

# 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.

## Acknowledgements

### Development Team

Teresa Eade, Senior Program Manager  
StopWaste.Org, teade@StopWaste.Org

Cynthia Havstad, Program Manager  
StopWaste.Org, chavstad@StopWaste.Org

David Gilmore, Graphic Designer  
davidgdesigns@gmail.com

*Special thanks go to the following landscape professionals and agency representatives for their input, review and commitment to the completion of these guidelines:*

Michael Baefsky  
Baefsky & Associates

Christine Finch, Susan Handjian & David Langridge  
East Bay Municipal Utility District

Jim Scanlin  
Alameda Countywide Clean Water Program

Katrine Benninger  
Katrine Benninger Landscape Design

Geoff Hall  
Sentient Landscape, Inc.

Glen Schneider  
Glen Schneider Landscape

Michael Boland  
Presidio Trust

Doug Johnson  
California Invasive Plant Council

Chris Shein  
Wildheart Gardens

Jake Cacciato  
Jensen Corporation Landscape Contractors

Manual Gonzales  
Cagwin & Dorward

Nate Silin  
New Growth Landscape

Rebecca Coffman  
Design Works

Greg Harrington  
UC Berkeley

Mr. Burt Tanoue  
Office of Cheryl Barton

Shauna Cozad & Karen Wikler  
UC Cooperative Extension, Alameda County

Jerry Koch  
City of Berkeley

Michael Thilgen  
Four Dimensions Landscape Co.

Tanya Drlik  
Bio-Integral Resource Center

George Pacheco  
Pacheco Brothers Gardening

COVER PHOTOS: TOP LEFT AND CENTER RIGHT: MICHAEL THILGEN, FOUR DIMENSIONS LANDSCAPE CO. TOP RIGHT: SUSAN REYNOLDS PHOTOGRAPHY. BOTTOM RIGHT: JANE HUBER.

Sharon Farrell & Tamara Shulman  
Aquatic Outreach Institute  
(now called The Watershed Project)

Bob Perry, Professor Emeritus  
Cal Poly, Pomona

PRINTED ON 100% RECYCLED-CONTENT PAPER, 50% POST-CONSUMER, BY NEW LEAF, REINCARNATION MATTE.

MARCH 2010 (4TH EDITION)

## 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.

## CHAPTER 1

<i>Introduction to Bay-Friendly Landscaping</i>	2
---	---

## CHAPTER 2

<i>Bay-Friendly Landscaping Menu of Best Practices</i>	9
--	---

## CHAPTER 3

<i>Bay-Friendly Landscaping Principles and Practices</i>	12
--	----

1 Landscape Locally.....	13
2 Landscape for Less to the Landfill.....	20
3 Nurture the Soil.....	27
4 Conserve Water.....	34
5 Conserve Energy.....	38
6 Protect Water & Air Quality.....	41
7 Create & Protect Wildlife Habitat.....	49

## CHAPTER 4

<i>Bay-Friendly Landscape Scorecard</i>	52
---	----

## CHAPTER 5

<i>How to Start Landscaping in a Bay-Friendly Way</i>	60
---	----



### TABLE OF TIPS

• Soil Texture by Feel.....	14
• Fire-Resistant Plants.....	15
• Using Salvaged Materials in the Landscape.....	26
• Indicators of Quality Compost.....	30
• Sheet Mulching.....	31
• Compost Tea.....	32
• OMRI.....	33
• Rebates for Irrigation Upgrades.....	37
• Shade Effectiveness in Parking Lots.....	39
• Attracting Beneficial Insects.....	44
• Pervious Concrete.....	47
• Using Dry Wells to Capture Water from Downspouts.....	48
• Sources of California Natives.....	50
• Flowering Periods of Plants that Attract Beneficial Insects.....	51
• Guide Your Clients through a Transition Period.....	62
• Bringing Bay-Friendly Landscaping to Public Sector Projects.....	65



### 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 ROLLINS

## 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.

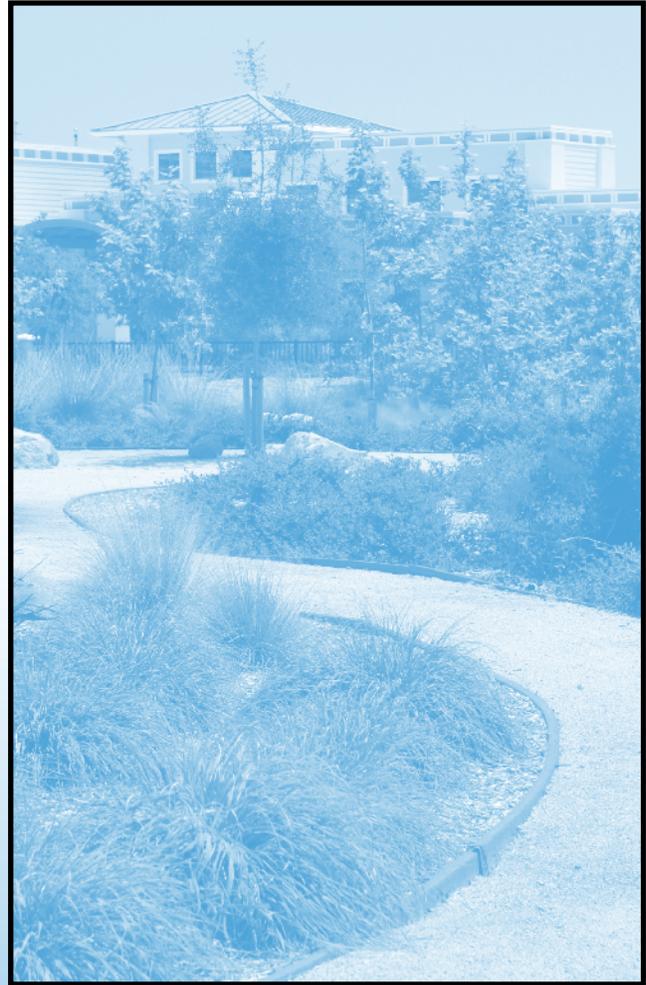


PHOTO: RICHARD ROLLINS

## 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.

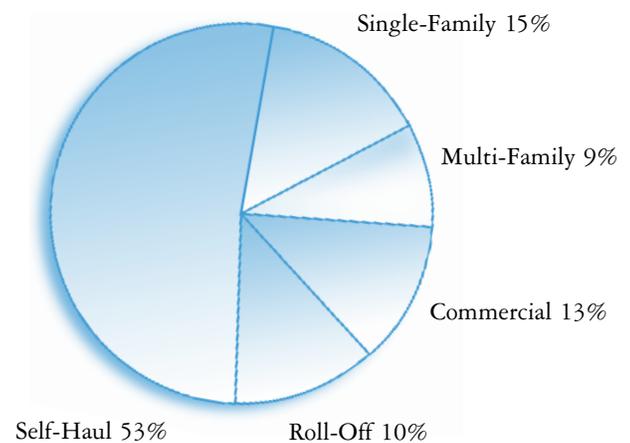
Bay-Friendly landscaping minimizes the use of plastics and pesticides, and diverts plant debris from the landfill by preventing waste in the first place through careful plant selection, watering and fertilizing or reusing plant material through grasscycling, mulch and compost.

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...

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.



PHOTO: ERIN ANWEG

*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.<sup>1</sup> 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 CO<sub>2</sub>

Less organic debris in the landfill

= less CH<sub>4</sub>

Reduced mowing & trimming

= less CO<sub>2</sub>

Fewer fertilizers & pesticides

= less N<sub>2</sub>O & CO<sub>2</sub>

Reduced water consumption

= less CO<sub>2</sub>

Increased soil organic matter

= less CO<sub>2</sub>

<sup>1</sup> 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 <sub>2</sub>
Waste kept on site	2.5
Avoided transportation	1.1
Reduced shearing & mowing	.2
Reduced water needs	.2
<b>Total</b>	<b>4.0</b>



## *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.