least using them only as a last resort is one of the most important practices for nurturing wildlife.

Applications

- Refer to the integrated pest management practices in the section: *Protect Water & Air Quality*.
- Use only products allowed by OMRI (see page 33).
- Read the label on every pesticide (including naturally derived pesticides) that you use for toxicity to non-target organisms.

Benefits

Beneficial organisms, which can keep pests under control, are not harmed. The soil's ability to filter out pollutants and suppress disease is fostered.

Contact the Wildlife Habitat Council for information on how both private and corporate landscapes can be managed for wildlife habitat at www.wildlifehc.org.

5. Conserve or restore natural areas & wildlife corridors

Description

Careful site planning, especially for new development along the urban-wild interface is important for protecting biodiversity. Natural areas and corridors increase habitat and range, supporting a diversity of organisms and allowing them to travel safely between sites.

Applications

- Become familiar with local open space requirements.
- Limit earthwork and clearing of vegetation.
- Place impervious surfaces outside of tree drip lines.
- Specify, in the construction contract, penalties for destruction of protected soil, trees and other vegetation.
- On previously developed sites, restore open space by planting native vegetation.
- Build in wildlife corridors adjacent to open spaces, wild lands, and creeks.
- Consider corridors when designing roads and fencing.
- Protect or create a diverse buffer of dense low maintenance vegetation along monocultures, creeks and the bay.

Benefits

The San Francisco Bay Area's open space, plant and animal diversity is protected. Runoff is slowed, streams are cooled and bank erosion is prevented.



TIPS FOR SUCCESS

Flowering Periods of Plants that Attract Beneficial Insects

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Salix</i> sp. (Willow sp.)												
<i>Ceanothus</i> sp.												
<i>Baccharis viminea</i> (Mule Fat)												
<i>Achillea</i> sp. (Yarrow sp.)												
<i>Rhamnus californica</i> (Coffeeberry)												
<i>Prunus ilicifolia</i> (Holly-Leaf Cherry)												
<i>Eriogonum</i> sp. (Buckwheat sp.)												
<i>Sambucus</i> sp. (Elderberry sp.)												
<i>Heteromeles obtusifolia</i> (Toyon)												
<i>Myoporum parvifolium</i> (Creeping Boobialla)												
<i>Asclepias fascicularis</i> (Narrowleaf Milkweed)												
<i>Baccharis pilularis</i> (Coyote Brush)												

ADAPTED FROM CORNFLOWER FARMS WILDLAND/AGRICULTURE CATALOG

4

Bay-Friendly Landscape Scorecard

“Conscientious landscape professionals are seeking ways to balance environmentally sound practices with business demands. Many successful companies have adopted win-win sustainable landscaping strategies for the benefit of their business, their employees and the environment.

SOURCE: SAN FRANCISCO BAY CHAPTER OF THE CALIFORNIA LANDSCAPE CONTRACOR'S ASSOCIATION, FROM: INTRODUCTION TO, "PRESERVING THE ENVIRONMENT AND GROWING YOUR BUSINESS" SEMINAR, 2002.

Bay-Friendly Scorecard for Commercial & Civic Landscapes

2008 Version

This scorecard tracks Bay-Friendly features incorporated into the design and construction of new landscapes. The minimum requirements for a Bay-Friendly Landscape are: earn a total of 60 points or more; and complete the 9 required practices indicated by the "R" in the columns labeled "Possible Points."

A. Site Planning	Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
	POSSIBLE POINTS						
1. Select and evaluate the site carefully							
a. Submit the completed Bay-Friendly Site Analysis before 100% design development documents	5						
b. The site is located within an urban growth boundary and avoids environmentally sensitive sites	3						
c. The site development results in the clean up of a contaminated site (i.e. brownfield) or is in a designated redevelopment area						3	
2. Consider the potential for fire							
a. For sites adjacent to fire sensitive open space or wildlands only: Submit a Fire Mitigation Plan	5						
3. Keep plant debris on site							
a. Produce mulch from plant debris							
i. Design documents specify areas under tree & shrub canopies and at least 10 feet away from hard surfaces and storm drains, to be used as a leaf repository for mulch		1					
ii. Construction documents specify that of the trees identified for removal, some are chipped for use as mulch onsite		1					
b. Produce compost from plant debris							
i. A site for composting is included in landscape plans. Systems for composting up to and including 3 cubic yards at one time		1					
ii. Systems for composting more than 3 and up to 10 yards at one time (total 2 points)		1					
iii. Systems 10 cubic yards or larger (total 3 points)		1					
4. Reduce and recycle waste							
a. An easily accessible area is dedicated to the collection and storage of materials for recycling		2					
5. Minimize site disturbance							
a. On greenfield sites, limit site disturbance to protect topography, vegetation and hydrology (total 3 points)	1					1	1
b. On previously developed sites, restore vegetation and hydrology (total 3 points)	1					1	1
6. Provide water and/or shelter for wildlife such as birdhouse, bathouses, boulders, logs, wood piles, large native shrubs or trees							1
7. Conserve or restore natural areas & wildlife corridors							
a. The landscape is designed to preserve 80% of existing mature healthy trees and penalties for destruction of protected trees are included in construction contract							2
b. The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors							2
c. Create or protect a diverse plant buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas							2
Site Planning Subtotal, out of possible 33 points:							



	Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
B. Stormwater and Site Drainage							
POSSIBLE POINTS							
1. Minimize impervious surfaces							
a. Permeable paving, gravel or other porous surfaces are installed for						1	
i. 25% OR							
ii. 33% (total 3 points) OR						2	
iii. 50% of the paved area (total 5 points)						2	
b. No impervious surfaces directly connect to the storm drain						2	
2. Design a system to capture and filter storm water							
a. Capture and filter runoff from parking lots into landscape beds, vegetated swales or other landscape stormwater bmps						2	
b. Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and/or stormwater wetlands, that are designed to capture and filter 85% of average annual stormwater runoff OR						2	
c. Designed to capture and filter 100% of average annual runoff (total 4 points)						2	
d. Bioswales specify flat bottoms of at least 18 inches across and/or rock cobble at points of concentrated flow						1	
e. Turf is not specified in bioswales						1	
f. Direct rain water from all down spouts to planters, swales or landscaped areas						1	
Stormwater and Site Drainage Subtotal, out of possible 16 points:							
C. Earthwork and Soil Health							
1. Assess the soil and test drainage							
a. Submit laboratory soil analysis results and recommendations for compost and natural fertilizers (total 3 points)	2		1				
2. Remove and store topsoil before grading							
a. The removal, temporary storage, and re-spreading of topsoil is specified in the landscape design documents AND specifications include a maximum topsoil pile height of 6 feet, as well as measures to protect the stored topsoil from erosion			2				
3. Protect soil from compaction							
a. Grading specifications and construction plans call for the installation and maintenance of fencing to prohibit parking or materials staging in areas identified for protection			2				
b. Design documents specify that soil is not worked when wet			1				
4. Aerate compacted soils							
a. Design documents include specification to alleviate compacted soils to a depth of at least 8 inches, before planting, for all landscaped areas that can not be protected during construction			1				
b. Design documents include specification to alleviate compacted soils to a depth of at least 12 inches, before planting, for all landscaped areas that can not be protected during construction (total 2 points)			1				
5. Feed soils naturally & avoid synthetic fertilizers							
a. Fertilizers or soil amendment materials prohibited by Organic Materials Research Institute in its generic materials list are prohibited in construction of the project			1				
6. Mulch							
a. Required: Planting specifications and plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of recycled mulch			R				

	Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
	POSSIBLE POINTS						
7. Amend the soil with compost before planting							
a. Quality compost is specified as the soil amendment, at the rates indicated by a soil analysis, to bring the soil organic matter content to a minimum of:							
i. Required: 3.5% by dry weight OR 1 inch of quality compost OR				R			
ii. 5% by dry weight OR (total 2 points)							
iii. Specify the use of compost from processors that participate in the US Composting Council's Standard Testing Assurance program							
8. Use IPM design and construction practices to prevent pest problems							
a. Sheet mulch is specified for weed control (total 3 points)						2	
b. Synthetic chemical pre-emergents are prohibited						2	
9. Keep soil & organic matter where it belongs							
a. Compost berms or blankets or socks are specified for controlling erosion (total 2 points)							
Earthwork and Soil Health Subtotal, out of possible 21 points:							
D. Materials							
1. Use salvaged items & recycled content materials							
a. Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood:							
i. Decking (100% of non structural materials)							
ii. Fencing (100% of non structural materials)		2					
iii. Outdoor furniture such as bike racks, benches, tables and chairs (50% minimum)		2					
iv. Planters or retaining walls (100% of either or both)							
v. Parking stops or lighting/sign posts (100% of either or both)							
vi. Play structures or surfaces (100% of either or both)		2					
vii. Edging or decorative glass mulch (100% of either or both)							
b. A minimum 25% of recycled aggregate (crushed concrete) is specified for walkway, driveway, roadway base and other uses		2					
c. Replace Portland cement in concrete with flyash or slag							
i. 20%							
ii. 25% (total 2 points)							
d. Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste							
i. 100% of compost OR 100% of mulch							
ii. 100% of both (total 2 points)							
2. Reduce and recycle landscape construction waste							
a. Required: Divert 50% of landscape construction and demolition waste.		R					
b. Divert 100% of asphalt and concrete and 65% of remaining materials OR		2					
c. Divert 100% of asphalt and concrete and 80% of remaining materials (total 4 points)		2					
d. Donate unused materials							
3. Reduce the heat island effect with cool site techniques							
a. at least 50% of the paved site area includes cool site techniques					2		

	Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
POSSIBLE POINTS							
4. Design lighting carefully							
a. Low energy fixtures are specified for all site lighting					2		
b. Photovoltaic is specified for site lighting							
i. all path lighting is solar powered					1		
ii. 50% of all other site lighting is solar powered					2		
iii. 100% of all other site lighting is solar powered (total 4 points)					2		
c. Reduce light pollution and trespass: exterior luminaries emit no light above horizontal or are Dark Sky certified					1		
d. The site and exterior building lighting does not cast direct beam illumination onto adjacent properties or right of ways					1		
5. Choose and maintain equipment for fuel conservation							
a. Specify solar powered pump(s) for water features					1		
6. Specify low embodied energy products							
a. 100% of any stone and non-concrete hardscapes materials are produced within 500 miles of the project site					2		
7. Use integrated pest management							
a. Design documents include construction specifications that require integrated pest management						2	
8. Use organic pest management							
a. Design documents include construction specifications that prohibit the use of pesticides that are not allowed by Organic Materials Research Institute in its generic materials (total 4 points)							2
Materials Subtotal, out of possible 39 points:							
E. Planting							
1. Select appropriate plants: choose & locate plants to grow to natural size and avoid shearing							
a. Required: No species will require shearing		R					
b. Plants specified can grow to mature size within space allotted them		1					
2. Select appropriate plants: do not plant invasive species							
a. Required: None of the species listed by Cal-IPC as invasive in the San Francisco Bay Area are included in the planting plan		R					
3. Grow drought tolerant CA native, Mediterranean or climate adapted plants							
a. Required: Specify California native, Mediterranean or other climate adapted plants that require occasional, little or no summer water for 75% of all non-turf plants				R			
b. Specify California native or Mediterranean or other climate adapted plants that require occasional, little or no summer water for 100% of all non-turf plants				2			
c. 100% of the non-turf plant palette need no irrigation once established (total 5 points)				3			
4. Minimize the lawn							
a. Turf is not specified in areas less than 8 feet wide or in medians, unless irrigated with subsurface or low volume irrigation				2			
b. Turf shall not be installed on slopes exceeding 10%				2			
c. Required: A maximum of 25% of total irrigated area is specified as turf, with sports or multiple use fields exempted				R			
d. A maximum of 15% of total landscaped area is specified as turf, with sports or multiple use fields exempted				2			
e. No turf is specified (total 5 points)				3			

	Landscapes Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
POSSIBLE POINTS							
5. Implement hydrozoning				2			
a. Group plants by water requirements and sun exposure and select plant species that are appropriate for the water use within each zone and identify hydrozones on the irrigation plan (with separate irrigation valves for differing water needs, if irrigation is required)				2			
6. Provide shade to moderate building temperatures					2		
a. Protect existing trees and/or specify new trees such that 50% or more of west facing glazing and walls will be shaded (at 4 pm in September) by the trees at their mature size AND trees must be deciduous					2		
7. Plant trees					2		
a. At least 50% of the paved site area is shaded by trees or other vegetation					2		
b. At least one tree species is a large stature species (total 2 points)					1		1
8. Diversify							
a. Landscapes less than 20,000 square feet shall have a minimum of:							
ii. 20 distinct species OR							1
iii. 30 distinct plant species (total 3 points)							2
c. Landscapes with 20,000 to 43,560 square feet (1 acre) shall include a minimum of:							
i. 30 distinct plant species OR							1
ii. 40 distinct species OR (total 2 points)							1
iii. 50 distinct plant species (total 4 points)							2
d. Landscapes of greater than 1 acre shall include a minimum of 40 distinct plant species AND							
i. one additional species per acre over 1 acre OR							2
ii. two additional species per acre over 1 acre (total 4 points)							2
9. Choose California natives first							
a. CA natives are specified for 50% of non-turf plants							2
Planting Subtotal, out of possible 36 points:							
F. Irrigation							
I. Design for on-site rainwater collection, recycled water and/or graywater use							
a. Irrigation systems and/or all ornamental uses of water (ponds, fountains, etc) are plumbed for recycled water where it is available from a municipal source				3			
b. Design a system that can store and use rainwater and/or graywater to satisfy a percentage of the landscape irrigation requirements:							
i. 10% OR				3			
ii. 50% OR (total 4 points)				1			
iii. 100% of dry season landscape water requirements satisfied with harvested rainwater (total 5 points)				1			

	Landscaping Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
POSSIBLE POINTS							
2. Design and install high efficiency irrigation systems							
a. Required: Specify weather based (automatic, self adjusting) irrigation controller(s) that includes a moisture and/or rain sensor shutoff				R			
b. Required: Sprinkler and spray heads are not specified for areas less than 8 feet wide				R			
c. For 75% or greater of non-turf irrigated areas: Specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as drip or bubblers				2			
d. For 100% of non-turf irrigated areas: Specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as drip or bubblers (total 5 points)				3			
e. For all turf areas: Specify and install equipment with a precipitation rate of 1 inch or less per hour and an operational distribution uniformity of 70% or greater				2			
f. Design and install irrigation system that will be operated at 70% of reference ET				3			
3 Install a dedicated meter for landscape water use or install a submeter							
a. A dedicated irrigation meter or submeter is specified to track irrigation water				2			
Irrigation Subtotal, out of possible 20 points:							
G. Maintenance							
1. Keep plant debris on site							
a. Grasscycle							
i. Maintenance specifications and/or task list includes grasscycling (grass clippings left on the lawn after mowing) for all lawns from April through October, or longer. Sports turf may be excluded "in season" when clippings will interfere with play		2					
b. Produce mulch from plant debris							
i. Maintenance specifications and/or task list requires that leaves and/or seed free vegetative debris less than 4 inches (including cut or chipped woody prunings) be re-incorporated into the mulch layer of landscaped areas away from storm drain		2					
c. Produce compost from plant debris							
i. Composting plant debris on site is included in maintenance specifications or task list		3					
2. Separate plant debris for clean green discounts							
a. Maintenance specifications and/or task list require all exported plant debris be separated from other refuse and taken to a facility where it will be used to produce compost or mulch		3					
3. Protect soil from compaction							
a. maintenance task list specifies that soil is not worked when wet, generally between October and April			1				
4. Feed soils naturally & avoid synthetic fertilizers							
a. Maintenance manual include specifications to topdress turf with finely screened quality compost after aeration and/or 1-4 times per year			1				
b. Plant and soil amendments for maintenance are specified as compost, compost tea or other naturally occurring, non-synthetic fertilizers for all landscape areas			1				
c. Fertilizers prohibited by Organic Materials Research Institute are prohibited in the project			1				
5. Mulch Regularly							
a. Regular reapplication of organic mulch, to a minimum depth of 3 inches is included in the maintenance specifications or task list (total 2 points)			1	1			

	Landscaping Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water and Air Quality	Create Wildlife Habitat
POSSIBLE POINTS							
6. Manage and maintain irrigation system so every drop counts							
a. Maintenance task list includes a schedule for reading the dedicated meter or submeter and reporting water use				1			
b. At completion of the installation, the contractor shall provide the property owner with 1. precipitation rate for each valve zone, 2. area calculations for each irrigation zone and the irrigation plans which include the location of irrigation supply shut off, 3. internet address for watering index information				2			
c. Maintenance task list includes regular checking of irrigation equipment, and/or checking soil moisture content before watering AND/OR immediate replacement of broken equipment with equal or superior materials				1			
7. Use IPM as part of maintenance practices							
a. Maintenance task list includes integrated pest management specifications						2	
b. At least one landscaping staff member or contractor is trained in the use of IPM or is a Bay-Friendly Qualified Professional						2	
8. Choose and maintain your materials, equipment & vehicles carefully							
a. Maintenance task list specifies that all oil leaks are repaired immediately and that repairs are not done at the landscape site						1	
b. Equipment that uses biobased lubricants and/or alternative fuels is specified in the maintenance task list						2	
9. Use organic pest management							
a. Maintenance task list prohibits the use of pesticides that are not allowed by Organic Materials Research Institute in its generic materials list							2
Maintenance Subtotal, out of possible 29 points:							
H. Innovation							
1. Bay-Friendly Landscape Guidelines and Principles are defined and referenced in the construction bid documents							
	3						
2. Design & install educational signage							
a. Provide instructional signs and other educational materials to describe the landscapes Bay-Friendly design, construction and maintenance practices	4						
3. Create a Bay-Friendly Maintenance task list							
a. Provide a detailed Bay-Friendly maintenance task list and/or use the BF Maintenance Specification Guidelines as an official reference document in the the landscape maintenance contract and/or with on site landscape staff (total 7 points)	1	1	1	1	1	1	1
4. Employ a holistic approach							
a. Site analysis is submitted AND 65% of landscape construction waste is diverted AND planting plan includes a diverse palette AND 50% of non-turf plants are California native species AND none of the landscape area is in turf AND compost is specified for amending the soil during installation AND natural fertilizers are specified as the exclusive source of nutrients AND integrated OR organic pest management is specified (total 7 points)	1	1	1	1	1	1	1
5. Innovation: Design your own Bay-Friendly innovation							
a. Enter the description of the innovation here, and enter up to 4 points to the right. Points will be evaluated by the Bay-Friendly rater	0	0	0	0	0	0	0
Innovation Subtotal, out of possible 25 points:							
Summary							
Total Possible Points:	25	41	18	45	22	36	28
Total Points Achieved:	0	0	0	0	0	0	0



5

How to Start Landscaping... in a Bay-Friendly Way

KAMALA BENNETT, SUSTAINABLE LIVING DESIGNS



Conventional landscape

A conventional landscape is transitioned to a Bay-Friendly landscape.



Lawn sheet mulched in place



One year later

San Francisco Bay Area residents, business owners and policy makers are already thinking about the connection between their landscapes and the environment and they want to make a difference. Yet Bay-Friendly landscaping practices require skill and expertise. Communicate your expertise to earn new clients and strengthen your existing customer loyalty, then expand to include more practices, marketing yourself as a Bay-Friendly landscaper.

STEP 1: Start with the Bay-Friendly practices that you already do... and explain the benefits to your clients.

STEP 2: Plan to offer more Bay-Friendly landscaping practices

STEP 3: Market “Bay-Friendly Landscaping Packages”

STEP 4: Integrate Bay-Friendly into Green Building

STEP 5: Start your Bay-Friendly Reference Library

STEP 1:

Start with the Bay-Friendly practices that you already do...and explain the benefits to your clients.

The best strategy for offering Bay-Friendly landscaping to your clients is to **start by identifying those practices that you already do.**

Then: train yourself and your staff on the benefits. Learn how these practices can protect your client’s health or that of the environment, save landfill space, provide wildlife habitat or increase the value of their property.

Communicate your skills and the benefits of Bay-Friendly landscaping to your customers or potential new customers. Feel free to share the information in these guidelines with them. Let them know you can help them landscape in an environmentally friendly manner with these Bay-Friendly services. Emphasize that many of these services can save them money. Detail your skill in providing these benefits in periodic quality control reports mailed to your clients. Be sure to include the benefits to your customer such as lower water bills and increased property value.

Include the practices and their benefits in your contracts. You may even want to request that your clients sign an agreement on the goals of their Bay-Friendly Landscape program.



“Once clients see you’re doing a good job, you can educate them about landscaping to have a low impact on the environment.”

— Katrine Benninger, Katrine Benninger Landscape Design, Oakland



Landscape professionals learn how to sheet-mulch.

PHOTO: CINDY NELSON

STEP 2:

Plan to offer more Bay-Friendly landscaping practices

The ideal Bay-Friendly landscape is designed, constructed and maintained with most, if not all, the practices listed in this guide. It is a holistic, integrated approach that yields the most benefits to your clients, your business, the environment and our community. It is more likely, though, that you will need to evolve towards that goal rather than instantly switch over:

Sit down with your staff and ask yourselves:

- Do we currently offer more practices from one principle than others? Why?
- What other Bay-Friendly practices from the *Menu of Best Practices* (pages 10-11) might our clients also value?
- What additional practices would be relatively easy to learn about and implement in the near future?

Consider how to adopt more of the practices over time:

- Under the principle(s) at which your company is already strong, (such as *Conserve Water*) what would it take to offer all or most of the practices?
- What additional practices can you offer in the next fiscal year, or the next 2 years?
- What training do you need to offer more Bay-Friendly services?
- Design professionals: ask that the landscapes you design be maintained in accordance with the *Bay-Friendly Landscape Guidelines* by firms with Bay-Friendly Qualified Landscape Maintenance Professionals on staff. You can find these qualified professionals at www.BayFriendly.org/qualified

“An ecologically-based planting design is inherently complex. The maintenance needs to change over time. A trained maintenance presence is needed.”

— Michael Thilgen, Landscape Architect and Contractor, Four Dimensions Landscape Company, Oakland



PHOTO: RICHARD ROLLINS



Survey Says...

Almost 50% of single-family households that employ a professional landscaper would pay more for a service that uses environmentally-friendly practices.



TIPS FOR SUCCESS

Guide your Clients through a Transition Period

Transitioning a landscape that has been managed with few chemical inputs and some additions of organic amendments to a Bay-Friendly landscaping maintenance program can be a relatively simple and short process. Landscapes that have been intensively treated with pesticides, over-watered and over-fertilized will require greater skill and time to transition.

- Let your customers know that it may take 2 years or more to make the change, that it will require skill, frequent monitoring and increased communication, and that their expenses could be greater during that period.
- Agree upon an acceptable period and include this in your contract.
- Start by assessing the soil and testing drainage.

STEP 3:

Market Bay-Friendly Landscaping Packages

Another important question to ask yourself as you expand your Bay-Friendly services is how to market them to your clients. Here are some suggestions for Bay-Friendly Landscaping Packages that could be developed to both respond to and encourage customer demand:

Bay-Friendly Lawn Care Program

Lawns continue to be a part of our culture. But maybe it is time to rethink what we mean by a lawn. Bay-Friendly landscaping emphasizes that high input lawns are not included solely for their looks. Small functional lawns — those that are used for play and relaxation - can be managed to minimize environmental impacts and provide your clients with a safer lawn by including:

- Grasscycling
- Aerating, then topdressing with compost
- Phasing out the scheduled application of synthetic fertilizers and pesticides
- Feeding with compost or other natural or slow release fertilizers after analysis or demonstrated need
- Integrated pest management that includes:
 - Hand pulling weeds
 - Use of natural herbicides
 - Use of beneficial nematodes
 - Use of compost tea for disease management and nutrient cycling
- State of the art irrigation management to prevent over watering

Bay-Friendly Wildlife Gardening

Specializing in designing, constructing or maintaining wildlife gardens is another opportunity for your business to grow and flourish. Develop expertise in the following practices and offer them to new and existing clients:

- Survey flora and fauna
- Learn about local, natural plant communities and use them as models
- Conserve or restore natural areas
- Diversify and include many California native plant species
- Provide water and shelter
- Eliminate the use of pesticides

Bay-Friendly Soil Health Care Program

Soil is the foundation of a healthy, beautiful landscape. Offer the following practices:

- Assessing the soil and testing drainage
- Removing and storing topsoil during construction
- Protecting soil from compaction and erosion
- Amending the soil with compost
- Mulching regularly
- Feeding soils naturally with compost or compost tea
- Avoiding synthetic fertilizers
- Minimizing chemicals with a goal of eliminating them altogether



“Ecological design has a lot to do with how we present it to the client. It’s in our hands. We need to describe our work in language that appeals to people, that they can relate to and sign on to.”

— Rebecca Coffman, Landscape Architect, Berkeley



Survey Says...

More than 50% of single-family households with yards or gardens are interested in creating habitat for birds and pollinators.

Amending the soil with compost may be one of your easiest selling points:

Compost pays for itself over the long term as you and your clients benefit from:

- Bringing life to the soil
 - > Reduces the need for fertilizers
 - > Improves plant resistance to disease
 - > Reduces need for pesticides
 - > Degrades pollutants
- Healthier plants with an improved appearance
 - > Increased customer satisfaction
- Faster planting in amended soils
- Reducing plant loss
 - > Fewer callbacks
 - > Improved profits
- Increasing water holding capacity
 - > Irrigation costs are cut by as much as 50%
 - > Reduced water bills for customer
 - > Decreased stormwater runoff
- Paying back the cost of amending soil in 5-7 years
- Protecting the environment and the health of their families.

ADAPTED FROM: FIELD GUIDE TO COMPOST USE, US COMPOSTING COUNCIL AND SOILS FOR SALMON: A LANDSCAPERS GUIDE TO BUILDING HEALTHY SOILS AND STREAMS, 2000.

“Landscapes need to become ‘sustainable’ or the industry will suffer economically. We need to move the industry, the public and public policy to improve our environments.”

SOURCE: TOM ASH, LANDSCAPE WATER USE: WHAT TO KNOW & WHAT TO DO NOW, ECO-LANDSCAPING: PROFITING FROM A GREEN FUTURE, 2004.

STEP 4:

Integrate Bay-Friendly into Green Building

GreenPoint Rated is a residential rating program for single and multifamily new construction projects in California. It is administered by Build It Green and designed to provide a credible yet accessible entry point into green building and to guide home builders to achieve increasingly higher levels of performance. GreenPoint Rated is based on the *Build It Green Building Guidelines*, originally developed in Alameda County and later adopted by local governments throughout California. GreenPoint Rated for remodeling and existing homes is expected to be completed by the end of 2007 and like the program for single and multifamily homes, will be integrated with Bay-Friendly Landscaping for use in the San Francisco Bay Area. For more information, visit www.builditgreen.org.

Nationally, the US Green Building Council has developed a rating system that specifies ‘green’ standards for commercial, multifamily and civic buildings. The Leadership in Energy and Environmental Design (LEED™) is a voluntary program for rating the environmental impacts and sustainability of both new and existing building projects. Certification is awarded at different levels, based on the number of points earned. Go to www.usgbc.org for more information.

Also under development, through a partnership between the American Society of Landscape Architects, US Green Building Council and the Ladybird Johnson Wildflower Center is the Sustainable Sites Initiative to develop national, voluntary standards for sustainable land development and management. Visit www.sustainableites.org for updates on their progress.



PHOTO: RICHARD ROLLINS



TIPS FOR SUCCESS

Bringing Bay-Friendly Landscaping to Public Sector Projects

There are some important differences in the way public landscapes are designed, constructed, and maintained. A good first step for successfully implementing Bay-Friendly landscaping in public projects is starting with the coordinated involvement of city planners, landscape architects, landscape contractors, and landscape maintenance professionals. If there is a building also being planned, bring a team together to discuss Bay-Friendly goals at the conceptual design phase for the building — including the professionals responsible for both designing and maintaining the landscape.

Here are some additional tips for making the transition to Bay-Friendly in public landscaping projects more successful:

- Identify the key people, again involved in the project, initially and for the long term — and organize a Bay-Friendly landscape team that includes the city planner, arborist, landscape architect or designer, landscape contractor, and the landscape maintenance staff.
- Have the key people, again including maintenance staff, complete an initial *Bay-Friendly Scorecard for Commercial and Civic Landscapes* no later than the design and development phase, to define the Bay-Friendly landscape goals for the project.
- Include language in the RFP & RFQ that clearly states that the landscape will be designed to Bay-Friendly landscape standards as per the *Bay-Friendly Scorecard*.
- Include language in the construction bid documents that clearly states that the landscape will be built as per the final *Bay-Friendly Scorecard*.
- Create a Bay-Friendly landscape maintenance task list, or use the *Bay-Friendly Landscaping Model Maintenance Specifications* as a reference document to the maintenance contract.
- Provide educational signage describing the Bay-Friendly features of the landscape and their benefit to the public.

STEP 5:

Start your Bay-Friendly Reference Library with these titles:

Beidleman, Linda and Eugene N. Kozloff, *Plants of the San Francisco Bay Region*, University of California Press, 2003.

Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*, Cachuma Press, 2005.

Bossard, Carla, John Randall and Marc Hoshovsky, *Invasive Plants of California Wildlands*, University of California Press, 2000.

East Bay Municipal Utility District, *Plants and Landscapes for Summer Dry Climates of the San Francisco Bay Region*, www.ebmud.com, May 2004.

Flint, Mary Louise, *Pests of Landscape Trees & Shrubs*, University of California Press, 1994 (Revised edition due in January 2004).

Flint, Mary Louise and Steve Dreistadt, *Natural Enemies Handbook: The Illustrated Guide to Biological Pest Control*, University of California Press, 1998.

Francis, Mark and Andreas Reimann, *The California Landscape Garden: Ecology, Culture and Design*, University of California Press, 1999.

Gilmer, Maureen, *California Wildfire Landscaping*, Taylor Publishing Company, 1994.

Lowry, Judith Lamer, *Gardening With a Wild Heart: Restoring California's Native Landscapes at Home*, University of California Press, 1999.

Schmidt, Marjorie G., *Growing California Native Plants*, University of California Press, 1980.

Thompson, J. William and Kim Sorvig, *Sustainable Landscape Construction: A Guide to Green Building Outdoors*, Island Press, 2000.

University of California Cooperative Extension, *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California*, www.owue.water.ca.gov/docs/wucols00.pdf, 2000.

Wasowski, Andy and Sally Wasowski, *The Landscaping Revolution: Garden with Mother Nature, Not Against Her*, Contemporary Books, 2000.

Resources

Introduction

- The EPA GreenScapes Alliance, unites government and industry into a powerful force for the reduction, reuse, and recycling of waste materials in large landscapes. Learn more about GreenScapes, or become a participant in the GreenScapes Alliance at: www.epa.gov/epaoswer/non-hw/green
- Low Impact Development (LID) is a more environmentally-sensitive approach to developing land and managing stormwater runoff. Many jurisdictions are incorporating LID techniques to help protect their waters and natural resources. Learn more at www.lowimpactdevelopment.org

Landscape Locally



- Soil surveys can be found at your local library or by contacting the USDA Natural Resource Conservation Service. Look for contact information at www.baysavers.org
- Contact soil and compost testing laboratories:
 - ABC Organics at www.abconorganics.com
 - A&L Western Agricultural Labs at www.al-labs-west.com
 - Harmony Farm Supply & Nursery at www.harmonyfarm.com
 - Peaceful Valley Farm Supply: www.groworganic.com
 - Soil Control Lab at www.controllabs.com
 - Soil Foodweb at www.soilfoodweb.com
 - Soil & Plant Lab at www.soilandplantlaboratory.com
- Fire Prevention: *Options for Managing Fire Fuel Load* can be found at the California Forest Stewardship website: <http://ceres.ca.gov/foreststeward/html/fuelsoption.html>
- The City of Oakland offers *Recommendations for Ecologically Sensitive Fire Abatement* at www.oaklandpw.com/creeks/docs/fire.doc

Landscape for Less to the Landfill



- Invasive plant species websites: www.cal-ipc.org and <http://tncweeds.ucdavis.edu> and www.invasivespecies.org
- ANSI A300-(Part 1)-2001: *Tree Care Operations*, can be purchased from www.ansi.org
- For more information on using goats for controlling weeds and creating firebreaks, contact: www.goatsrus.com or www.thegoatworks.net or www.goatgrazers.com
- To find or offer salvaged materials visit California Integrated Waste Management Board's (CIWMB) CalMax website at www.ciwmb.ca.gov/CalMAX/ or MarinMax Materials Exchange at www.marinmax.org
- To purchase salvaged materials contact or visit:
 - Black's Farmwood: www.blacksfarmwood.com/
 - Building Resources: www.buildingresources.org
 - East Bay Habitat for Humanity's ReStore www.eastbayhabitat.org/restore

- Ohmega Salvage: www.ohmegasalvage.com
- Terra Mai Reclaimed Wood Products: www.terramai.com
- Urban Ore: <http://urbanore.citysearch.com>
- Recycle municipal trees: www.greenwasterecycleyard.com

Nurture the Soil



- Guidelines on creating and implementing a Soil Management Plan can be downloaded from Western Washington at www.puyallup.wsu.edu
- For listings of compost and mulch producers visit the CIWMB website: www.ciwmb.ca.gov/organics
- The CIWMB also provides specifications for using compost. Go to www.ciwmb.ca.gov to download *Compost Use for Landscape and Environmental Enhancement*
- The US Composting Council describes its Standard Testing Assurance program for ensuring quality compost at www.compostingcouncil.org
- Rolls of recycled cardboard can be purchased for sheet mulching from www.northbaypaper.com or Monahan Paper, (510) 835-4670
- Info on compost tea is available from: www.attra.org or www.composttea.org or www.soilfoodweb.com
- For information and equipment to brew compost tea contact: EPM, Inc., www.composttea.com, *Growing Solutions*, www.growingsolutions.com, or *SoilSoup*, www.soilsoup.com or www.soilfoodweb.com

Conserve Water



- The California Department of Water Resources has information on water supply and demand, at www.waterplan.water.ca.gov
- California Urban Water Agencies offer information on water conservation, including costs at www.cuwa.org
- The California Urban Water Conservation Council offers a variety of services and information, including product news and technical resources at www.cuwcc.org
- *Graywater Guide: Using Graywater in Your Home Landscape* is at www.owue.water.ca.gov/docs/graywater_guide_book.pdf
- The Irrigation Training & Research Center at California Polytechnic State University, San Luis Obispo offers Irrigation Auditor and Landscape Water Budget classes. Information at www.itrc.org
- Information on the California Irrigation Management Information System (CIMIS) is at www.cimis.water.ca.gov
- Local water districts often offer information on water conservation or landscape audits or audit/water budget training. Contact your water supplier or check the following websites for some SF Bay Area water districts:
 - Alameda County Water District: www.acwd.org
 - Bay Area Water Supply and Conservation Agency: www.baswca.org
 - Cal Water Service: www.calwater.com

- Coastside County Water District: www.coastsidewater.org
- Contra Costa County Water District: www.ccwater.com
- Dublin-San Ramon Water district: www.dsrd.com
- EBMUD: www.ebmud.com
- Marin Municipal Water District: www.marinwater.org
- North Coast County Water District: www.nccwd.com
- San Mateo County: www.midpeninsulawaste.org or www.coastsidewater.org
- Santa Clara Valley Water District: www.valleywater.org
- Zone 7 Water Agency: www.zone7water.com

Conserve Energy



- PG&E website, which includes information on planting trees to reduce energy consumption: www.pge.com
- The Center for Urban Forest Research of the USDA Forest Service offers free fact sheets on maximizing the benefits of the urban forest, as well as many reports on their costs and benefits. Visit <http://cufr.ucdavis.edu>
- The International Dark Sky Association has a list of approved light fixtures at www.darksky.org

Protect Water & Air Quality



- Alameda Countywide Clean Water Program provides landscaping tips and resources for preventing runoff/stormwater runoff and pollution. Visit their website: www.cleanwaterprogram.com
- You can learn more about the EPA Pesticide Environmental Stewardship Program by visiting: www.pesp.org
- Bio-Integral Resource Center (BIRC) offers the *IPM Practitioner* and *Common Sense Pest Control Quarterly*. Visit www.birc.org
- Environmentally-friendly pest management solutions for hundreds of pests of garden and landscape plants, including an interactive guide for healthy lawns, is available from the UC Statewide IPM Program, www.ipm.ucdavis.edu
- Seattle Green Gardening program offers free Pro IPM Fact Sheets at www.ci.seattle.wa.us/util/proipm/default.htm
- A Porous Pavement fact sheet is at www.epa.gov/owmitnet/mtb/porouspa.pdf; information is also available from the Concrete Promotion Council of Northern California at www.cpcnc.org
- For information on pesticides, water quality, and less toxic alternatives, visit www.ourwaterourworld.org
- Lawn Fact Sheet for least toxic approaches to lawn care visit www.ourwaterourworld.org/factsheets.cfm
- To look up impacts of active ingredients in pesticides visit www.pesticideinfo.org
- Information on the hazards of lawn chemicals are at www.beyondpesticides.org/pesticidefreelawns

Create & Protect Wildlife Habitat



- California native plants are described at www.calflora.org
- East Bay Native Plant Society (www.ebcnps.org) is a good resource for information on local native plant species
- An updated list of native plant nurseries is at www.cnps.org/links/native_plant_nurseries.htm
- Information on California Oaks is available from the California Oak Foundation at www.californiaoaks.org
- California Native Grasslands Association (www.cnga.org) is an excellent resource for landscaping with native grasses
- Wildlife Habitat Council (www.wildlifehc.org) provides information on how landscapes can provide habitat
- To foster wildlife habitat for pest control visit www.hungryowl.com and www.californiabats.com
- Learn about an organic approach to pest control in landscapes from the *Standards for Organic Land Care: Practices for Design and Maintenance of Ecological Landscapes*, from the Northeast Organic Farming Association, www.nofamass.org

Bay-Friendly Landscape Professional Training Opportunities

Residents and local municipalities are becoming aware of the benefits of Bay-Friendly landscaping and the need for trained and experienced Bay-Friendly landscape professionals.

Gain a competitive edge by becoming an expert in Bay-Friendly landscaping.

- **For landscape maintenance professionals**
Enroll in the 6-week Bay-Friendly Landscape Maintenance Training and Qualification Program. Upon the successful completion of the class and final exam, participants will be able to market their expertise and services as Qualified Landscape Professionals.
- **For landscape design and construction professionals**
In both the public and private sectors, StopWaste.Org offers half-day trainings at least once a year. These trainings feature case studies and guest experts presenting cutting-edge practices in their field.

Go to www.Bay-Friendly.org for more information.

About StopWaste.Org

The Bay-Friendly Landscaping program has produced this guide to aid landscapers in the reuse and reduction of plant debris. Bay-Friendly Landscaping is a project of StopWaste.Org.

StopWaste.Org is the Alameda County Waste Management Authority and the Alameda County Source Reduction and Recycling Board acting as one public agency. It is an integrated public agency comprised of the County of Alameda, each of the fourteen cities within the county and two sanitary districts that also provide refuse collection services. Its mission is to provide the most environmentally sound waste management program for the residents, businesses and institutions of Alameda County. Funding is derived solely from waste disposal and waste import mitigation fees collected at the Altamont, Tri-Cities and Vasco road landfill sites. The agency receives no general tax funds.

StopWaste.Org offers a wide range of programs in the areas of source reduction, public education, sustainable landscaping, home composting, green building, recycled product procurement, technical assistance, low interest loans and grants.

Bay-Friendly Landscaping for Member Agencies Design Resources & Grant Program

StopWaste.Org's Bay-Friendly Landscaping for Member Agencies (BFMA) Program provides Bay-Friendly training, design resources, and grant funding to its Member Agencies (cities, county and sanitary districts in Alameda County). The BFMA Program educates and provides support to member agency staff, including officials, planners, landscape architects, and maintenance staff, to help them implement Bay-Friendly policies, design and maintenance practices. For more information about the BFMA Program, contact Teresa Eade, Program Manager; (510) 891-6500.

Visit our website:
www.BayFriendly.org

Bay-Friendly Gardening Program

Look for the StopWaste.Org's *Bay-Friendly Gardening Guide* for the homeowner; now available to download from our website.

Take Advantage of Our Free Resources

Visit www.BayFriendly.org to download free copies of these guidelines as well as:

- *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
- *A Bay-Friendly Landscaping Guide to Grasscycling: Save Time, Save Money and Create Beautiful Lawns*
- *A Case Study: Grasscycling*
- *Una guía de Bay-Friendly Landscaping sobre el reciclaje del pasto (A Landscaper's Guide to Grasscycling in Spanish)*
- *Choosing a Professional Landscaper for your Bay-Friendly Garden (A Brochure to give potential clients).* Visit www.StopWaste.Org/fsbuild.html to download copies of:

- *Builder's Guide to Reuse and Recycling, A Directory for Construction, Demolition & Landscaping Materials*
- *A Guide to Green Maintenance Operations*

Visit www.StopWaste.Org/buyrecycled.html to download the following fact sheets:

- *How to Buy Recycled-content Park & Recreation Products in Alameda County*
- *Pointers on Using Recycled-content Plastic Lumber*
- *How to Buy Recycled-content Transportation Products*



Comprehensive guides for using mulch and recycling grass clippings are available at www.BayFriendly.Org

STOPWASTE.ORG

Reducing the Waste Stream for Alameda County

1537 Webster Street, Oakland, CA 94612

