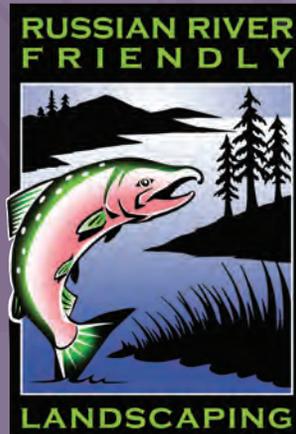


# RUSSIAN RIVER-FRIENDLY LANDSCAPE GUIDELINES

*Sustainable Practices  
for the Landscape Professional  
in the Russian River Watershed*



# RUSSIAN RIVER-FRIENDLY LANDSCAPE GUIDELINES

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*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



The *Russian River-Friendly Landscape Guidelines* were created for landscape professionals in the Russian River region by the Russian River Watershed Association (RRWA), with permission and assistance from StopWaste.Org in Alameda County. The *Russian River-Friendly Landscape Guidelines* are a Russian River revision of the *Bay-Friendly Landscape Guidelines*, originally published by StopWaste.Org in 2003.

The *Russian River-Friendly Landscape Guidelines* are intended to aid landscape professionals in the protection and conservation of the Russian River waterways, in the reuse and reduction of plant debris, and to support 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-three 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 practice.

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 principles and practices included in the original *Bay-Friendly Landscape Guidelines* were selected with guidance from many public and private landscape architects and contractors, representatives from Alameda County public agencies, nonprofit organizations, and the staff of StopWaste.Org. Acknowledgements for the many individuals, businesses, and agencies involved in the development of both the *Russian River-Friendly Landscape Guidelines* and *Bay-Friendly Landscape Guidelines* are listed on page 66.

## 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 Russian River Watershed Association 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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# 1

## *Introduction to Russian River-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: MIKE HEACOX, LUCIOLE DESIGN

## *Russian River-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 rich and diverse ecosystems, the Russian River Watershed.

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

- ✓ Landscaping in harmony with the natural conditions of the Russian River 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

A well designed and maintained Russian River-Friendly landscape can cost less to maintain in the long run by consuming fewer resources. For public spaces, Russian River-Friendly landscapes embody community values for health, wildlife and the environment.

For private property, Russian River-Friendly landscaping addresses issues that your clients care about, such as less

maintenance and decreased water usage, as well as increased environmental benefits. It can 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.

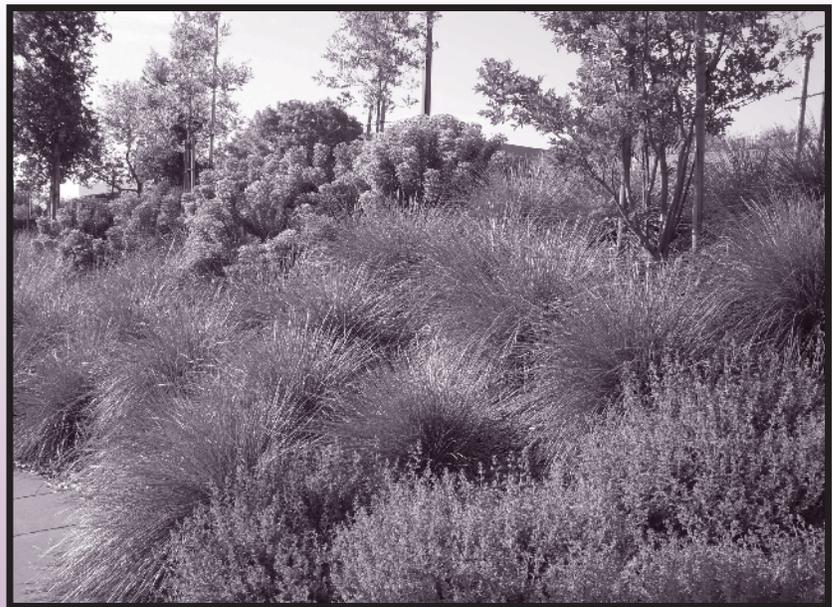


PHOTO: CITY OF SANTA ROSA

## 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 activities can cause damage to the environment by 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, possibly leading to pollution of our creeks and rivers, erosion, and global warming.



*“Our challenge is to create landscapes that inspire a shift, to not only sustainable practices, but to a land approach that is highly productive and filtering. Effective, beautiful landscapes can produce clean water, clean air, nutritious food and medicine, fiber, building materials, etc. while sequestering carbon, moderating climate, and providing habitat.*

*How long will it take for our landscapes to replace the ecological, social, and economic value of the resources used for their construction?”*

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

*“In Sonoma County, 92,000 tons of plant debris was turned into compost instead of landfilled in 2008. But that same year, an additional 24,000 tons of plant debris that could also have been turned into compost and used to nurture the soil was instead wasted in the landfill.”*

— Karina Chilcott, Waste Management Specialist, Sonoma County Waste Management Agency, Santa Rosa

### 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, the Russian River and ultimately the Pacific Ocean

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.

## Why is Russian River-Friendly Landscaping Important?

Over the last two decades, there has been a significant reduction in plant debris landfilled in the Russian River Watershed, due in large part to residential recycling programs and because many 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.

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 the waste management agencies in our watershed — and only a fraction of the pesticides are disposed of properly.

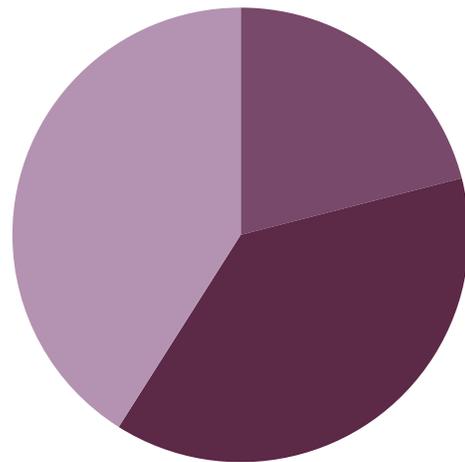
Russian River-Friendly landscaping minimizes the use of plastics and pesticides, and diverts plant debris from the landfill by preventing waste in the first place through careful plant selection, watering and fertilizing, reusing plant material through grasscycling, and by using mulch and compost.

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

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

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

### Plant Debris Disposed of by Sector in Sonoma County



- Residential 21%
- Commercial 38%
- Self-haul 41%

SOURCE: SONOMA COUNTY WASTE MANAGEMENT AGENCY WASTE CHARACTERIZATION STUDY FINAL REPORT, NOVEMBER 2007 (PLANT DEBRIS IS DEFINED AS INCLUDING LEAVES & GRASS, PRUNINGS & TRIMMINGS, BRANCHES & STUMPS).

### 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 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 prevent much of the water from ever reaching the soil.
2. In addition, 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 has the potential to wash 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 runoff flows directly into creeks and rivers, which are important resources for supporting the diverse and complex array of natural ecosystems.
6. And, all creeks and waterways in our watershed flow to the Russian River and ultimately to the Pacific Ocean where contaminated water can harm fish and other wildlife and can cause illness in humans.

## The Russian River Watershed



SOURCE: SOTOYOME RESOURCE CONSERVATION DISTRICT



*The Russian River Watershed drains nearly 1,500 square miles of forests, agricultural lands and urban areas within Sonoma and Mendocino Counties. The mainstem of the Russian River flows 110 miles from its headwaters near Redwood Valley and Potter Valley into the Pacific Ocean near the town of Jenner. It supplies drinking water to over 600,000 area residents and is home to approximately 30 species of fish\*, three of which are listed as threatened or endangered. The watershed encompasses the cities of Ukiah, Cloverdale, Healdsburg, Windsor, Santa Rosa, Rohnert Park, Sebastopol and Cotati.*

*Whether your client's site is next to a creek or miles away, your landscaping activities impact the quality of water and life in the Russian River Watershed.*

*The landscape you design, construct or maintain can be the first line of defense.*

\*SONOMA COUNTY WATER AGENCY

## The Link between Russian River-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.\* 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 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. These practices are becoming increasingly subject to local, state and federal regulations, and are 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 one 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 Russian River Watershed 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 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 *Russian River-Friendly 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 carefully planning routes
  - Irrigating efficiently
  - Reducing lawn size
  - Selecting low maintenance and drought-tolerant California native or Mediterranean 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 Russian River-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>

\* 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 (CO<sub>2</sub>)

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

#### Methane (CH<sub>4</sub>)

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

#### Nitrous Oxide (N<sub>2</sub>O)

- 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 Russian River Friendly Landscaping

Measure	Tons eCO <sub>2</sub> *
Waste kept on site	2.5
Avoided transportation	1.1
Reduced shearing and mowing	.2
Reduced water needs	.2
<b>Total</b>	<b>4.0</b>

\*CARBON DIOXIDE EMISSIONS



## 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 Russian River 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 Russian River ecosystem.

# Russian River-Friendly 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 and 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 and 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 and 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 or sheep for controlling weeds and creating firebreaks
- 6. Use salvaged items and 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

• See chapter 4, Summary of Russian River-Friendly Landscaping Benefits to view a list of practices categorized by design, construction and maintenance.

## 4 Conserve Water



- 1. Create drought resistant soils with compost and mulch
- 2. Grow drought-tolerant California native or Mediterranean plants
- 3. Minimize or eliminate 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 and Air Quality



- 1. Use Integrated Pest Management
  - A. Prevent pest problems
  - B. Train your staff to identify and monitor pest and beneficial populations
  - C. Educate your clients
  - D. Control pest problems with physical and 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 and vehicles carefully
- 5. Keep soil and 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

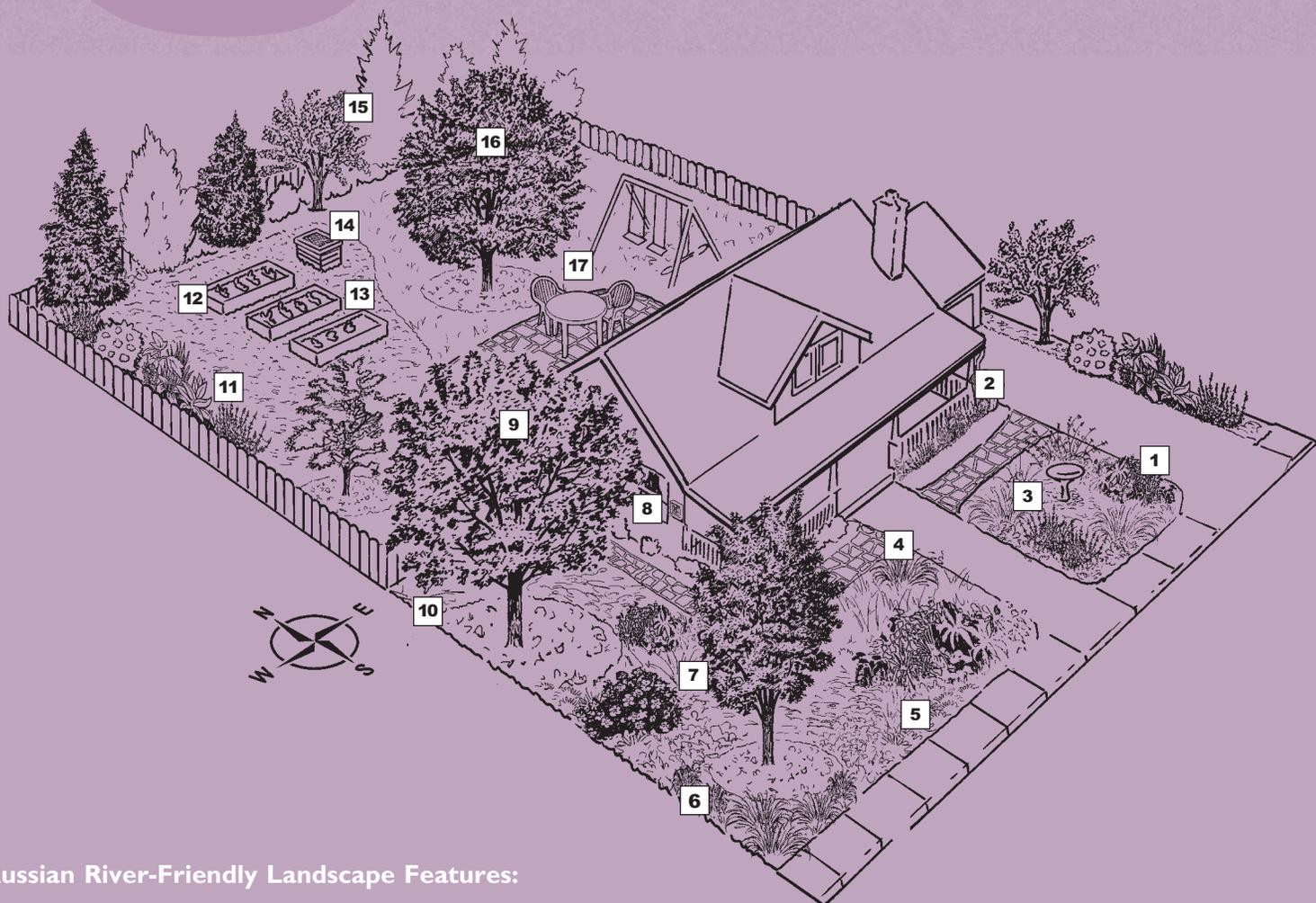
## 7 Create and Protect Wildlife Habitat



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

# 3

## *Russian River-Friendly Landscaping Principles and Practices*



### Russian River-Friendly Landscape Features:

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

# 1. LANDSCAPE LOCALLY



**R**ussian River-Friendly landscaping recognizes that our landscapes, whether they are commercial, institutional, residential or open space, are part of the larger ecosystem of the Russian River Watershed. 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 Russian River ecosystem.

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

## 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

- Locate sites within urban growth boundaries, clean up brownfields and avoid environmentally sensitive sites.
- 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 and size of planting areas
  - Zones with difficult access
  - Water flow
- Visit [Visit www.bayfriendly.org](http://www.bayfriendly.org) for a free copy of the Site Analysis template. Click on: 'Landscape Professionals' > 'Scorecard, Tools & Resources' > 'Site Planning'

### Benefits

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



*“We are in the business of land management, and therefore ecosystem management.*

*The landscape industry is positioned very well to heal our ecosystems in urban and rural settings. Healing our ecosystems will heal the ability of life to thrive!”*

— Jacob Voit, Sustainability Manager, Cagwin & Dorward, Novato



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 <http://websoilsurvey.nrcs.usda.gov>)
- 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 Russian River-Friendly landscape. Also do a soil analysis:
  - When planning a renovation
  - When experiencing ongoing problems
- Watch the weeds. Clover, in turf, for example suggests a need for nitrogen.

### Benefits

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



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

## 3. Survey and protect flora and fauna

### Description

Existing flora and fauna provide insight into the ecosystem health and the landscape possibilities. Native vegetation, wildlife habitat and 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

The potential for fire in the Russian River Watershed can be great, and 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.

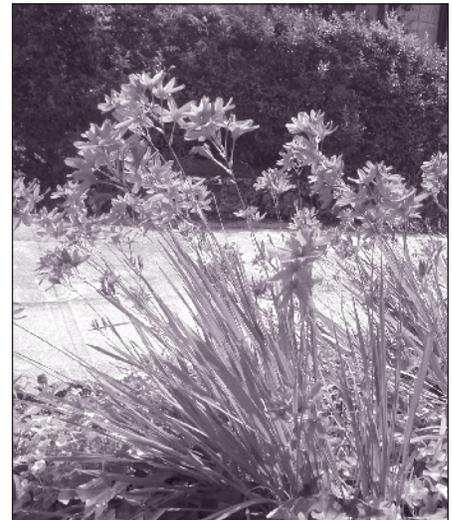


PHOTO: VIRGINIA PORTER

African Corn Lily (*Ixia*) bulbs produce foliage and flowers with very little water other than winter rains. Foliage dies to the ground before late summer, leaving no flammable debris for fire season.



*“To reduce fire hazard, avoid plants native to chaparral such*

*as chemise and some ceanothus. Favor flowering herbaceous perennials instead of woody trees and shrubs.”*

— Denise Cadman, Natural Resource Specialist, City of Santa Rosa



## 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

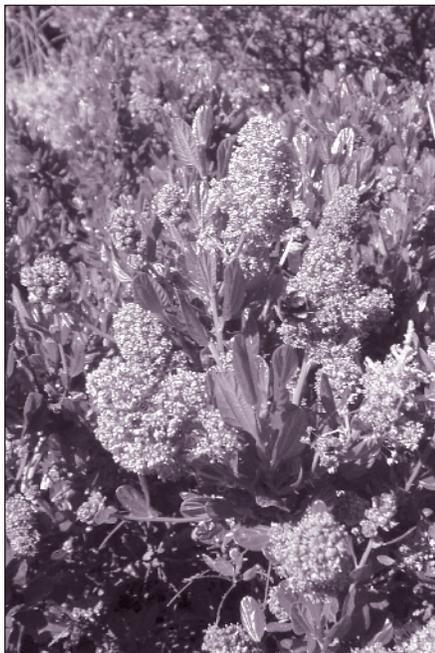
A plant community is a relatively distinct pattern of vegetation that is found in different regions of the Russian River Watershed. Six of these local plant communities are briefly described in the next section of these guidelines. It is important to also consider that species of plants within these 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 of plant selection. Be careful with the Chaparral community as it is prone to fire.
- 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.



## Russian River Watershed 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 native 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

Russian River Watershed consists of many different environments, from the towering Redwood forest, to the dry ridge tops of the coastal mountain range, to the low lying valley flood plains. These environments support a series of distinctive plant communities including Riparian Woodland, Mixed Evergreen Forest, Chaparral, Valley and Foothill Oak Woodland, Valley and Hill Grasslands and Redwood Forest.

Following is a short list of representative species and a brief description of the most common plant communities of the Russian River Watershed.



## Chaparral

### Shrubs

- *Adenostoma fasciculatum* (Chamise)
- *Baccharis pilularis* (Coyote Brush)
- *Ceanothus* spp. (Wild Lilac)
- *Cercocarpus betuloides* (Mountain Mahogany)
- *Garrya elliptica* (Coast Silktassel)
- *Heteromeles arbutifolia* (Toyon)
- *Lupinus* spp. (Lupine)
- *Mimulus aurantiacus* (Sticky Monkeyflower)
- *Quercus berberidifolia* (Scrub Oak)
- *Rhamnus californica* (Coffeeferry)
- *Salvia sonomensis* (Sonoma Sage)

### Herbaceous Perennials

- *Artemisia douglasiana* (Mugwort)
- *Castilleja foliolosa* (Chaparral Paintbrush)
- *Epilobium canum* (California Fuchsia)
- *Iris douglasiana* (Douglas Iris)
- *Scrophularia californica* (Bee Plant)
- *Wyethia angustifolia* (Mule Ears)

## Redwood Forest

### Trees

- *Lithocarpus densiflorus* (Tanbark Oak)
- *Sequoia sempervirens* (Coast Redwood)
- *Umbellularia californica* (California Bay)

### Shrubs

- *Corylus cornuta* var. *californica* (Hazelnut)
- *Myrica californica* (Pacific Wax Myrtle)
- *Vaccinium ovatum* (California 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)
- *Smilacina racemosa* (False Solomon's Seal)
- *Woodwardia fimbriata* (Giant Chain Fern)

## Riparian Woodland

### Trees

- *Acer macrophyllum* (Bigleaf Maple)
- *Acer negundo* (Box Elder)
- *Alnus rhombifolia* (White Alder)
- *Fraxinus latifolia* (Oregon Ash)
- *Populus fremontii* (Fremont Cottonwood)
- *Sambucus mexicana* (Blue Elderberry)

### Shrubs

- *Calycanthus occidentalis* (Spicebush)
- *Lonicera involucrata* (Twinberry)
- *Rosa californica* (California Rose)
- *Rubus parviflorus* (Thimbleberry)
- *Salix* spp. (Willow)

### Herbaceous Perennials

- *Artemisia douglasiana* (Mugwort)
- *Athyrium filix-femina* (Lady Fern)
- *Carex* spp. (Sedge)
- *Equisetum* spp. (Horsetail)
- *Mimulus guttatus* (Monkeyflower)
- *Oenanthe sarmentosa* (Creek Parsley)
- *Sisyrinchium californicum* (Yellow-eyed Grass)

### Vines

- *Aristolochia californica* (Dutchman's Pipe)
- *Clematis lasiantha* (Clematis)
- *Vitis californica* (California Grape)

## Valley and Foothill Oak Woodland

### Trees

- *Aesculus californica* (California Buckeye)
- *Arbutus menziesii* (Madrone)
- *Chrysolepis chrysophylla* (Chinquapin)
- *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)
- *Heteromeles arbutifolia* (Toyon)
- *Myrica californica* (Pacific Wax Myrtle)
- *Rhamnus californica* (Coffeeferry)
- *Ribes sanguineum* var. *glutinatum* (Pink-flowering Current)
- *Rosa californica* (California Rose)
- *Sambucus mexicana* (Blue Elderberry)
- *Symphoricarpos albus* (Snowberry)

### Herbaceous Perennials

- *Artemisia douglasiana* (Mugwort)
- *Dryopteris arguta* (Woodfern)
- *Epilobium canum* (California Fuchsia)
- *Festuca californica* (California Fescue)
- *Lupinus* spp. (Lupine)
- *Polypodium vulgare* (Polypody Fern)
- *Rubus parviflorus* (Thimbleberry)
- *Rubus ursinus* (California Blackberry)

### Vines

- *Clematis ligusticifolia* (Virgin's Bower)
- *Lonicera hispidula* (California Honeysuckle)

## Mixed Evergreen Forest

### Trees

- *Arbutus menziesii* (Mardone)
- *Lithocarpus densiflorus* (Tanbark Oak)
- *Pseudotsuga menziesii* (Douglas Fir)
- *Quercus kelloggii* (Black Oak)
- *Quercus chrysolepis* (Canyon Live Oak)
- *Umbellularia californica* (California Bay)

### Shrubs

- *Arctostaphylos* spp. (Manzanita)
- *Baccharis pilularis* (Coyote Brush)
- *Toxicodendron diversilobum* (Poison Oak)

### Herbaceous Perennials

- *Monardella villosa* (Coyote Mint)
- *Polystichum munitum* (Western Sword Fern)
- *Salvia sonomensis* (Sonoma Sage)
- *Sidalcea* spp. (Checkerbloom)

## Valley and Hill Grasslands

### Herbaceous Perennials

- *Asclepias fascicularis* (Narrow-leaved Milkweed)
- *Danthonia californica* (California Oatgrass)
- *Dichelostemma capitatum* (Bluedicks)
- *Eschscholzia californica* (California Poppy)
- *Festuca idahoensis* (Blue Bunchgrass)
- *Juncus patens* (Common Rush)
- *Nassella lepida* (Needlegrass)
- *Nassella pulchra* (Purple Needlegrass)
- *Poa secunda* (Pacific Blue Grass)
- *Sisyrinchium bellum* (Blue-eyed Grass)
- *Wyethia angustifolia* (Mule Ears)

# Common Plant Communities of the Russian River Watershed

## *Chaparral*

Lying predominately in the rain-shadow slopes of the inner Coast Ranges, chaparral forms dense communities of shrubs and herbaceous perennials on dry slopes, sometimes on serpentine soil. This highly fire-prone plant community is often alive with color in the spring.



PHOTO: CITY OF SANTA ROSA

## *Redwood Forest*

Redwood forest exists in groves scattered in canyons mainly within the coastal fog belt areas of the watershed. Redwoods are adapted to capture moisture from the summer fog with their leaves, adding to precipitation and soil moisture. A distinct group of understory species is adapted to the deep shade and highly organic soils of Redwood groves.



PHOTO: CITY OF SANTA ROSA

## *Riparian Woodland*

Occurring along the Russian River and along its many tributaries throughout the watershed, riparian woodland hosts a variety of moisture-loving plant species. On many of the tributaries and portions of the main stem of the Russian River, trees create a predominately deciduous overstory, with shrubs and herbaceous perennials occupying the understory.



PHOTO: EAST BAY REGIONAL PARK DISTRICT



## *Valley and Foothill Oak Woodland*

Covering large areas in the lower elevations within the Russian River Watershed, oak woodland communities are made up of dense areas of predominately broad-leaf evergreen hardwood trees including oaks, Bay and Madrone. Varied shrubs and herbaceous species occupy the perimeters and understory, with patches of grasslands interspersed.

## *Mixed Evergreen Forest*

Large areas within the Russian River Watershed support dense forest with a mixture of broad-leaf evergreen and coniferous species. This plant community primarily occupies areas west of Highway 101 which are generally moister than areas east of the highway. Dominant trees include Douglas Fir, Tanbark Oak, California Bay and numerous live oak species.



## *Valley and Hill Grasslands*

Scattered throughout the coastal hills and interior slopes and valleys are areas of grassland. Many are now dominated by exotic annual grasses, although depending on soil moisture availability and disturbance history, these communities may support native species of grasses and herbaceous perennials.



## 2. LANDSCAPE FOR LESS TO THE LANDFILL

**R**educing 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 are generated annually.

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 Russian River Watershed.

### I. Select appropriate plants

#### A. Choose plants to match the microclimate and 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 Russian River-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 THILIGEN, 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.



*“It’s important to take into consideration what might have naturally existed in an area before taking any action in the landscape. Then you should use nature’s model to restore the land using California natives and non-invasive plants that attract local fauna, including beneficial insects, birds and soil organisms. The result will be aesthetically pleasing for our customers and provide habitat for local wildlife.”*

— J.M. Baeli, General Manager, Chief Operations Officer, Baelin, Inc. Sebastopol

## 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.

### C. Replace sheared hedges with plants that can grow to their natural shape and 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

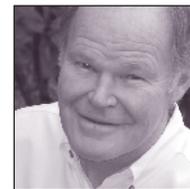
Invasive plants used in landscaping often escape into our natural areas, where they can spread rapidly and out-compete natives, degrade wildlife habitat and increase the fuel load.

#### 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](http://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.



### Selecting the right plant

material for

*the right place will reduce unnecessary and undesirable outputs, but only if you train your employees to shut down the hedge trimmers and pull out the hand shears. It is hard to believe, but this actually saves time and green waste in the long term! Not to mention green house gasses, landfill space, etc.”*

— David K Penry, Partner, Pacific Landscapes, Inc. Sebastopol



PHOTO: CHERYL H. SULLIVAN

## Avoid Invasive Garden Plants of the Russian River Watershed

<b>Invasive Plants</b>		<b>Non-Invasive Plants</b>
<b>Latin Name</b>	<b>Common Name</b>	<b>Instead Try</b>
<i>Arundo donax</i>	Giant Reed	<b><i>Myrica californica</i> (Pacific Wax Myrtle)</b> , <i>Nandina domestica</i> (Heavenly Bamboo), <i>Rhamnus alaternus</i> (Italian Buckthorn)
<i>Carpobrotus edulis</i>	Iceplant or Hottentot Fig	<i>Delosperma cooperi</i> (Hardy Iceplant), <i>Drosanthemum floribundum</i> (Rosea Iceplant), <i>Osteospermum fruticosum</i> and hybrids (Trailing African Daisy)
<i>Cortaderia selloana</i> , <i>C. jubata</i>	Pampas Grass, Jubata Grass	<b><i>Carex spissa</i> (San Diego Sedge)</b> , <i>Muhlenbergia lindheimeri</i> (Lindheimer's Muhly Grass), <b><i>Nolina bigelovii</i> (Bigelow's Beargrass)</b>
<i>Cotoneaster lacteus</i> , <i>C. pannosus</i>	Cotoneaster	<i>Arbutus unedo</i> (Strawberry Tree), <i>Feijoa sellowiana</i> (Pineapple Guava), <i>Heteromeles arbutifolia</i> and cultivars (Toyon), <b><i>Rhamnus californica</i> (California Coffeeberry)</b> , <i>Viburnum suspensum</i> (Sandankwa Viburnum)
<i>Cytisus scoparius</i> , <i>C. striatus</i> , <i>Spartium junceum</i> , <i>Genista monspessulana</i>	Scotch, Portuguese, Spanish or French Broom	<i>Euryops pectinatus</i> (Bush Daisy), <i>Hypericum rowallane</i> (Shrub Hypericum), <i>Kerria japonica</i> (Japanese Kerria), <i>Phlomis fruticosa</i> (Jerusalem Sage), <b><i>Ribes aureum</i> (Golden Currant)</b>
<i>Hedera helix</i> , <i>H. canariensis</i> , <i>Delairea odorata</i> , <i>Vinca major</i>	English Ivy, Algerian Ivy, Cape Ivy, Periwinkle	<b><i>Asarum caudatum</i> (Wild Ginger)</b> , <b><i>Baccharis pilularis</i> – dwarf cultivars (Dwarf Coyote Brush)</b> , <i>Bergenia cordifolia</i> and hybrids (Bergenia), <i>Campanula poscharskyana</i> (Serbian Bellflower), <b><i>Heuchera maxima</i> and hybrids (Island Alumroot)</b> , <i>Rubus pentalobus</i> (Creeping Raspberry), <i>Trachelospermum asiaticum</i> (Asian Jasmine)
<i>Sesbania punicea</i>	Scarlet Wisteria	<b><i>Fremontodendron californicum</i> (Flannelbush)</b> , <b><i>Galvezia speciosa</i> (Showy Island Snapdragon)</b> , <i>Lagerstroemia</i> spp. (Crape Myrtle), <i>Salvia gregii</i> (Autumn Sage)

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*  
(Pampas Grass)

PHOTO: BRIANNA RICHARDSON

### Instead Try



*Muhlenbergia lindheimeri*  
(Lindheimer's Muhly Grass)

PHOTO: BLUESTEM NURSERY,  
[WWW.BLUESTEM.COM](http://WWW.BLUESTEM.COM)

Cal-IPC also recommends that we don't plant the following trees in the Russian River Watershed:

- *Acacia dealbata* (Silver Wattle)
- *Ailanthus altissima* (Tree of Heaven)
- *Crataegus monogyna* (Single Seed Hawthorn)
- *Elaeagnus angustifolia* (Russian Olive)
- *Eucalyptus globulus* (Blue Gum Eucalyptus)
- *Robinia pseudoacacia* (Black Locust)
- *Sapium sebiferum* (Chinese Tallow Tree)
- *Tamarix* species (Saltcedar)

For suggested alternatives, visit [www.cal-ipc.org](http://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](http://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. Additional benefits include improved soil infiltration and thatch reduction.

*“It is always best to let existing natural processes sustain plantings without the dubious help of chemical fertilizers.”*

— Keenan Foster, Environmental Specialist, Sonoma County Water Agency



PHOTO: JOHN KOPSHEVER

### 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.

#### Applications

- Avoid removing leaves as they drop from the tree — designate areas under the tree and 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, prevent 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* in these guidelines or visit [www.BayFriendly.org](http://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.

Sonoma County Water Agency supports an Oak Savanna landscape. The leaf litter provides an interesting landscape element and a natural mulch layer.

### 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 the University of California Cooperative Extension at [www.SonomaMasterGardeners.org](http://www.SonomaMasterGardeners.org).
- 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.SonomaMasterGardeners.org](http://www.SonomaMasterGardeners.org) to download composting brochures and [www.mendorecycle.org/composting.html](http://www.mendorecycle.org/composting.html) for information on how to compost.

#### Benefits

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



PHOTO: KEN HUTCHINS

*“We installed a 30 cubic yard compost system at a home owners association in Santa Rosa, eliminating the need to haul 25 truckloads of green waste annually, while producing 50 yards of rich compost at no additional cost to the customer. These layers of brown and green really do produce black gold!”*

— John Kopshever, Owner, Sonoma Mountain Landscape, Inc., Penngrove

### 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 (ANSI A300) 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 dormant or not under stress (note: in some exceptions, dormant pruning can spread Sudden Oak Death).
- 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.

*“A portion of the fertilizers we apply to our landscapes could find its way to the Russian River when rainwater flows across our yards. By reducing the use of fertilizers, we not only reduce excessive plant growth, but also the amount of pollutants in the Russian River.”*

— Patrick Givone, Town of Windsor, Assistant Engineer



Damage to fencing from sprinkler irrigation.

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

### 4. Water and fertilize judiciously

#### Description

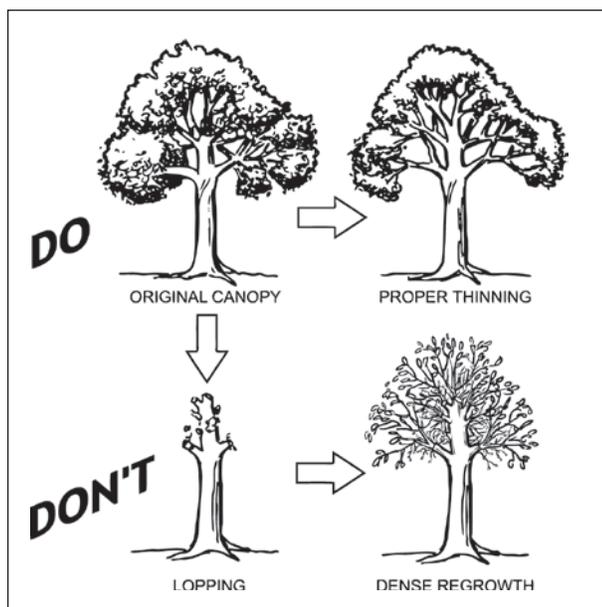
Watering and fertilizing wisely prevents rampant plant growth that weakens the plants and generates plant debris.

#### Applications

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

#### Benefits

Plants are not pushed into growth over-drive. 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.



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](http://WWW.BAYFRIENDLY.ORG)

## 5. Use goats or sheep for controlling weeds and creating firebreaks

### Description

Goats and sheep will eat many weeds that are otherwise very difficult to control — like poison oak, for example. Goats and sheep 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 and sheep 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 or sheep. Ask for references of local landscapers who have used goats or sheep for controlling weeds or creating firebreaks in our area.
- Use them with care as they eat desirable vegetation along with weeds: identify California natives and other vegetation (including tree bark) that will need to be protected from the goats or sheep with temporary fences. Remove them from the area before they have a chance to overgraze.

### Benefits

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



PHOTO: DEBORAH WALTON

A Babydoll Southdown sheep and her lamb grazing at Canvas Ranch, Petaluma, CA. Babydoll Southdown are a rare heritage breed of miniature sheep, only 24" tall at the shoulder.

## 6. Use salvaged items and 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](http://www.ciwmb.ca.gov/CalMax) or by visiting:
  - [www.recyclenow.org](http://www.recyclenow.org) (Sonoma County)
  - [www.garbage.org](http://www.garbage.org) (Sonoma County)
  - [www.mendorecycle.org](http://www.mendorecycle.org) (Mendocino County)
- Specify the use of recycled content materials or those made from rapidly renewable resources.
- Consider substituting compost blankets and filter socks for plastic silt fencing.
- Purchase biodiesel or biobased lubricants for your equipment.
- Use sustainably harvested wood (FSC Certified) if plastic, or salvaged 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.



*“Using onsite materials*

*in our designs saves money, time and emissions. It also helps us get creative about the resources we have by learning to turn problems into solutions.”*

— Trathen Heckman, Executive Director, Daily Acts Organization, Petaluma



PHOTO: DAVID GILMORE

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

## 7. Reduce and recycle waste

### Description

Russian River-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.

### Applications

- Dedicate an easily accessible area to the collection and 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](http://www.ciwmb.ca.gov/CalMax) or visit:
  - [www.recyclenow.org](http://www.recyclenow.org) (Sonoma County)
  - [www.mendorecycle.org](http://www.mendorecycle.org) (Mendocino County)
- 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

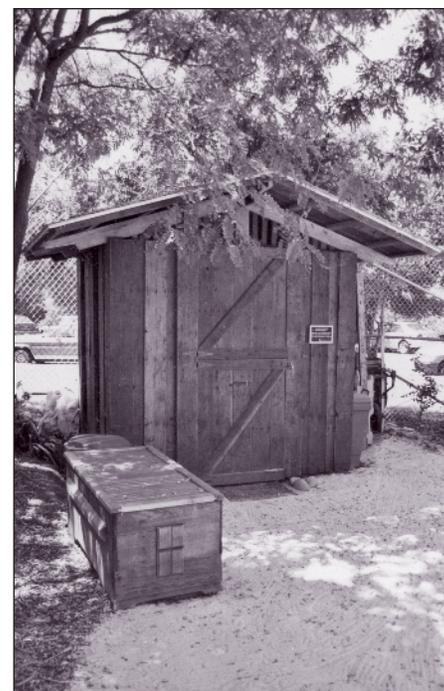
Most local landfills and transfer stations offer a discount for disposing of plant debris if it is kept separate from other types of waste.

### 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.



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



## 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.

# 3. NURTURE THE SOIL



**S**oil 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.

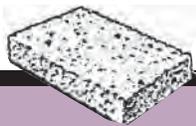
A cornerstone of Russian River-Friendly landscaping is creating and protecting conditions for a diversity of beneficial soil organisms. It is based on the principle of feeding the soil, not the plant, to encourage a thriving community — a foodweb — of microorganisms, worms and other beneficial creatures.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

## Why Does Soil Life Matter?

Living soil is teeming with bacteria, fungi, protozoa, beneficial nematodes, insects, 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

## Functions of a Healthy Living Soil



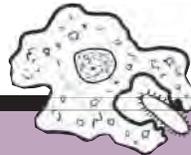
### Store water and nutrients

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.



### Groundwater recharge and runoff reduction

Healthy soil regulates runoff by naturally maintaining the water cycle and slowly discharging to streams and lakes, and recharging aquifers.



### Neutralization of pollutants

Healthy soil is the site of intensive physical, chemical and biological activity, thus it can remove water and air pollution. Soil rich in organic matter contains microorganisms that can immobilize or degrade pollutants, which the microorganisms use as food.



### Resists pests

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.

3 Principles & Practices

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, and improve stormwater quality. 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.

### Applications

- 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 and infiltrates more stormwater.

## Why Use Compost for Erosion Control?

- Compost blankets are less expensive when construction, maintenance, removal and disposal costs are considered.
- Compost blankets provide chemical, biological and physical filtration.
- They can work better than standard BMP's like 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.
- It can avoid the use of petroleum based products.
- 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.



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

### 3. Defend against erosion

#### Description

A sediment and erosion control plan that conforms to local sedimentation and erosion standards or the California Stormwater Quality Association's Construction Handbook (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 sedimentation of streams, stormwater drains and 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 blankets or socks where possible. Consult your local municipal jurisdiction for specific erosion control requirements.
- 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 and 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 maintaining the hydrologic cycle 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, Russian River-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 and other organic matter while controlling weeds. Refer to the tip on sheet-mulching on page 31 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 the 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.
- Consider the conditions under which the plant grows naturally. Some California natives require less fertile soils and compost may not be necessary.
- Quality compost is important. When feasible, use compost made from local plant debris and food waste. Specify compost from a producer that is enrolled in the US Composting Council's Seal of 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 and 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](http://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](http://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 and 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

*“In the City of Cotati we transformed a park lawn to low water use plants and edibles using the sheet mulching process. This process reduced our installation costs and eliminated the need for stripping out and disposing of the lawn, or applying herbicides to kill it – which is important to protect the adjacent Laguna de Santa Rosa.”*

— Damien O’Bid, Director of Public Works,  
City of Cotati



## 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 or lawn. 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
- Eliminate existing lawn areas (no need to either sod cut and dispose of turf or apply a chemical herbicide)
- Reduce labor and maintenance costs: weeds and lawn 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 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 the 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.

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

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.

## 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 and 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](http://www.composttea.org); [www.attra.org](http://www.attra.org); [www.soilfoodweb.com](http://www.soilfoodweb.com)

### Equipment for Brewing Compost Tea:

EPM, Inc., [www.composttea.com](http://www.composttea.com); Growing Solutions, [www.growingsolutions.com](http://www.growingsolutions.com); SoilSoup, [www.soilsoup.com](http://www.soilsoup.com); Lyngso Garden Materials, [www.lyngsogarden.com](http://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%.



*“People think they need to feed their plants.*

*What they don't realize is that they need to feed their soil and their soil will nourish their plants.”*

— Marie Abranya, Habitat and Ornamental Gardener, Frey Winery, Redwood Valley

## 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 and Mediterranean 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 and prevent algae blooms and pollution in our local creeks.

## 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](http://www.ipm.ucdavis.edu) or [www.birc.org](http://www.birc.org) or [www.ourwaterourworld.org](http://www.ourwaterourworld.org) for more information.

### 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, download the product catalog, or subscribe to OMRI, at [www.omri.org](http://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 Russian River-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 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 and mulch

### Description

A robust, living soil, with sufficient organic content, is the foundation of a water conserving landscape: one 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 organic mulch to all exposed surfaces to encourage living soils and reduce evaporation.
- For additional practices see *Nurture the Soil* in these guidelines.
- Finally, for depleted soils, consider applying high quality mycorrhizal inoculants, available as root dips, mixes, tablets and solutions.

### Benefits

Compost and mulch 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 are 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), *Populus fremontii* (Cottonwood) and *Sequoia sempervirens* (Redwood) 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. Once established, reduce irrigation as much as possible.
- 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. California native species are readily available from traditional and specialty sources. Using local natives reduces the risk of spreading non-local plant species and provides optimal habitat for wildlife.



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

PHOTO: DEBRA LANE

### 3. Minimize or eliminate 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 or Mediterranean groundcovers or perennial grasses, shrubs and trees.
- If lawns are desired, limit turf to no more than 25% of total irrigated area. 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.
- Avoid planting turf on slopes greater than 10%, in strips less than 8 feet wide, or in irregular shapes.
- Where appropriate, specify grasses that can go summer dormant and require minimal mowing. Visit California Native Grasslands website at [www.cnga.org](http://www.cnga.org).

#### 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.



Eliminating the lawn can greatly decrease water usage, reduce maintenance costs, increase diversity and improve property value.

### 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 exposure needs (dry shade, dry sun, wet sun, wet shade).
- Place thirstier plants in relatively small areas and if possible, in spots that naturally collect water.
- Plant a large perimeter area with drought adapted species.
- Plan to discontinue or minimize irrigation to 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, always put turf on its own valve(s).

#### Benefits

Water use can be more accurately matched to the plant requirements. This fosters improved health, resistance to pests, and 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 or more of water can be collected from 1,000 square feet of roof. Stored water can then be used for irrigation.

Recycled water is wastewater that has been tertiary treated at a wastewater treatment plant to a high quality suitable for landscape irrigation and other approved uses, but not for human consumption. Used for over 40 years in California, it provides a drought-proof supply of water.

Graywater is wastewater from bathroom sinks, showers, bathtubs and washing machines that is not contaminated by human waste and is reused on site. Not suitable for drinking, it is a resource that can be used for subsurface irrigation of the roots of trees and shrubs.

#### Applications

- Encourage the building architect, if possible, to pre-plumb for graywater and to channel rainwater from the roof to irrigate landscape areas.
- Promote groundwater recharge and conserve water by channeling rainfall from the roof to specially designed planters, swales and other landscaped areas.
- Design, install and operate recycled water irrigation systems (dual distribution systems) to allow for the current and future use of recycled water.
- Check with local building code for applicable permits and backflow protection for rainwater, recycled water and graywater systems.
- Use graywater for subsurface irrigation only. Educate your clients to use biodegradable soaps.

#### Benefits

The use of potable water to irrigate lawns and gardens can be reduced. Groundwater is recharged. Greenhouse gas emissions produced from pumping water is reduced.

## 6. Design and install high efficiency irrigation systems

### Description

Drip and bubbler irrigation technologies can apply water accurately, to the plant root zones, at the rate that it can infiltrate. Low flow sprinkler heads can 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 90% or greater distribution uniformity in turf areas and 80% in all other landscaped areas.
- Install a weather or sensor based, self-adjusting irrigation controller that has been certified by the Irrigation Association ([www.irrigation.org](http://www.irrigation.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.
- Investigate new drip technologies. 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. Use stream rotator heads or oscillating nozzles 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 60% 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.

The California Landscape Contractors Association's (CLCA) Water Management Certification Program assists landscape contractors and other green industry professionals in helping their customers to cut water use and save money. CLCA-certified water managers must pass a written test to become provisionally certified, and demonstrate proficiency at required levels for one year on actual landscape sites prior to achieving full certification status. For more information visit: [www.clca.org](http://www.clca.org).



## 7. Install a dedicated meter to monitor landscape water use

### Description

Separate irrigation meters allow for the monitoring and evaluation of water use in the landscape. Local regulations require them on all new water service for commercial landscapes. Submeters can be installed on existing mixed-use commercial or residential meters.

### Applications

- Specify the addition of a separate water meter for landscapes.
- Combine with master valve, flow sensor and monitoring equipment for a thorough 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 and 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 may also reduce your client's sewer bill.

## 8. Manage irrigation according to need

### Description

Watering requirements will vary with soil, plant, climate, exposure and season. Whether using a traditional controller or a weather based or sensor controller, management of the irrigation requires particular attention and expertise.

### Applications

- Become familiar with CA Irrigation Management Information System (CIMIS) to learn how much water your landscape needs.
- Base irrigation on:
  - The water needs of the plant material.
  - 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, especially 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. Water for shorter periods rather than one long irrigation by utilizing the 'repeat start time' or 'cycle and soak' feature on the irrigation controller. This will minimize runoff and increase the depth of water infiltration.

### 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 may 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

- 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.
- Mulch to reduce evaporation.
- Become IA certified EPA Water Sensor Partner. Contact the Irrigation Association at [www.irrigation.org](http://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.

Through the Qualified Water-Efficient Landscaper (QWEL) Program, landscape professionals are making a positive impact towards reducing landscape water demand by becoming more water efficient in landscape design, maintenance, and operation. QWEL provides 20 hours of educational foundation, based on principals of proper plant selection, irrigation system design and maintenance, and irrigation system programming and operation.



QWEL is an approved U.S. EPA WaterSense Irrigation Auditor Certification Program. Graduates are eligible to become WaterSense Irrigation Partners ([www.epa.gov/WaterSense](http://www.epa.gov/WaterSense)). For more information on becoming a QWEL professional, visit [www.qweltraining.com](http://www.qweltraining.com).

*“Conservation and Water-Use Efficiency are investments in our future. Benefits range from something as simple as saving money on water bills to concepts as complex as combating global climate change... it is where these two concepts overlap that people should capitalize!”*

— Daniel Muelrath, Water Conservation Coordinator, City of Santa Rosa



## TIPS FOR SUCCESS

### Rebates for Irrigation Upgrades and Turf Removal

Many water providers offer free residential and commercial landscape irrigation audits, irrigation upgrade and turf removal programs.

For example, qualifying customers of the City of Cotati may receive a rebate of \$1.00 for every square foot of lawn area removed; commercial customers of the City of Santa Rosa may receive up to \$3,500 per dedicated irrigation meter towards the materials costs of improving the efficiency of the existing irrigation system. In both cases, a site survey is required in order to participate.

Contact your local water provider for current information on free services and rebate incentive programs.

See *Conserve Water* in the Resource Section of this guideline for a listing of water providers in the Russian River Watershed.



# 5. CONSERVE ENERGY

**T**he need to conserve energy is as important to Russian River-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 U.S. 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 Russian River-Friendly, energy conserving practices in your design or service program:

## I. Shade buildings to moderate temperatures

### Description

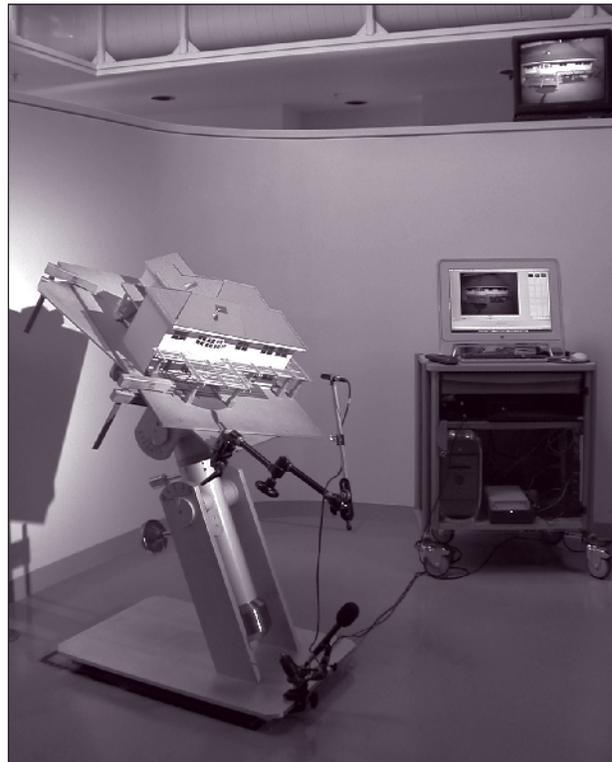
Trees conserve energy by shading, cooling the air through transpiration and reducing the velocity of wind. Selecting and placing trees to shade adjacent buildings in the summer or protect them from the prevailing winter winds can moderate building temperatures.

### 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.
- 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 information, go to the following website:  
<http://cufr.ucdavis.edu>



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](http://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.
- Select light colored, reflective paving materials.
- And consider shading paved areas with photovoltaic arrays.

### Benefits

Patios and 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 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 management	=	Lower cost for 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), light emitting diode (LED) 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 instead of all night illumination.
- Specify that all exterior luminaries emit no light above horizontal OR are Dark Sky certified. Visit [www.darksky.org](http://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 and 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.



PHOTO: JILL ENGVALDSEN

*“We use a company-built mobile solar generator to provide all electricity needed for our landscape installations, thus eliminating the need to draw our client’s power. We upfitted a standard 8’x10’ trailer to contain a solar electric generating system, steel shelving for tool storage, a plan table, electric heater, microwave, and a coffee pot!”*

— Rick Taylor, Principal, Elder Creek Landscapes, Sebastopol

# 6. PROTECT WATER AND AIR QUALITY



*Russian River-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, as little as 15% of the rainwater leaves the system through surface water runoff. Up to 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 90% of all rain and irrigation runoff flows 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? Erosion of channels is greatly accelerated. As little as 10% impervious surface in our watershed 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 Russian River. Other pollutants include trace metals, pesticides, nutrients from fertilizers and pet waste, trash and suspended soil particles from poorly vegetated ground.

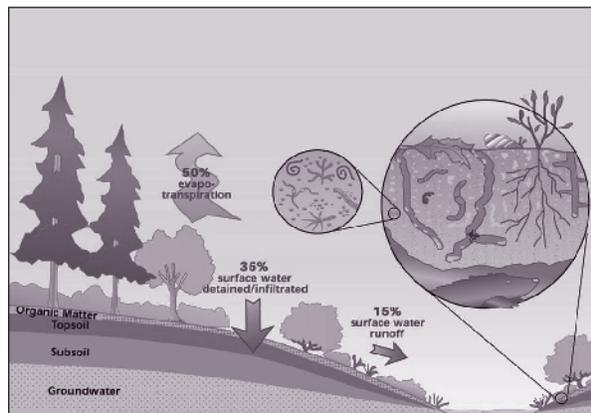
Stormwater runoff, from both residential and commercial sites, thus becomes a large source of pollution.

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

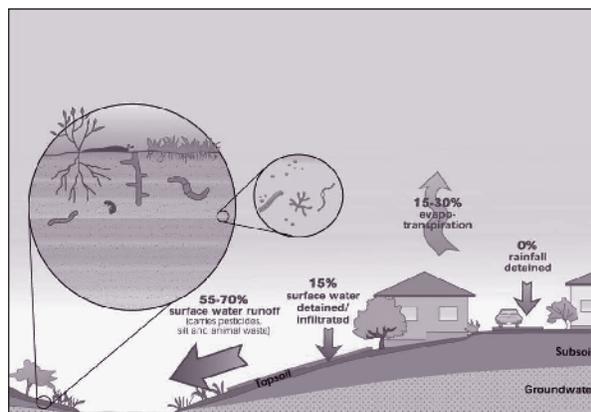
*Russian River-Friendly landscaping can help protect our air from pollution by:*

- ✓ Reducing fossil fuel consumption
- ✓ Recycling plant debris on site
- ✓ Planting trees to remove CO<sub>2</sub> and absorb air pollutants

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.

**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 effect.
- 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.
- Sheetmulching, 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 Russian River Watershed.

## 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 and 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 work to kill weeds and are a better option in areas where an open flame may be hazardous.

### Select herbicides as a last resort and 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 and 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](http://www.ipm.ucdavis.edu)) or subscribe to the *IPM Monitor* from the Bio-Integral Resources Center ([www.birc.org](http://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](http://www.ourwaterourworld.org) or from the UC Statewide IPM Program at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) or the Seattle Green Gardening program at [www.ci.seattle.wa.us/util/proipm/](http://www.ci.seattle.wa.us/util/proipm/)
- 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 and 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.
- Use flame weeder on 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.

*“Many things we do within the Russian River Watershed have the potential to help or hurt our river, its tributaries and the lands that feed these aquatic environments. We need the principles of integrated pest management to be embraced by landscape professionals, businesses and residents. We all benefit from IPM.”*

— Virginia Porter, Executive Director, Russian River Watershed Association, Ukiah

## 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 some 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 or sheep, 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.
- Installing nest boxes, when appropriate, can attract beneficial predators that help control pest species. More information is available at [www.hungryowl.org](http://www.hungryowl.org).

### Pesticides to Avoid:

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

### Use with Caution:

- Pyrethrins
- Imidacloprid
- Fipronil

SOURCE: KELLY MORAN AND MARY LOUISE FLINT

## 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.

Two hungry Barn Owls in suburban Novato, CA



PHOTO: DAVID GOODMAN



## TIPS FOR SUCCESS

### Attracting Beneficial Insects

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

ADAPTED FROM CORNFLOWER FARMS WILDLAND/AGRICULTURE CATALOG, 2006

## 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 efficacy.
- Consider naturally occurring pesticides before synthetic. For example, soaps and oils can be used for control of scale 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 Russian River Watershed.

## 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 turf.

### 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.

### Sonoma County Regional Parks – County Center Water Conservation Project – Phase 1

In 2007 the Sonoma County Regional Parks Department, in cooperation with the City of Santa Rosa and the Sonoma County Water Agency, completed Phase 1 of a three phase project aimed at educating the public on the issue of water conservation and practical applications to address this issue. Existing turf was removed at the County Administration Building and replaced with low water use plants, permeable walking paths, point source drip irrigation and mulch.



West side BEFORE



West side AFTER



North/East side BEFORE



North/East side AFTER



Permeable walking path

Once all phases are completed, the project will reduce irrigation water use by 2.4 million gallons annually and weed growth by 80% during the dry season. Additional benefits will include a significant reduction in maintenance hours, carbon emissions and the need for synthetic fertilizers and pesticides. For more information visit: <http://www.sonoma-county.org/parks/water/>

### 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 the *Nurture the Soil* section of these guidelines.
- 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 site clearing to the 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 are undisturbed and erosion is prevented. Sediment does not clog waterways.

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

#### Description

Lawn mowers, chain saws and leaf blowers emit significant amounts of pollutants. According to the U.S. EPA, a gas-powered lawn mower emits eleven 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 (FSC Certified) or salvaged wood 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 and 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*. Be sure to keep organic matter from being washed or blown into the gutter or stormdrain.
- Use compost filter socks around stockpiled organic matter.
  - Store compost and organic matter away from creeks and stormdrains.
  - Sweep every day during construction.
  - Minimize the use of blowers and use them carefully so you are not removing topsoil.
  - Switch to gravel or cobblestone mulch in areas of high surface water flow.
  - Keep 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: PRO IPM 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 65% or more impervious surfaces. Asphalt and concrete for parking lots and driveways can be formulated to be porous to address this issue. 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 where appropriate.
- 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](http://www.cwp.org).
- Remove all unnecessary impervious paving. Check with your local pavement or aggregate supplier for more information on where to recycle asphalt and concrete.

### Benefits

Increasing porous surfaces decreases runoff, protects the biology of the Russian River Watershed and contributes to the restoration of our local streams, creeks and wetlands. Groundwater is recharged.



PHOTO: DAVID GILMORE

## 7. Plant and protect trees

### Description

Trees help clean and cool the air by absorbing dirty air and removing pollutants. Additionally, trees intercept significant amounts of rainfall each year, thus helping to control stormwater runoff. Their root growth also increases the ability of the soil to take in water.

### Applications

- Select trees that match the microclimate and soil characteristics.
- Select low water use California natives or Mediterranean 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.



*“Strategically placed trees around a building can increase energy efficiency and reduce heat island effect through microclimate enhancement (seasonal shading and wind mitigation.) The ‘greening’ of a building with trees and landscape also contributes to softening hard edges, creating foreground and entry experience, framing dramatic architectural elements, and providing beauty for building occupants.”*

— Sierra Hart, Director of Design, Allen Land Design, Santa Rosa



## 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](http://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 through regular system checks.
- Install rain shut-off devices.
- Upgrade to new technology irrigation controllers that adjust watering schedules to reflect weather conditions and plant water requirements, or soil moisture.
- 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 Russian River Watershed.

## 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

Water, unimpeded by curbs, flows to grass planting in bioswale with storm drain filters, enhancing on-site infiltration and reducing contaminants.

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 returned on site fosters the removal of pollutants and encourages biodiversity. Downstream engineering costs are decreased. Property values can be increased.

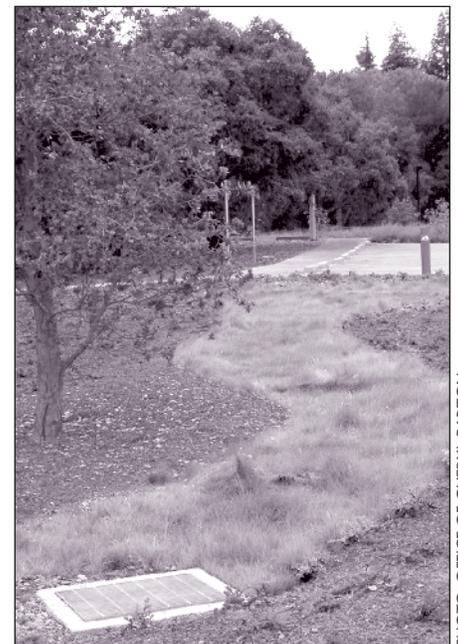


PHOTO: OFFICE OF CHERYL BARTON



## TIPS FOR SUCCESS

### Create Non-Irrigated Landscapes out of Decorative Turf Areas



Landscapes often contain remote turf areas that are irrigated and maintained but not utilized. Replacing these areas with non-irrigated landscapes provides a good opportunity to save resources without sacrificing aesthetics, build your business and help your customers to become more Russian River-Friendly.

Identify these landscape areas and propose to your customers:

- Abandoning the irrigation system
- Sheet mulching the existing turf (instructions on p. 31)
- Applying 3" of mulch
- Planting bulbs and wildflower seeds for diversity and color in the spring

Benefits May Include:

- Water savings (100% in treated areas)
- Reduced surface runoff
- Reduced maintenance (turf and irrigation system)
- Water quality protection (need for fertilizers and pesticides is eliminated)
- Elimination of property damage due to overhead irrigation
- Increased bio-diversity. A diverse landscape may resist disease and pests better than those with little variety
- "Spring Color" is a good selling point: provides ornamental aesthetic with no need for irrigation

# 7. CREATE AND PROTECT WILDLIFE HABITAT



**P**lant and animal diversity is one of the many factors that makes the Russian River Watershed unique and beautiful. More than 1,400 native plant species bloom throughout the year, supporting hundreds of native pollinators, beneficial insects and other organisms that can reduce the need for pesticides. Birds and 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 Russian River ecosystem and its inhabitants. Yet the loss of habitat is threatening local biodiversity. The population of the Russian River Watershed is growing and expected to continue to do so. With increased populations comes development, which must be done with 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 Russian River Watershed, 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 herbaceous and woody plants, 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 and that 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.



PHOTO: KEN HUTCHINS



PHOTO: KWAI 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 and visual interest. A single insect or disease infestation is less likely to be devastating.

*“Studies have shown that even in urban landscapes, native plants are associated with the increased populations of native songbirds.”*

— Denise Cadman, Natural Resource Specialist, City of Santa Rosa

## 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 Russian River 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 planting 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 Russian River Watershed, often with less water, fertilizers and maintenance. Local wildlife is fostered.



## TIPS FOR SUCCESS

### Sources of California Natives

There are more than 1,400 plants native to the Russian River Watershed and many are 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](http://www.albrightseed.com)

Bay Natives  
San Francisco, (415) 285-2240  
[www.baynatives.com](http://www.baynatives.com)

Buckeye Nursery  
Petaluma, (707) 559-7081

California Flora Nursery  
Fulton, (707) 528-8813  
[www.calfloranursery.com](http://www.calfloranursery.com)

Central Coast Wilds  
Santa Cruz, (831) 459-0655  
[www.centralcoastwilds.com](http://www.centralcoastwilds.com)

Clyde Robin Seed Company  
Castro Valley, (510) 785-0425  
[www.clyderobin.com](http://www.clyderobin.com)

Cornflower Farms  
Elk Grove, (916) 689-1015  
[www.cornflowerfarms.com](http://www.cornflowerfarms.com)

Elkhorn Native Plant Nursery  
Moss Landing, (831) 763-1207  
[www.elkhornnursery.com](http://www.elkhornnursery.com)

Greenlee Nursery  
Chino, (909) 393-6544  
[www.greenleenursery.com](http://www.greenleenursery.com)

Hedgerow Farms  
Winters, (530) 662-6847  
[www.hedgerowfarms.com](http://www.hedgerowfarms.com)

Larner Seeds  
Bolinas, (415) 868-9407  
[www.larnerseeds.com](http://www.larnerseeds.com)

Matilija Nursery  
Moorpark, (805) 523-8604  
[www.matilijanursery.com](http://www.matilijanursery.com)

Mostly Natives Nursery  
Tomales, (707) 878-2009  
[www.mostlynatives.com](http://www.mostlynatives.com)

Native Revival Nursery  
Aptos, (831) 684-1811  
[www.nativerivival.com](http://www.nativerivival.com)

North Coast Native Nursery  
Petaluma, (707) 769-1213  
[www.northcoastnativenursery.com](http://www.northcoastnativenursery.com)

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

Pacific Coast Seed  
Livermore, (925) 373-4417  
[www.pcseed.com](http://www.pcseed.com)

Rana Creek Wholesale Nursery  
Carmel Valley, (831) 659-2830  
[www.ranacreeknursery.com](http://www.ranacreeknursery.com)

Seedhunt  
Freedom  
[www.seedhunt.com](http://www.seedhunt.com)

Sierra Azul Nursery & Gardens  
Watsonville, (831) 763-0939  
[www.sierraazul.com](http://www.sierraazul.com)

Suncrest Nurseries, Inc.  
Watsonville, (831) 728-2595  
[www.suncrestnurseries.com](http://www.suncrestnurseries.com)

The Watershed Nursery  
Berkeley, (510) 548-4714  
[www.thewatershednursery.com](http://www.thewatershednursery.com)

Yerba Buena Nursery  
Woodside, (650) 851-1668  
[www.yerbabuenanursery.com](http://www.yerbabuenanursery.com)

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



PHOTO: KAPALA 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 and 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/programs/landcare](http://www.nofamass.org/programs/landcare).
- 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 support wildlife and add interesting elements to the landscape.

### 4. Use organic pest management

#### Description

Pesticides kill more than 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 *Protect Water and Air Quality* section of this chapter.
- 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](http://www.wildlifehc.org).

### 5. Conserve or restore natural areas and wildlife corridors

#### Description

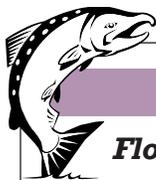
Careful site planning, especially for new development along the urban-wild interface is important for protecting biodiversity. Natural areas and corridors increase habitat and range, supporting a diversity of organisms and allowing them to travel safely between sites.

#### 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 river.

#### Benefits

The Russian River Watershed's open space, plant and animal diversity are 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> spp. (Willow)												
<i>Ceanothus</i> spp.												
<i>Baccharis viminea</i> (Mule Fat)												
<i>Achillea</i> spp. (Yarrow)												
<i>Rhamnus californica</i> (Coffeeberry)												
<i>Prunus ilicifolia</i> (Holly-Leaf Cherry)												
<i>Eriogonum</i> spp. (Buckwheat)												
<i>Sambucus</i> spp. (Elderberry)												
<i>Heteromeles arbutifolia</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

### *Summary of Russian River-Friendly Landscaping Benefits*

*“We are aware, now more than ever of the need to be even more responsible stewards of our environment. As our level of individual and organizational awareness drives us to action, we need as many successful and innovative models to follow as possible. Russian River-Friendly Landscaping is a model that provides those looking for a place to start with the confidence that they need to take those first critical steps toward lasting change. For those that have already taken the first steps, it gives them a road map to continue to focus their energy on sustainable change that will benefit their business, their employees and the environment.”*

BOARD OF DIRECTORS, NORTH COAST CHAPTER OF THE CALIFORNIA LANDSCAPE CONTRACTORS ASSOCIATION

# Summary of Russian River-Friendly Landscaping Benefits

1. LANDSCAPE LOCALLY	Design	Construct	Maintain	BENEFITS
1. Select and evaluate the site carefully				This knowledge is critical to all other Russian River-Friendly landscaping practices – particularly being able to select plant materials that match the site. It places the landscape in the context of the Russian River Watershed. In the long run, it allows you to collaborate with nature, saving you time and money.
2. Assess the soil and test drainage				Understanding the soil is 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 and fauna				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.
4. Consider the potential for fire				Landscapes can be designed to reduce the fire hazard, with a clearer understanding of the risks, proper design and choice of plants.
5. Use local, natural plant communities as models				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.
2. LANDSCAPE FOR LESS TO THE LANDFILL	Design	Construct	Maintain	BENEFITS
1A. Select appropriate plants: Choose plants to match the microclimate and soil conditions				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 replacements are often reduced. Debris is not generated in the first place.
1B. Select appropriate plants: Choose plants that can grow to their natural size in the space allotted them				Labor, fuel and waste are likely to be reduced, cutting your costs. Plant health and resistance to disease is fostered.
1C. Select appropriate plants: Replace sheared hedges with plants that can grow to their natural shape and size				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.
1D. Select appropriate plants: Do not plant invasive species				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.
2A. Keep plant debris on site: Grasscycle				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. Additional benefits include improved soil infiltration and thatch reduction.
2B. Keep plant debris on site: Produce mulch from plant debris				Nutrients are recycled, habitat is created, waste is reduced and the beneficial soil life that feeds on the organic matter jumpstarts other natural processes.
2C. Keep plant debris on site: Compost plant debris				Composting on-site returns valuable nutrients and organic matter to the soil and reduces pollution associated with transporting waste, as well as disposal costs.
3. Prune selectively and properly				Trees and shrubs are stronger and more likely to resist pests. Waste is minimized.
4. Water and fertilize judiciously				Plants are not pushed into growth over-drive. 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.
5. Use goats or sheep for controlling weeds and creating firebreaks				As the goats or sheep graze they reduce the fuel load, return nutrients to the soil and eliminate the need to haul off plant debris.
6. Use salvaged items and recycled content materials				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, markets for recycled products strengthened.
7. Reduce and recycle waste				Recycling and donating unused items reduces pressure on landfills, saves time and 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				Your disposal costs are trimmed, and in most cases, the material is processed into mulch or compost.

- Indicates a practice that is a primary issue in the design, construction or maintenance phase.
- Indicates a practice that is a secondary issue in the design, construction, or maintenance phase.
- Indicates that a practice is not often as relevant in the design, construction or maintenance phase.

3. NURTURE THE SOIL	Design	Construct	Maintain	BENEFITS
1. Remove and store topsoil before grading				Conserving topsoil can reduce the likelihood of many problems over the long run, and improve stormwater quality. It can minimize fertilizer and irrigation requirements and topsoil replacement costs.
2. Protect soil from compaction				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 and infiltrates more stormwater.
3. Defend against erosion				The likelihood of erosion is lessened, thereby maintaining the hydrologic cycle and protecting aquatic habitat.
4. Amend the soil with compost before planting				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 and pesticide use and lower water usage.
5. Grasscycle				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				Mulch conserves water, enhances the growth of plants and the appearance of the landscape. It can also simplify your operations – thereby possibly lowering your costs – by suppressing annual weed growth and reducing the need for trimming around trees and poles.
7. Aerate compacted soils				Root growth is stimulated and plants are more easily established. Water and fertilizer requirements may be lessened, while disease is resisted.
8. Feed soils naturally				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%.
9. Avoid synthetic, quick release fertilizers				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 and prevent algae blooms and pollution in our local creeks.
10. Minimize the use of chemical pesticides				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.
4. CONSERVE WATER	Design	Construct	Maintain	BENEFITS
1. Create drought resistant soils with compost and mulch				Compost can increase permeability and water-holding capacity, thereby reducing the need for irrigation and lowering water bills.
2. Grow drought-tolerant California native or Mediterranean plants				Appropriately sited native or Mediterranean type plants often require less soil preparation, watering, mowing, fertilizing and spraying, which can reduce your operating costs. California native species are readily available from traditional and specialty sources. Using local natives reduces the risk of spreading non-local plant species and provides optimal habitat for wildlife.
3. Minimize or eliminate the lawn				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				Water use can be accurately matched to the plant requirements. This fosters improved plant health, resistance to pests and conserves water. Plant mortality is reduced, saving time and money.
5. Design for on-site rainwater collection, recycled water and/or graywater use				The use of potable water to irrigate lawns and gardens can be reduced. Groundwater is recharged. Greenhouse gas emissions produced from pumping water is reduced.

*Conserve Water (cont'd.)*

6. Design and install high efficiency irrigation systems				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.
7. Install a dedicated meter to monitor landscape water use				Monitoring the landscape water use more precisely can demonstrate and support water conservation. A separate meter may also reduce your client's sewer bill.
8. Manage irrigation according to need				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 client's water bills may be reduced.
9. Maintain the irrigation system so every drop counts				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.
10. Request an irrigation audit				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.
<b>5. CONSERVE ENERGY</b>	<b>Design</b>	<b>Construct</b>	<b>Maintain</b>	<b>BENEFITS</b>
1. Shade buildings to moderate temperatures				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.
2. Reduce the heat island effect				Patios and 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				The air conditioner runs more efficiently, which will reduce your client's utility bill.
4. Design lighting carefully				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				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				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.
<b>6. PROTECT WATER AND AIR QUALITY</b>	<b>Design</b>	<b>Construct</b>	<b>Maintain</b>	<b>BENEFITS</b>
1A. Use Integrated Pest Management (IPM): Prevent pest problems				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 Russian River Watershed.
1B. Use IPM: Train your staff to identify and monitor pest and beneficial populations				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.
1C. Use IPM: Educate your clients				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.
1D. Use IPM: Control pest problems with physical and mechanical methods				Pests can be kept at acceptable levels thereby reducing the need for pesticides. Pollutants are kept out of stormwater in the first place. Your staff will not be applying dangerous pesticides, which may reduce your liability.
1E. Use IPM: Control pests problems with biological controls				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.
1F. Use IPM: Control pest problems with the least toxic pesticide as a last resort				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 Russian River Watershed.

-  Indicates a practice that is a primary issue in the design, construction or maintenance phase.
-  Indicates a practice that is a secondary issue in the design, construction, or maintenance phase.
-  Indicates that a practice is not often as relevant in the design, construction or maintenance phase.

*Protect Water and Air Quality (cont'd.)*

2. Eliminate high input decorative lawns				The need for irrigation, synthetic fertilizers and pesticides can be reduced or eliminated, thus protecting water quality.
3. Minimize site disturbance				Vegetation, topography and hydrology are undisturbed and erosion is prevented. Sediment does not clog waterways.
4. Choose and maintain your materials, equipment and vehicles carefully				Fuel consumption is minimized. Air, water and noise pollution can often be reduced. Worker and community health will be protected.
5. Keep soil and organic matter where it belongs				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.
6. Minimize impervious surfaces				Increasing porous surfaces decreases runoff, protects the biology of the Russian River Watershed and contributes to the restoration of our local streams, creeks and wetlands. Groundwater is recharged.
7. Plant and protect trees				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 eight times the benefits of smaller trees.
8. Manage and maintain the irrigation system carefully				Water will be conserved, runoff reduced and your customer may save money on water bills, while protecting the Russian River Watershed.
9. Design a system to capture and treat water				Stormwater runoff is reduced while water returned on site fosters the removal of pollutants and encourages biodiversity. Downstream engineering costs are decreased. Property values can be increased.
<b>7. CREATE AND PROTECT WILDLIFE HABITAT</b>	<b>Design</b>	<b>Construct</b>	<b>Maintain</b>	<b>BENEFITS</b>
1. Diversify				Biodiversity is fostered. A diverse landscape may resist disease and insect pests better than those with little variety, while providing a higher habitat value and visual interest. A single insect or disease infestation is less likely to be devastating.
2. Choose California natives first				Many natives flourish in the Russian River Watershed, often with less water, fertilizers and maintenance. Local wildlife is fostered.
3. Provide water and shelter				Water and shelter support wildlife and add interesting elements to the landscape.
4. Use organic pest management				Beneficial organisms, which can keep pests under control, are not harmed. The soil's ability to filter out pollutants and suppress disease is fostered.
5. Conserve or restore natural areas and wildlife corridors				The Russian River Watershed's open space, plant and animal diversity are protected. Runoff is slowed, streams are cooled and bank erosion is prevented.

- Indicates a practice that is a primary issue in the design, construction or maintenance phase.
- Indicates a practice that is a secondary issue in the design, construction, or maintenance phase.
- Indicates that a practice is not often as relevant in the design, construction or maintenance phase.



# 5

*How to Start Landscaping...  
in a Russian River Friendly Way*



KAMALA BENNETT, SUSTAINABLE LIVING DESIGNS

A conventional landscape is transitioned to a Russian River-Friendly landscape.

Conventional landscape



Lawn sheet mulched in place



One year later

**R**ussian River Watershed 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 Russian River-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 Russian River-Friendly landscaper.

**STEP 1:** Start with the Russian River-Friendly practices that you already do and explain the benefits to your clients

**STEP 2:** Plan to offer more Russian River-Friendly landscaping practices

**STEP 3:** Market “Russian River-Friendly Landscaping Packages”

**STEP 4:** Integrate Russian River-Friendly into Green Building

**STEP 5:** Start your Russian River-Friendly Reference Library

## STEP 1:

**Start with the Russian River-Friendly practices that you already do and explain the benefits to your clients**

The best strategy for offering Russian River-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 Russian River-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 Russian River-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 Russian River-Friendly Landscape program.



*“We meet with clients to look at real life, practical solutions that are site specific.*

*Once interest is generated, we submit proposals with ROI’s so that clients can weigh the cost issue. We also keep them apprised of pending and future trends of the industry that are applicable locally.”*

— Duane Feloni, Branch Manager, TruGreen LandCare, Windsor



Landscape professionals learn how to sheet-mulch.

PHOTO: CINDY NELSON

## STEP 2:

### Plan to offer more Russian River-Friendly landscaping practices

The ideal Russian River-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 Russian River-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 Russian River-Friendly services?
- Design professionals: ask that the landscapes you design be maintained in accordance with the *Russian River-Friendly Landscape Guidelines*.

Consider recommending firms with the following qualified professionals on staff:

- Bay-Friendly Qualified Maintenance Professionals. For a list of qualified professionals, visit [www.bayfriendly.org](http://www.bayfriendly.org). Click on 'Hire a Qualified Bay-Friendly Landscaper.'
- Qualified Water Efficient Landscaper (QWEL) program graduates. For a list of graduates, visit [www.qwel.net](http://www.qwel.net). Click on 'Graduates.'



***“The keys to sustainability are landscape designs that consider not only the DESIGN, but***

***also INSTALLATION and MAINTENANCE. Following “Right Plant-Right Place” as one bench mark is an example of good design, yet a sustainable system needs to include all three aspects.”***

— Susie Dowd Markarian, APLD, Certified Sustainable Landscape Designer, Santa Rosa



PHOTO: VIRGINIA PORTER



***“If we explain key issues in the Russian River Watershed, show the link to our landscape practices, and provide viable solutions, people will buy in.***

***It’s often difficult for people to feel that their small daily acts really mean something. We have to show them why their efforts make a difference.”***

— Rick Taylor, Principal, Elder Creek Landscapes, Sebastopol



## 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 Russian River-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 “Russian River-Friendly Landscaping Packages”

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

#### Russian River-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

#### Russian River-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. Russian River-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

### Russian River-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:

- Surveying flora and fauna
- Learning about local, natural plant communities and using them as models
- Conserving or restoring natural areas
- Diversifying and including many California native plant species
- Providing water and shelter
- Eliminating the use of pesticides



PHOTO: MIKE HEACOX, LUCIOLE DESIGN



***“Russian River-Friendly landscapes are economically sound landscapes. They require less machine use, less water, less maintenance, no toxic chemicals, and source local materials. They are comfortable and engaging, and make the people involved with them feel good.”***

— Kate Frey, Instructor, Sonoma State University Sustainable Landscape Certificate Program

## Amending 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
  - Increases customer satisfaction
- Faster planting in amended soils
- Reducing plant loss
  - Fewer callbacks
  - Improves profits
- Increasing water holding capacity
  - Irrigation costs are cut by as much as 50%
  - Reduces water bills for customer
  - Decreases 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.

## STEP 4:

### Integrate Russian River-Friendly into Green Building

GreenPoint Rated is a residential rating program for single family 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. For more information, visit [www.builditgreen.org](http://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](http://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](http://www.sustainableites.org) for updates on their progress.

## Bay-Friendly Landscaping & Gardening Coalition

The **Bay-Friendly Landscaping & Gardening Coalition** works in partnership to reduce waste and pollution, conserve natural resources, and create vibrant landscapes and gardens. The goal of the Coalition is to expand the Bay-Friendly landscaping and gardening programs to the entire nine counties of the San Francisco Bay Area.

### Bay-Friendly Landscape Professional Training Opportunities

Successful completion of these classes will allow you to market your expertise and services as a Bay-Friendly Qualified Landscape Professional.

- **For landscape maintenance & construction professionals:**

Enroll in the 7-week Bay-Friendly Landscape Maintenance Training and Qualification Program. The training is currently available for professionals with clients in multiple counties in the Bay Area.

- **For landscape design and construction professionals:**

Bay-Friendly Coalition agencies offer half day trainings that feature case studies and guest experts. Landscape design professionals with clients in Alameda County can also enroll in the 3 week Bay-Friendly Design Training and Qualification program.

Visit the Coalition web site at [www.bayfriendlycoalition.org](http://www.bayfriendlycoalition.org) for information or to view upcoming trainings, workshops, garden tours and conferences throughout the greater Bay Area.



PHOTO: ANNE MARIE ALLEN

## STEP 5:

### Start your Russian River-Friendly Reference Library with these titles:

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.

Dreistadt, Steve, *Pests of Landscape Trees & Shrubs*, University of California Press, February 2004.

East Bay Municipal Utility District, *Plants and Landscapes for Summer-Dry Climates of the San Francisco Bay Region*, [www.ebmud.com](http://www.ebmud.com). May 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.

Lancaster, Brad, *Rainwater Harvesting for Drylands and Beyond*, Vol. I, Rainsource Press, 2006.

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

Ludwig, Art, *The New Create an Oasis with Greywater*, Oasis Design, 2006.

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

Smith, Nevin, *Native Treasures: Gardening With the Plants of California*, University of California Press, 2006.

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*, 2000. [www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf](http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf)

## Russian River-Friendly Landscape Professional Training Opportunities

Green industry professionals, businesses owners and residents within the Russian River watershed are becoming aware of the benefits of landscaping with Russian River-Friendly principles. Expand your professional knowledge by taking advantage of these training opportunities which are aligned with all or some of the principles which define Russian River-Friendly Landscaping.

- Become a Master Gardener and learn about plants, soils, IPM and more:
  - Visit the Mendocino County Master Gardeners at [cemendocino.ucdavis.edu/Master\\_Gardener578](http://cemendocino.ucdavis.edu/Master_Gardener578)
  - Visit the Sonoma County Master Gardeners at [groups.ucanr.org/sonomamg](http://groups.ucanr.org/sonomamg)
- Santa Rosa Junior College offers Associate Degrees and Certificate Programs in a variety of landscape disciplines through its Environmental Horticulture department:  
[www.santarosa.edu](http://www.santarosa.edu)
- Sonoma State University offers a Sustainable Landscape Certificate Program: [www.sonoma.edu/sustainablelandscape](http://www.sonoma.edu/sustainablelandscape)
- The EPA's Qualified Water Efficient Landscaper Program [www.qweltraining.com](http://www.qweltraining.com)
- Other professional groups and non-profit organizations that offer conferences, trainings, workshops, or certification programs include:
  - Western Chapter, International Society of Arboriculture [www.wcisa.net](http://www.wcisa.net)
  - Irrigation Association [www.irrigation.org](http://www.irrigation.org)
  - Association of Professional Landscape Designers [www.apldca.org](http://www.apldca.org)
  - American Society of Landscape Architects [www.asla.org](http://www.asla.org)
  - Ecological Landscape Association [www.ecolandscaping.org](http://www.ecolandscaping.org)
  - Pesticide Applicators Professional Association <http://papaseminars.com>
  - California Landscape Contractors Association, North Coast Chapter [www.clcanorthcoastchapter.org](http://www.clcanorthcoastchapter.org)
  - Mendocino Ecological Learning Center [www.melc.us](http://www.melc.us)
  - Occidental Arts and Ecology Center [www.oaec.org](http://www.oaec.org)
  - Regenerative Design Institute [www.regenerativedesign.org](http://www.regenerativedesign.org)
  - Sonoma Ecology Center [www.sonomaecologycenter.org](http://www.sonomaecologycenter.org)

## 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](http://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](http://www.lowimpactdevelopment.org)



## Landscape Locally

- Soil surveys can be found at your local library or by contacting the USDA Natural Resource Conservation Service. For useful soil information and a free web-based soil survey, visit <http://websoilsurvey.nrcs.usda.gov/app>
- Contact soil and compost testing laboratories:
  - ABC Organics [www.abccorganics.com](http://www.abccorganics.com)
  - A&L Western Agricultural Labs [www.al-labs-west.com](http://www.al-labs-west.com)
  - Harmony Farm Supply & Nursery [www.harmonyfarm.com](http://www.harmonyfarm.com)
  - Peaceful Valley Farm Supply [www.groworganic.com](http://www.groworganic.com)
  - Soil Control Lab [www.controllabs.com](http://www.controllabs.com)
  - Soil Foodweb [www.soilfoodweb.com](http://www.soilfoodweb.com)
  - Soil & Plant Lab [www.soilandplantlaboratory.com](http://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>
  - University of California's Division of Agriculture and Natural Resources offers information on fire safe landscaping:
    - *Landscaping Tips to Defend Your Home from Wildfire* <http://ucanr.org/freepubs/docs/8322.pdf>
    - *Home Landscaping for Fire* <http://ucanr.org/freepubs/docs/8228.pdf>

## Landscape for Less to the Landfill



- Invasive plant species websites: [www.cal-ipc.org](http://www.cal-ipc.org) and [www.invasivespecies.org](http://www.invasivespecies.org)
- ANSI A300-(Part 1)-2001: *Tree Care Operations*, can be purchased from [www.ansi.org](http://www.ansi.org)
- For more information on using goats and sheep for controlling weeds and creating firebreaks, visit [www.livestockforlandscapes.com](http://www.livestockforlandscapes.com)
  - For sheep grazing, contact [www.canvasranch.com](http://www.canvasranch.com) or [www.livingsystemslandmanagement.com](http://www.livingsystemslandmanagement.com)
  - For goat grazing, contact [www.barlasboergoats.com](http://www.barlasboergoats.com) or [www.goatsrus.com](http://www.goatsrus.com)
- To find or offer salvaged materials visit California Integrated Waste Management Board's (CIWMB) CalMax website at [www.ciwmb.ca.gov/CalMAX/](http://www.ciwmb.ca.gov/CalMAX/) or:

- Garbage Reincarnation, Inc. [www.garbage.org](http://www.garbage.org)
- Mendocino Solid Waste Management Authority [www.mendorecycle.org](http://www.mendorecycle.org)
- Sonoma County Habitat for Humanity's ReStore [www.sonomacountyhabitat.org](http://www.sonomacountyhabitat.org)
- Sonoma County Waste Management Agency [www.recyclenow.org](http://www.recyclenow.org)
- SonoMax Materials Exchange [www.SonoMax.org](http://www.SonoMax.org)
- To purchase salvaged materials contact or visit:
  - Daniel O. Davis, Inc. [www.davisdemolition.com](http://www.davisdemolition.com)
  - Heritage Salvage Petaluma [www.heritagesalvage.com](http://www.heritagesalvage.com)
  - Garbage Reincarnation, Inc.'s "Recycletown" [www.garbage.org](http://www.garbage.org)
  - Salvage Shop at the Ukiah Transfer Station [www.candswaste.com/california/salvage\\_shop](http://www.candswaste.com/california/salvage_shop)

## Nurture the Soil



- Guidelines on creating and implementing a *Soil Management Plan* can be downloaded from Washington Organic Recycling Council's Building Soil website at [www.buildingsoil.org/tools/Soil\\_BMP\\_Manual.pdf](http://www.buildingsoil.org/tools/Soil_BMP_Manual.pdf)
- The US Composting Council describes its Seal of Testing Assurance program for ensuring quality compost at [www.compostingcouncil.org/programs/sta](http://www.compostingcouncil.org/programs/sta)
- For listings of compost and mulch producers visit the CalRecycle website at [www.calrecycle.ca.gov/organics](http://www.calrecycle.ca.gov/organics) For specifications on using compost, download *Compost Use for Landscape and Environmental Enhancement*.
- Compost made from Mendocino County yard waste is available for purchase at the Ukiah Transfer Station [www.candswaste.com/california/solidwaste](http://www.candswaste.com/california/solidwaste)
- Compost made from Sonoma County yard waste is available for purchase from Sonoma Compost Company, at the Sonoma County Central Disposal Facility [www.sonomacompost.com](http://www.sonomacompost.com)
- Rolls of recycled cardboard can be purchased for sheet mulching from [www.northbaypaper.com](http://www.northbaypaper.com)
- Information on compost tea is available from [www.attra.org](http://www.attra.org), [www.composttea.org](http://www.composttea.org) and [www.soilfoodweb.com](http://www.soilfoodweb.com)
- For information and equipment to brew compost tea contact Sustainable Agricultural Technologies, [www.composttea.com](http://www.composttea.com); Growing Solutions Inc., [www.growingsolutions.com](http://www.growingsolutions.com); Microbial Magic, [www.soilsoop.com](http://www.soilsoop.com); or Soil Foodweb, [www.soilfoodweb.com](http://www.soilfoodweb.com)

## Conserve Water



- WaterSense is an EPA-sponsored partnership program that seeks to protect the future of our nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices [www.epa.gov/WaterSense](http://www.epa.gov/WaterSense)
- The Alliance for Water Efficiency serves as a North American advocate for water-efficient products and programs and provides information and assistance on water conservation efforts [www.allianceforwaterefficiency.org](http://www.allianceforwaterefficiency.org)

- The California Department of Water Resources has information on water supply and demand at [www.water.ca.gov](http://www.water.ca.gov)
- The California Urban Water Conservation Council offers a variety of services and information, including product news and technical resources at [www.cuwcc.org](http://www.cuwcc.org)
- The Irrigation Training & Research Center at California Polytechnic State University, San Luis Obispo offers Irrigation Auditor and Landscape Water Budget classes: [www.itrc.org](http://www.itrc.org)
- Information on the California Irrigation Management Information System (CIMIS) is available at [www.cimis.water.ca.gov](http://www.cimis.water.ca.gov)
- The Irrigation Association is a national membership organization which provides information and education on irrigation equipment and water management practices: [www.irrigation.org](http://www.irrigation.org)
- The Qualified Water Efficient Landscaper (QWEL) Program is a WaterSense labeled Irrigation Auditor certification program: [www.qwel.net](http://www.qwel.net)
- Local water districts often offer information on water conservation, landscape audits or audit/water budget training. Contact your water supplier or check the following websites:
  - City of Cloverdale [www.cloverdale.net](http://www.cloverdale.net)
  - City of Cotati [www.ci.cotati.ca.us](http://www.ci.cotati.ca.us)
  - City of Healdsburg [www.ci.healdsburg.ca.us](http://www.ci.healdsburg.ca.us)
  - Mendocino County Water Agency [www.mendocountywa.com](http://www.mendocountywa.com)
  - City of Rohnert Park [www.rpcity.org](http://www.rpcity.org)
  - City of Santa Rosa [www.srcity.org/wc](http://www.srcity.org/wc)
  - City of Sebastopol [www.ci.sebastopol.ca.us](http://www.ci.sebastopol.ca.us)
  - Sonoma County Water Agency (For areas in Unincorporated Sonoma County) [www.scwa.ca.gov/conservation](http://www.scwa.ca.gov/conservation)
  - City of Ukiah [www.cityofukiah.com](http://www.cityofukiah.com)
  - Town of Windsor [www.townofwindsor.com](http://www.townofwindsor.com)
- Sonoma County Storm Water Program [www.sonoma-county.org/prmd/sw](http://www.sonoma-county.org/prmd/sw)
- City of Santa Rosa Storm Water Program [www.srcity.org/stormwaterandcreeks](http://www.srcity.org/stormwaterandcreeks)
- For local District Storm Water Contact, see contact information for local water districts in the 'Conserve Water' Resource Section.
- Learn more about safe pesticide use at [www.epa.gov/pesticides/controlling](http://www.epa.gov/pesticides/controlling)
- Bio-Integral Resource Center (BIRC) offers the IPM Practitioner and Common Sense Pest Control Quarterly at [www.birc.org](http://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](http://www.ipm.ucdavis.edu)
- The Seattle Public Utilities offers free Pro IPM Fact Sheets at [www.ci.seattle.wa.us/util/proipm](http://www.ci.seattle.wa.us/util/proipm)
- For information on pesticides, water quality, fact sheets (including lawn care), and less toxic alternatives, visit [www.ourwaterourworld.org](http://www.ourwaterourworld.org)
- To look up impacts of active ingredients in pesticides visit [www.pesticideinfo.org](http://www.pesticideinfo.org)
- Information on the hazards of lawn chemicals is available at [www.beyondpesticides.org/pesticidefreelawns](http://www.beyondpesticides.org/pesticidefreelawns)
- A porous pavement fact sheet is available at [www.epa.gov/npdes/pubs/porouspa.pdf](http://www.epa.gov/npdes/pubs/porouspa.pdf). Information is also available from the Concrete Promotion Council of Northern California at [www.cpcnc.org](http://www.cpcnc.org)
- For information on installing nest boxes visit [www.hungryowl.org](http://www.hungryowl.org)

## Conserve Energy



- The PG&E website includes information on reducing energy consumption: [www.pge.com](http://www.pge.com)
- The Center for Urban Forest Research of the US Forest Service offers free fact sheets on maximizing the benefits of the urban forest, as well as many reports on their costs and benefits: [www.fs.fed.us/psw/programs/cufr](http://www.fs.fed.us/psw/programs/cufr)
- The International Dark Sky Association has a list of approved light fixtures that reduce light pollution: [www.darksky.org](http://www.darksky.org)

## Protect Water and Air Quality



- Mendocino County Water Agency Storm Water Management Program [www.mendocountywa.com/storm.htm](http://www.mendocountywa.com/storm.htm)

## Create and Protect Wildlife Habitat



- California Native Plants are described at [www.calflora.org](http://www.calflora.org)
- Your local chapter of the California Native Plant Society (CNPS) is a good resource for information on local native plant species:
  - The Milo Baker CNPS Chapter serves Sonoma County: [www.cnpsmb.org](http://www.cnpsmb.org)
  - The Sanhedrin CNPS Chapter serves inland Mendocino County: [www.cnps-sanhedrin.org](http://www.cnps-sanhedrin.org)
- An updated list of native plant nurseries is available at [www.cnps.org/cnps/grownative/nurseries.php](http://www.cnps.org/cnps/grownative/nurseries.php)
- Information on California Oaks is available from the California Oak Foundation at [www.californiaoaks.org](http://www.californiaoaks.org)
- For information on Sudden Oak Death visit [www.suddenoakdeath.org](http://www.suddenoakdeath.org)
- The California Native Grasslands Association is an excellent resource for landscaping with native grasses: [www.cnga.org](http://www.cnga.org)
- The Wildlife Habitat Council provides information on how landscapes can provide habitat: [www.wildlifehc.org](http://www.wildlifehc.org)
- For information on fostering wildlife habitat for pest control in landscapes visit [www.hungryowl.org](http://www.hungryowl.org) and [www.californiabats.com](http://www.californiabats.com)



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The Russian River Watershed Association is an association of nine cities, counties and special districts in the Russian River Watershed that have come together to coordinate regional programs for clean water, fisheries restoration and watershed enhancement. The Association works to promote cooperation and implementation of projects that protect watershed resources, restore fisheries and improve water quality at reduced cost to rate payers.

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