

MANAGEMENT TIPS TO ENHANCE LAND & WATER QUALITY

FOR SMALL ACREAGE PROPERTIES

**Laguna de Santa Rosa Watershed
With tips appropriate on a regional level**



About Sotoyome Resource Conservation District

The Sotoyome Resource Conservation District (SRCD) is a non-regulatory special district of the state which was originally established in 1946 to aid farmers and ranchers in their soil erosion control efforts and provide assistance in water conservation. The Sotoyome RCD has expanded its services since that time to communities, school districts, river basin and watershed projects, and environmental improvement programs. The SRCD provides leadership in assessing the conservation needs of the constituents of the district, and in developing programs and policies to meet those needs.

For this publication, we compiled and edited content in coordination with a technical advisory committee comprised of landowners, agency and organization personnel, and agricultural producers. The information within consists of tips and resources about best management practices for small acreage properties. Additional resources, for further inquiry on specific topics, are provided in the appendix of the document.

Notice: RIGHT TO FARM

The County of Sonoma has declared it a policy to protect and encourage agricultural operations. If your property is located near an agricultural operation, you might at some times be subject to inconvenience or discomfort arising from agricultural operations. If conducted in a manner consistent with proper and accepted standards, said inconveniences and discomforts are hereby deemed not to constitute a nuisance for purposes of the Sonoma County Code.

Agricultural Commissioners Note:

If you are developing a new vineyard or replanting an existing vineyard, you must contact the Agricultural Commissioner to comply with the Vineyard Erosion and Sediment Control Ordinance at (707) 565-2371.

Growers planting new vineyards or replanting existing vineyards are required to utilize recognized conservation practices, best management practices and provide for riparian setback to protect the environment and watersheds of the county. For more information go to <http://www.sonoma-county.org/agcomm/vesco.htm> or call (707) 565-2371.

The Sotoyome Resource Conservation District
has created:

**Management Tips
to Enhance Land & Water Quality
for Small Acreage Properties**

*Adapted from
"Tips on Land & Water Management for Small Farms & Livestock Owners
in Whatcom County, Washington"*

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Getting Started

In This Section:

Introduction

What is a Watershed?

Maps

Small Acreage Farms in the Laguna

Local Setting

Regional Picture

Attitudes

Our Changing Relationship to the Laguna

Impacts of Development

Wetland Conservation

Managing the Watershed





Introduction

“Getting Started” provides the following information:

- Watershed definition
- Mapping to identify small acreage properties within a larger geographical area.
- Examples of attitudes and actions that influence land use planning and management.

What is a Watershed?

A watershed is a geographical region that includes a system of creeks, rivers, and water features. It “comes to life” as storm water and surface waters flow to named and unnamed creeks. By definition, it is a system of integrated parts. Larger watershed units such as the Russian River, define much of our region’s growth and capacity. We rely on the water and land within the basin to support our towns and industry. Looking closer, hillside creeks on either side of the river spill their waters to the mainstem of the Russian River. Within those hillsides and valley plains sit our homes and properties. Within those creeks, rivers, and upland from the water zone, water and land support a diverse array of organisms from fish to mammalian species. “We all live downstream,” of the benefits and detriments of land use practices that can affect our surface and groundwater resources, soils, and diversity.

Mapping– A Geographical Scope of Reference

Three maps are provided in this section.

- The **Small Acreage** map highlights small acreage properties nested within the Laguna de Santa Rosa Watershed.
- The **Local Setting** details the creeks and land mass within the 235.7 square mile Laguna de Santa Rosa Watershed.
- The **Regional Picture** identifies the larger 1485 square mile Russian River Basin, and its relationship to the local setting featured in this publication.

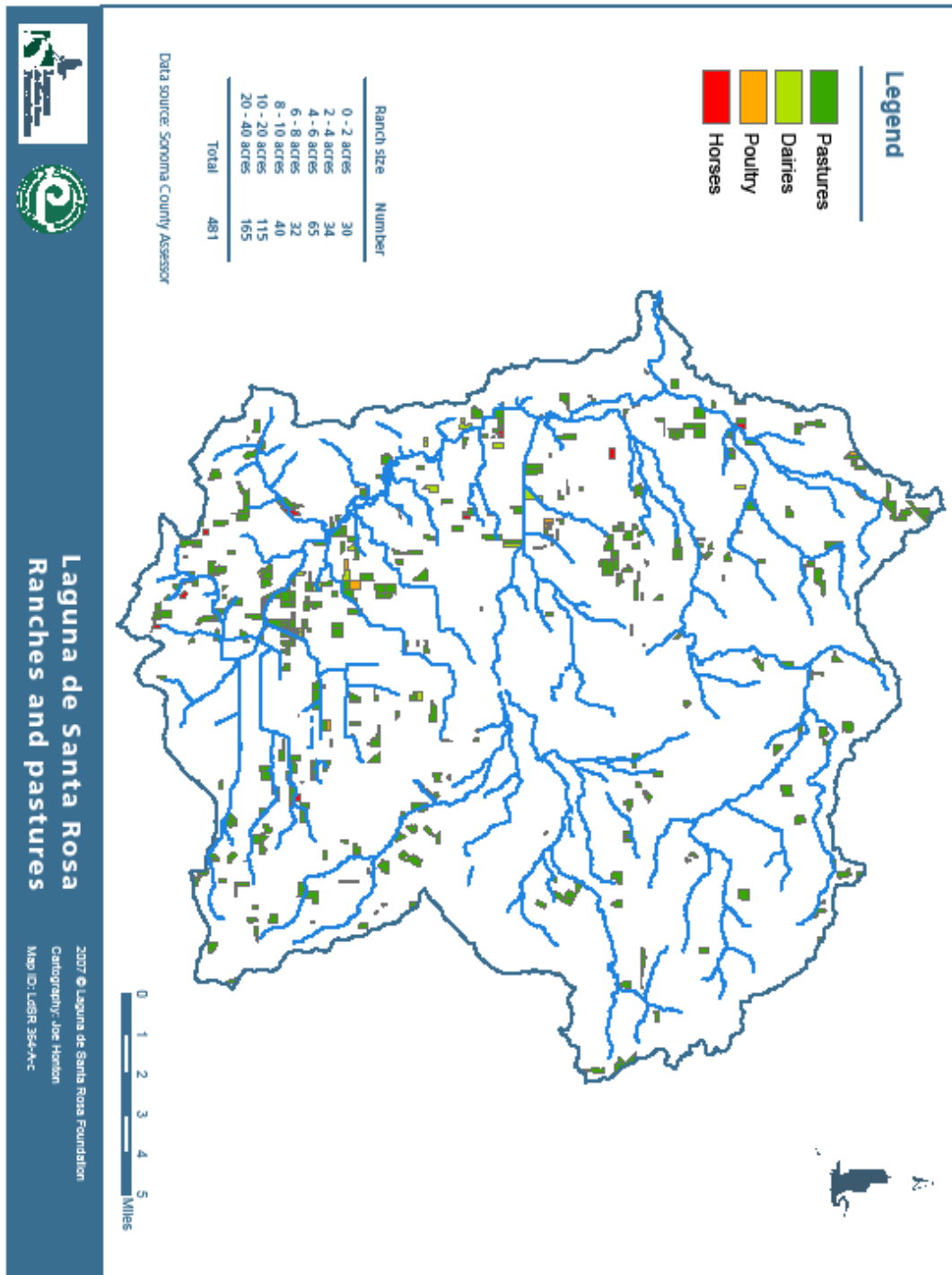
Land Use Attitudes and Management

Land use values change over time. This section identifies:

- Our **Changing Relationship** to the Laguna de Santa Rosa Watershed
- An example of the **Impacts of Development**
- The local conservation strategy to achieve **Wetland Conservation**
- Natural resource management agency objectives found in **Managing the Watershed**.

Introduction

Small Acreage Farms in the Laguna



The Laguna de Santa Rosa Watershed

The Laguna de Santa Rosa Watershed encompasses a 235.7 square mile area. It is the largest sub-watershed within the Russian River Watershed basin, and home to more than 50% of the population in Sonoma County. The Laguna is the second largest freshwater wetland complex in northern California. The sub watershed also includes high quality habitat for steelhead and Coho salmon, woodland, upland forest, and prime agricultural land. Developed cities, freshwater marshes, working farms, major transport routes, and wildlife conservation are some of the many uses ascribed to this geographical area. It presents the most complex convergence of natural habitat types and modern development in Sonoma County.

The Laguna de Santa Rosa Watershed can be understood as four main sub-watersheds. These sub watersheds encompass smaller creeks.

Windsor Creek

- Pool Creek
- Redwood Creek
- Starr Creek

Mark West Springs

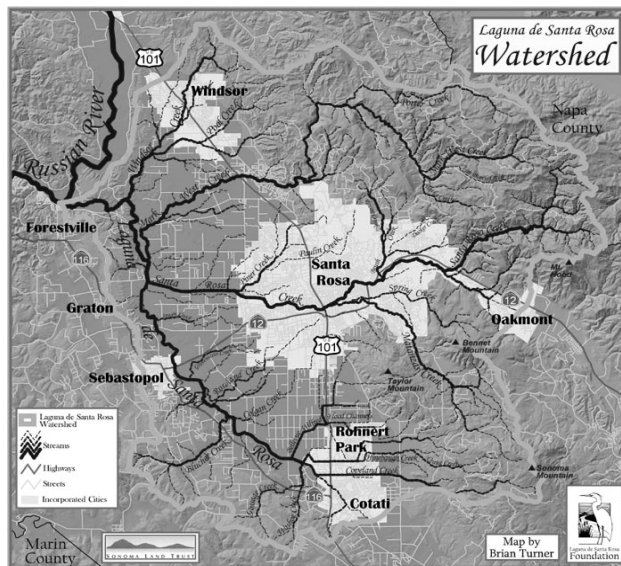
- Humbug Creek
- Mill Creek
- Porter Creek
- Van Buren Creek
- Weeks Creek

Santa Rosa Creek

- Brush Creek
- Colgan Creek
- Matanzas Creek
- Paulin Creek
- Piner Creek

Laguna de Santa Rosa

- Blucher Creek
- Colgan Creek
- Copeland Creek
- Five Creek
- Gossage Creek
- Gravenstein Creek



There are 92,851 distinct parcels within the watershed area. Five incorporated cities fall entirely or partially within the watershed: Santa Rosa, Rohnert Park, Cotati, Windsor, and Sebastopol.

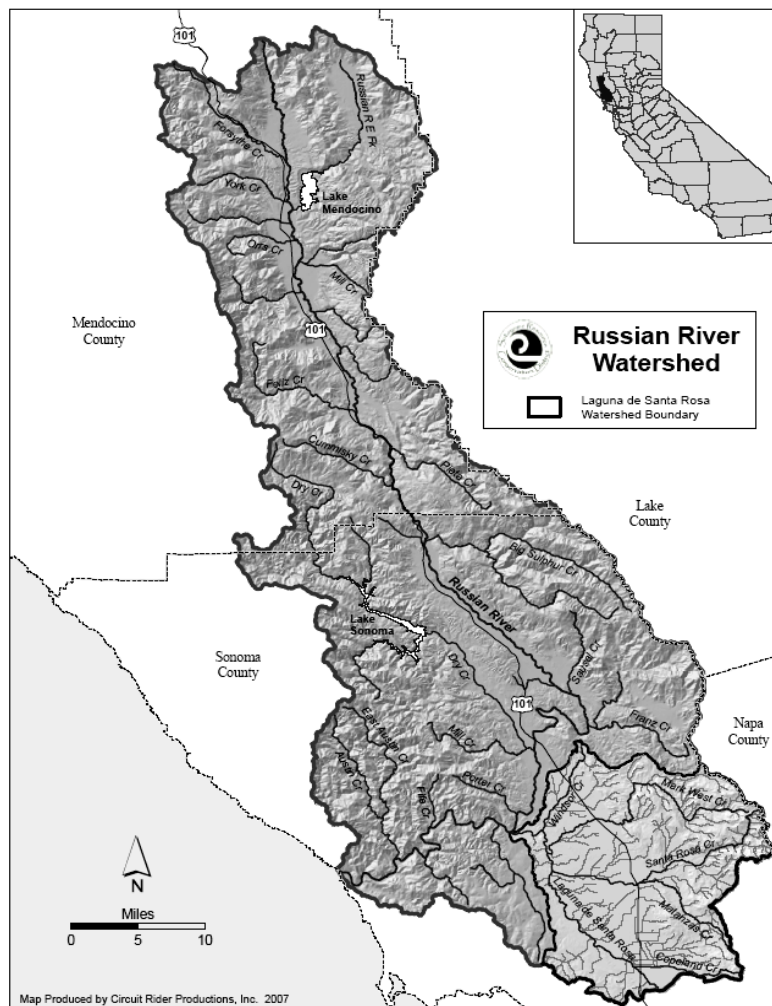
Map Resources

Geographic Information Systems (GIS) can enhance the ability to understand and manage natural resources through mapping. A variety of maps and resources exist to help understand the Laguna de Santa Rosa Watershed and how it fits into the larger Russian River basin. Informational map layers available to the public cover a range of data sets, such as soil types, precipitation, topography, highways and town, and more. Mapping projects on a landscape scale completed with public funds typically become public domain.

Local Setting

Regional Picture

The Russian River Watershed encompasses 1485 square miles, with its northernmost reaches in Mendocino County. The river generally flows southeastward to its confluence with Mark West Creek, then makes a sharp turn to the west, where it joins with the creek channel “Laguna de Santa Rosa.” It then cuts across the Coast Range and empties into the Pacific Ocean at Jenner. Two major reservoirs in the Russian River Watershed provide flood protection, water supply storage and recreation: Coyote Dam and Warm Springs Dam, located near Ukiah and Healdsburg. A diversion from the Eel River through the Potter Valley powerhouse flows into the East Fork and Lake Mendocino. The map below shows the Russian River basin with the subwatershed boundary for the Laguna de Santa Rosa nested within the southern reach of the watershed.



Our Changing Relationship to the Laguna

Written by Larry Robinson, City Council Member and former Mayor, City of Sebastopol

Sebastopol residents used to refer to the Laguna de Santa Rosa as "the lagoon" or "the swamp."

In those days, it was simply the place to dispose of what we didn't want anymore. What is now the centerpiece of our Laguna Wetlands Preserve was, at one time, our city dump and sewage treatment plant. When we began restoring the banks of the main channel, we had to pull out many tons of old appliances, bottles and automobile parts. The former holding ponds for the treatment plant are now home to many species of resident waterfowl and a stopover to others in transit.

In earlier times, though, the Laguna was seen by residents as a place of recreation - for fishing and boating. Even earlier, it was appreciated as a treasure trove of fish and other wildlife essential to the survival of the residents. Isn't it interesting how we have come full circle to see that what was once denigrated as "the swamp" is now regarded as one of our most precious resources and an indicator of the health of our entire region?

Just as we once projected the most despised aspects of our community onto the Laguna, we are now projecting our hopes and dreams for a healthy and vibrant restored local ecosystem. I find great hope in our collective commitment to restoring our waterways and riparian areas. It is an indication of our changing and maturing relationship to our greater community. We are in the process of becoming partners with nature rather than just "owners" or exploiters. In this process, the Laguna can be a profound teacher if we are willing to listen and learn.

Did you know?

- The Laguna was once home to herds of elk, pronghorn antelope, and grizzly bears.
- Tens of thousands of migratory birds wintered in the floodplain each year.
- Indigenous people lived along the Laguna up to 4,000 years ago as hunter-gatherers.
- In 1892, a single market hunter killed 6,200 ducks in the Laguna.
- Resorts were built along the western edge of the Laguna.
- Seven miles of the Laguna were channelized for flood control between 1950 and 1970.
- 75% of the riparian forests were altered or removed by the mid 1960's.

Our Changing Relationship

Impacts of Development



Forest, rangeland, and wetland features absorb rainfall then slowly discharge water to streams through seeps and springs. The regions of the Laguna de Santa Rosa Watershed include forested lands, oak woodlands, wetland, vernal pool and general floodplain features.

Land conversion can create an impervious surface or significantly change the pre-development drainage-absorption pattern. Reduced absorption leads to increased runoff to streams and changes how groundwater is recharged. Drainage systems that combine curbs, storm sewers, and ditches are designed to reduce flooding to the developed area but may increase the quantity and velocity of water entering creeks and river.

The velocity and quantity of water delivered to the creek can increase the potential for scouring action (erosion and bank failure) and overland flooding. As one enters the urban area, there becomes a need to balance the management of the creek for both flood control and wildlife habitat conservation. While creeks in urban areas may or may not be where wildlife takes residence, they often serve as a

corridor for multiple organisms and species. In fact, the creek and surrounding riparian zone represent the area where the greatest biological diversity can be supported.

Stormwater that runs off streets and lots is not treated for pollutants, compared to wastewater from internal and external plumbing systems. Each one inch of rain water on 1000 square feet of roof yields 600 gallons of runoff to the ground. Creeks take on the burden of increased runoff as a result of impervious surfaces such as concrete and asphalt sidewalks and roadways. Once the runoff enters the creek, it has the potential to pollute and degrade water that serves as our water supply and recreational swimming holes. Runoff can endanger human and pet health, and can have a detrimental effect on fish and wildlife. Storm water runoff can be managed to reduce these potential negative impacts by residential, municipal, and regional practices.

The City of Santa Rosa has developed new construction criteria where “neutral runoff impact” results from construction activity thus retaining the quality of the environment alongside growth. New development must demonstrate that runoff will not increase as a result of construction. The threshold/standard is based on a ten-year storm event.

The Santa Rosa Plain Conservation Strategy

The Santa Rosa Plain Conservation Strategy convened from Fall 2004 to 2005 to create a long-term conservation program sufficient to mitigate potential adverse effects on listed species due to future development in the Santa Rosa Plain. This effort follows a Vernal Pool Task Force effort that commenced in 1999. The interdisciplinary group came together to:

- Contribute to the recovery of the Sonoma County distinct population segment of the California tiger salamander (CTS), Burke's goldfield, Sonoma sunshine, Sebastopol meadowfoam and the Many-flowered navarretia (listed plants), and to conserve their habitat.
- Protect stakeholders' (both public and private) land use interests, and supports issuance of an authorization for incidental take of CTS and listed plants that may occur in the course of carrying out project activities on the Plain.
- Identify the impact and cooperative solutions related to CTS listing to jurisdictions, landowners and developers with US Fish and Wildlife Service.
- Utilize biological information to achieve conservation of CTS and the listed plants, based on available information on the distribution, ecology and genetics of CTS and listed plants.
- Estimate land use patterns and assumptions for growth & development.

Results:

- Identified eight conservation areas for CTS and listed plants, one CTS and listed plant preserve system, and one listed plant conservation area.
- Recommended mitigation for project-related impacts in the eight conservation areas.
- Agreed that property within a conservation area should not be encumbered by land use designation or zoning changes, or property use restrictions.
- Determined that CTS mitigation will range from one to three acres of conservation for each one acre of impact. Mitigation for impacts to wetlands will be determined through State and Federal permitting processes. Mitigation for listed plants will be pursuant to the programmatic biological opinion.
- Preserves may be established within the conservation areas by acquiring land in fee title or through conservation easements, and may include habitat and wetland restoration/creation.

Wetland Conservation

Managing the Watershed

A variety of plans and studies exist to restore ecological function for particular plant and animal species in the watershed. Landowners should be familiar with the management plans affecting their area, as they:

- Provide insight on pollutants and issues in their particular portion of the watershed.
- Increase opportunity to receive public funds for restoration on private lands.
- Let the landowner know that certain practices are under higher scrutiny or priority for management needs, and regulatory response when voluntary action fails.

A short list of those documents with management goals for the Laguna de Santa Rosa watershed includes:

The Russian River Basin Plan (California Department of Fish and Game (CDFG))

The Coho Salmon Recovery Plan (CDFG)

The Coho Salmon Recovery Tasks (CDFG)

The Steelhead Trout Management Tasks (CDFG)

The Copeland Creek Watershed Assessment (Sotoyome RCD)

Laguna de Santa Rosa: Resource Atlas and Protection Plan (Sonoma Land Trust)

Watershed Planning Chapter- Russian Bodega Watershed Management Area, Northern California Water Quality Control Board

The Laguna de Santa Rosa Resource Management Plan (Laguna de Santa Rosa Foundation)

The Santa Rosa Creeks Master Plan (City of Santa Rosa)

Studies on sediment rates, vernal pool presence, biological surveys, hydraulic capacity of flood control channels, and groundwater assessments have been conducted in the Laguna de Santa Rosa Watershed. The Russian River Interactive Information System (RRIIS) provides a starting point to research these documents and can be found at: www.russianriverwatershed.net.

Examples of Management Goals

Example A

The California Department of Fish and Game (regulatory agency)

Goal: Coho Salmon Recovery Tasks

Region: Mark West and Santa Rosa sub-basin:

Objectives:

- Improve habitat in the stream itself in hillside portions of the creek.
- Reduce impact to salmon from channeled creeks in the flatland.
- Reduce sources of sediment to the creeks throughout the area.

Example of improvements: more canopy cover shading creeks, invasive species removal, large wood presence in creeks, road improvements that reduce sediment and erosion to the creek from ranch roads.

Example B

Laguna Resource Management Plan (non-profit organization)

Goal: Improvement of Ecological Function

Region: Entire watershed

Objective:

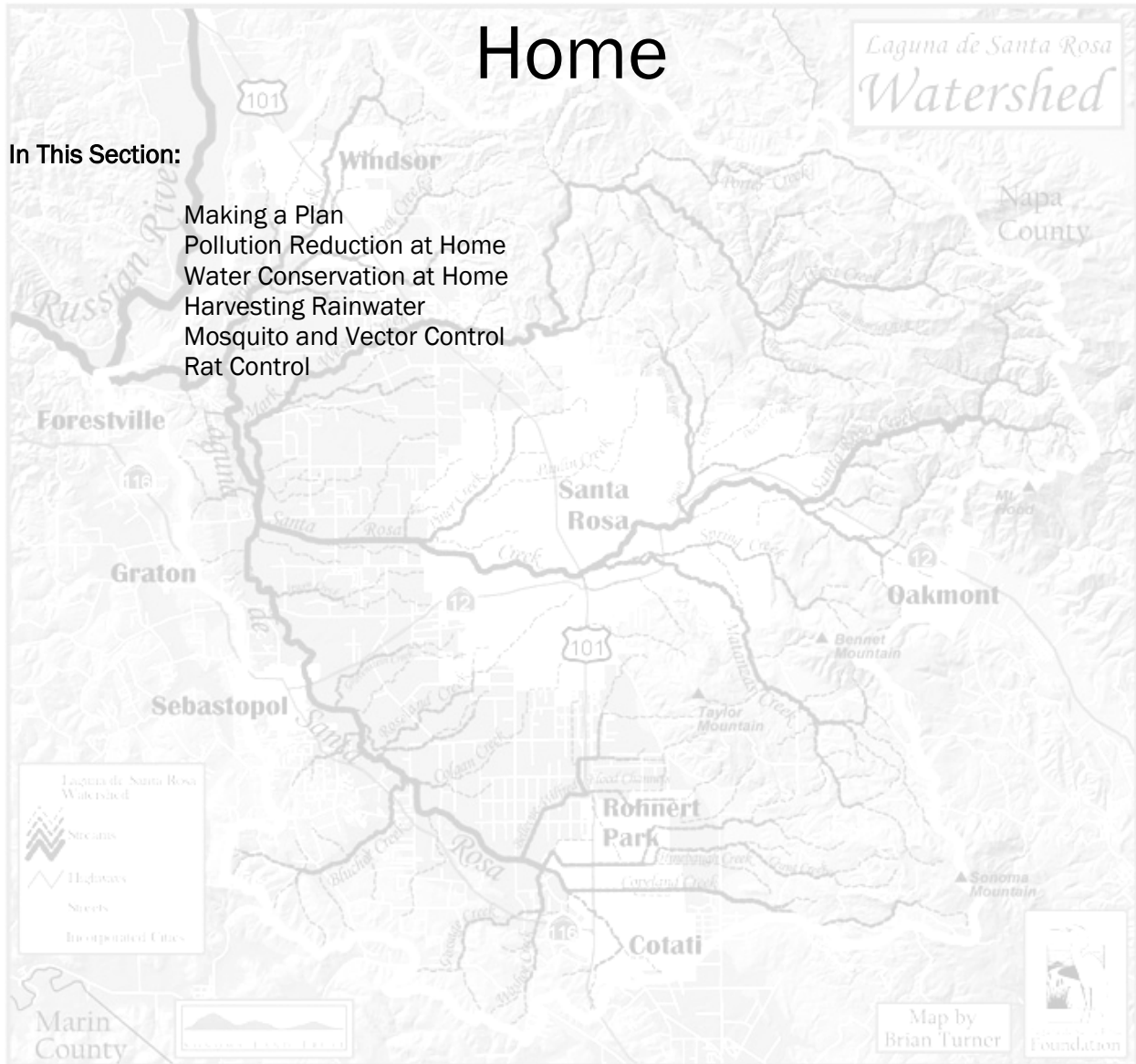
- Enhance riparian forests
- Plant more oak trees
- Establish fence line hedgerows
- Remove invasive exotic plants

Home

*Laguna de Santa Rosa
Watershed*

In This Section:

Making a Plan
Pollution Reduction at Home
Water Conservation at Home
Harvesting Rainwater
Mosquito and Vector Control
Rat Control



Making a Plan

Creating a Plan for Your Property

Becoming familiar with your home and property is the first step to understanding the interaction between its natural resources and your typical property use.

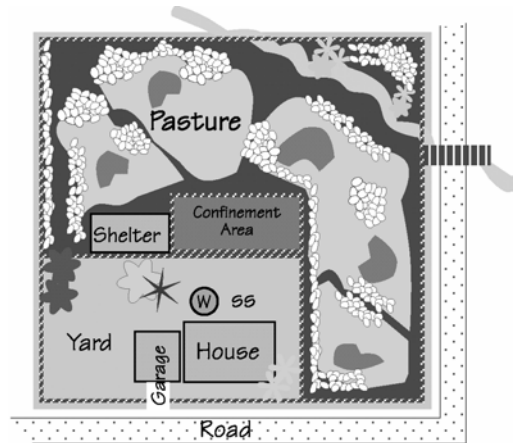
Draw or obtain a property map:

Identify and illustrate your parcel/lot size. There are two ways to do this:

- If you are the homeowner, you will find your Assessor Parcel Number (APN) and lot illustration in your real estate documents. Start with this map, or,
- Walk your property and measure and map your property boundary to the best of your ability.

Identify your basic features and scale:

- Take a walk around your property, mapping features such as ponds, creeks, roads, etc. Note slope and drainage patterns observed through a typical winter.
- Map the creek and creek side vegetation present.
- Note fences, property outbuildings, and general conditions of these features.
- Illustrate (if applicable) livestock confinement areas, wells, septic system, vegetation next to watercourses, manure storage areas, muddy areas, and bare ground. Be especially cognizant of the interaction between animals and chronic wet spots.
- Identify wildland areas and cultivated areas.



Document your practices:

- Your typical storage and rinsing practices associated with herbicides, insecticides, fertilizers, and other chemicals.
- Runoff from your property to ditches or storm gutters through irrigation or rainfall.
- Vegetation patterns around your home.
- Dirt road runoff.
- Waste storage and manure management areas.
- Land use around septic systems.
- Encroachment or land use near creeks.
- Heavy animal use areas such as feeding troughs or confinement areas.
- Management or storage of debris from yard or garden clearing or pruning.

Planning Tools

Once your maps are drawn to include all the existing natural and man-made features, and you have an historical perspective as well as soil information, it is time to contact agencies that can help with planning. Each property is unique and yet fits into a larger watershed perspective.

Once you have a feel for the basic lay of the land and the way you interact with your property, seek out the local technical resources available about the underlying geology and soils that influence your land.

Soil survey– Utilize the Natural Resources Conservation Service (NRCS) web soil survey tool to identify soils on your property. The survey can be found at <http://websoilsurvey.nrcs.usda.gov/app/>.

Aerial photographs–

Two major sources for aerial photos include:

The Sonoma County Assessors Office can provide aerial photos that are part of their current flight line but can not do custom made photos for your particular property.

707.565.1888

<http://www.sonoma-county.org/Assessor/>

The WAC corporation can provide custom made aerial photos for your property if provided with a topographic map with the property boundary outlined on it. To order from WAC:

1-800-845-8088

FAX (541) 485-1258

www.Waccorp.com

Historical aerials photos are also available at your local RCD or NRCS office. Historical photos are helpful to see how your property has changed over time.

Planning resources –Your local RCD can help you locate planning resources that lead to more extensive ranch and farm plans. RCDs, the NRCS, UC Cooperative Extension, and other private organizations offer training courses to help you to complete a farm plan and manage your land and resources. An extensive list of resources is available in the Sotoyome RCD's publication "Russian River Watershed Directory" available as a free online resource at www.Sotoyomercd.org. The organizations can help direct you to the resources best suited to your needs, whether it involves runoff pollution, wildlife enhancement, septic problems, or other issues..

Making a Plan

Pollution Reduction at Home

The Laguna de Santa Rosa Watershed is home to more than fifty percent of all residents within Sonoma County. Managing this environment is as much an urban issue as an agricultural responsibility. Urban and suburban centers have a tremendous impact on the health of the watershed. Runoff from our homes and businesses comprise a significant source of contaminants to our environment through stormwater pollution. The Russian River Watershed Association gives the following tips:

Ten Tips to Reduce Pollution at Home

1. **Identify your pest management options.** The University of California hosts an integrated pest management website at <http://www.ipm.ucdavis.edu/>; Sonoma County Waste Management Agency's website provides tips for less-toxic pest management: at www.recyclenow.org/. When using pesticides, read and follow the label for application rates, safety equipment, and environmental considerations.
2. **Minimize your use of fertilizer.** Though generally not toxic, fertilizers from lawn runoff harm the environment when they reach creeks and rivers via stormwater drains.
3. **Don't pour cooking grease down the sink.** Cooking grease poured down the sink drains can block sewer pipelines when it congeals and cause sewer backups and overflows into the street (or your house) and potentially into the storm drain. For more information about proper disposal of cooking grease, visit the Russian River Watershed Association (RRWA) "FOG" (Fats, Oils and Grease) Program at www.rrwatershed.org/FOG.html.
4. **Don't litter.** Trash left in streets or driveways will likely end up in a storm drain and eventually a creek. To learn more about the importance of keeping litter out of the storm drain, see the RRWA environmental column: www.rrwatershed.org/TSGC_Oct06.pdf.
5. **Dispose of pet waste properly.** Pet waste is typically high in nutrients and bacteria. Pet waste should be deposited into the trash. For more information, see RRWA's article about pet waste disposal at www.rrwatershed.org/feb.07-envcol.pdf.
6. **Wash your car at a car wash.** Detergents are harmful to aquatic life. Most carwash facilities are either connected to treated sewer systems or recycle the wash water.
7. **Keep your car properly maintained and leak free.** Leaking vehicle fluids will drip onto the street or your driveway and may be washed into the storm drain by rain. Vehicle fluids such as motor oil and anti-freeze are harmful to aquatic life. If you change your oil at home, call your waste hauler to see if they have a special curbside pickup program.
8. **Properly dispose of household toxics** such as paints, oils, grease, fluorescent bulbs, batteries and chemicals properly. For more information about disposal of household toxics, see the Sonoma County Waste Management Agency website at www.recyclenow.org.
9. **Properly store household toxics.** Make sure that household toxics are stored in dry areas and properly contained so as to prevent spills.
10. **Reduce stormwater runoff from your property.** Capture rooftop runoff using rain barrels. The captured water can then be used to irrigate your lawn/garden during drier months. Screen to keep mosquitoes out. The less pavement you have on your property, the less stormwater runoff you will generate. Consider replacing your concrete driveway with a pervious surface.

The US Army Corps of Engineers manages the water supply for Sonoma County. They require mandatory water use cutbacks from the Sonoma County Water Agency (SCWA) during drought years. SCWA in turns requires cities contracting to receive water to implement water conservation measures. Private water districts that draw from wells and other areas devise their own water conservation measures. Mandatory water use reduction typically seeks a fifteen to twenty percent reduction in water use during the low-flow season– typically the beginning of July to the end of October.

Top ten water conservation tips:

1. Schedule two short cycles of irrigation rather than one long single cycle.
2. Find and repair leaks now.
3. Inspect and tune-up irrigation system monthly.
4. Irrigate between midnight and 6:00 a.m. to reduce water loss from evaporation and wind.
5. Use a broom, not a hose, to clean driveway, deck or patio.
6. Use a bucket and a hose with an automatic shut-off nozzle when you wash the car, or take your car to a carwash that recycles.
7. Cover pools and hot-tubs to reduce evaporation.
8. Use front-load washing machines.
9. Run the dishwasher and clothes washer with full loads only.
10. Prevent and report water waste.



Water Utilities Services

Turf Time Information Line

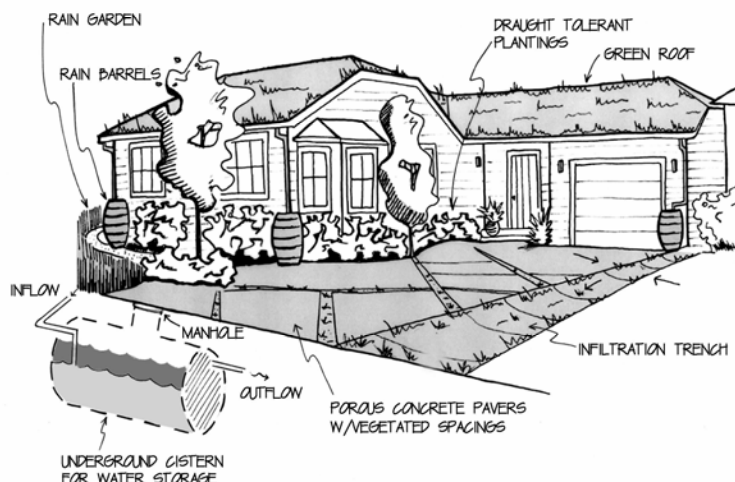
The City of Santa Rosa has initiated a Turf Time information line that helps residents adjust their water schedules based on rainfall and humidity and barometric pressure readings. To access the line, call 707) 543-3985.

Contact Your Water Provider

Check with your water supplier for rebates and incentives. Examples have included front loader washer purchase rebate offers, incentives for lawn removal such as “cash for grass”, reimbursement for purchase of Smart water controller devices, and more. Each water provider differs in its current offers and support toward water conservation. Look on your water utility bill to identify your provider and contact information.

Water Conservation at Home

Harvesting Rainwater



Several resources exist to guide rainwater harvesting, increase use of roof runoff, and provide for increased groundwater filtration. Harvested water, when done correctly, can be used for summer garden irrigation to drinking water. One should consult the resource section to plan a system that addresses safety, permits, rodent and vector prevention, and related sanitation from collection areas to storage of rainwater.

Harvest your rainwater techniques include:

- Harvest roof rainwater by capturing in barrels, or tanks to use during summer months.
- Establishing rain gardens to utilize excess runoff.
- Groundwater recharge areas where excess runoff can collect and enter the ground.
- Porous surfaces on driveways, paths, etc., to allow ground water absorption.
- Filter strips of vegetation to help utilize excess nutrients before they reach waterways.

Wastewater to Irrigation– The purple pipes

Regional efforts to reuse recycled water may be available for you in your portion of the watershed. In 1996, the Sonoma County Water Agency began to evaluate the potential for using recycled water in irrigation. The Agency has worked closely with agricultural and environmental groups, cities, towns, and districts to evaluate the potential for a recycled water distribution system that would link the reclamation systems operated by four municipalities and two sanitation districts. These facilities currently produce between 30,000 and 40,000 acre-feet of recycled water per year, a significant source for agricultural and municipal use. Of this, approximately 15,000 acre-feet are currently reused for urban and agricultural irrigation. Recycled water systems are differentiated by purple colored pipes. City of Santa Rosa's Finley Park, Windsor High School, and areas within Rohnert Park comprise some of the urban landscaped areas irrigated by this system.

Fight the Bite - An A-Z Property Maintenance Checklist

Mosquitoes need still water to lay their eggs, which will develop in seven to ten days. If you can eliminate standing water weekly, you can keep many mosquitoes from breeding in the first place. PLEASE take care of your standing water now.



Animals: Eliminate mosquito breeding areas from livestock pens. Keep fresh water in troughs or use mosquito fish.

Birdbaths: Clean or hose out birdbaths weekly.

Clothing: Wear long sleeved shirts and long pants when working around mosquito infested areas.

Containers: Cover containers or turn upside down so that they do not hold water including: ashtrays, boxes, buckets, cans, cups, pots and trash.

Dawn/Dusk: The times of day that biting mosquitoes are most active since they avoid the heat of day.

Drains: Keep outdoor drains flowing freely.

Dripping water: Fix leaks around faucets, air conditioners, and hoses.

Irrigation: Do not over-water. Eliminate any areas of excess standing water weekly.

Playgrounds: Drill drainage holes in tire swings and playground equipment that holds water.

Ponds: Stock with mosquito-eating fish.

Potted plants: Do not over water plants. Empty saucers weekly or flush with garden hose. Drill small drainage holes in outdoor saucers.

Pools and spas: Maintained pools and whirlpool spas are not a hazard since pool chemicals and filters kill any larvae. Drain water or add mosquito fish to deserted pools and spas.

Rain barrels: Cover tightly with screening.

Rain gutters: Keep gutters clear of debris, which can become breeding areas of standing water.

Sculpture: Lawn ornaments should be checked for areas that hold water, and drained or flushed weekly.

Screens: Install and maintain tight fitting windows and door screens.

Septic tanks: Cover tanks and lids and screen all vents including vents on your roof.

Streams and creeks: Call you local Mosquito and Vector Control District for help with standing water in creeks and streams.

Tires: Properly dispose of old tires or cover. Tires are considered hazardous waste.

Tree holes: Eliminate water from dead tree stumps and hollow areas of live trees. Fill cavities with a polymer.

Watercraft: Cover all watercraft when not in use as the inside of boats can collect water. Turn over canoes and kayaks when stored.

Wheelbarrows: Store wheelbarrows vertically or turned over to prevent water accumulation.

For more information:
MARIN/SONOMA
MOSQUITO and VECTOR CONTROL DISTRICT
(707) 285-2200
www.mosquito.com

Mosquito and Vector Control

Rat Control

Rats of Concern in Sonoma County

The Roof rat (*Rattus rattus*), is a problem species in Sonoma and Marin Counties. This rat is slender and agile, and the tail is longer than the head and body. Roof rats will enter buildings if given the opportunity, and often use utility lines and fences as runways. Roof rats prefer to feed on fruits, nuts, ivy, and pet food commonly found in residential areas. Once rats are established, wise use of rodenticides, and trapping are the most effective approaches to rat control.

The Norway rat (*Rattus norvegicus*), is a common species in Sonoma and Marin Counties. It is generally found in agricultural areas, creeks, sewers, and developed neighborhoods. The Norway rat is larger and more aggressive than the roof rat. Its eyes and ears are smaller than the Roof rat's and the tail is shorter than the combined head and body length. This species usually lives in underground burrows, and feeds on garbage, pet food, cereal grains and vegetables.

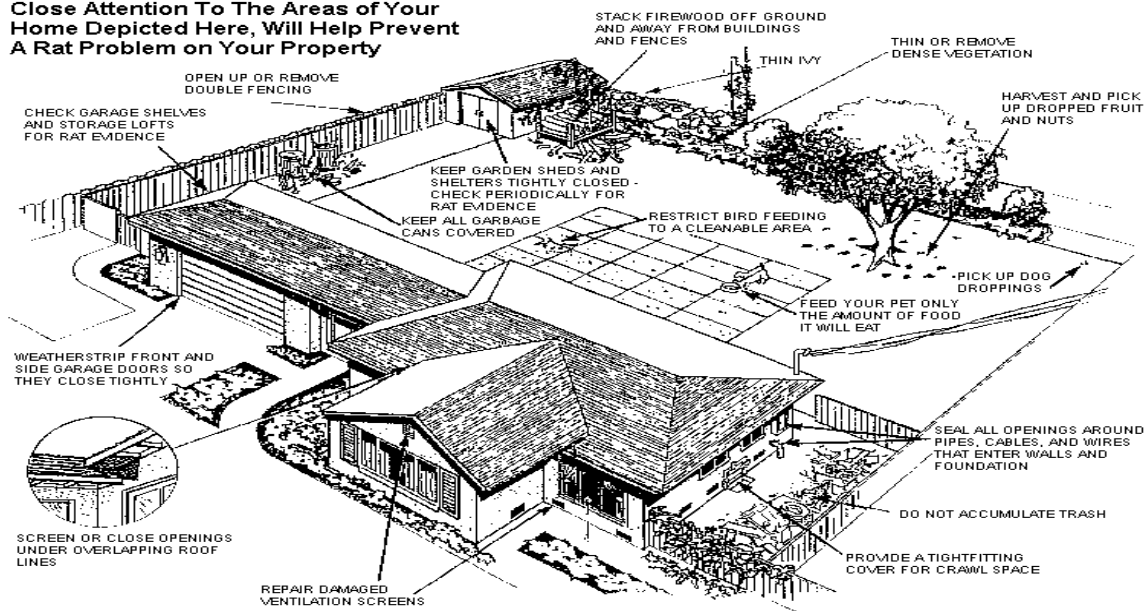
Rat survival and prosperity requires three basic environmental conditions:

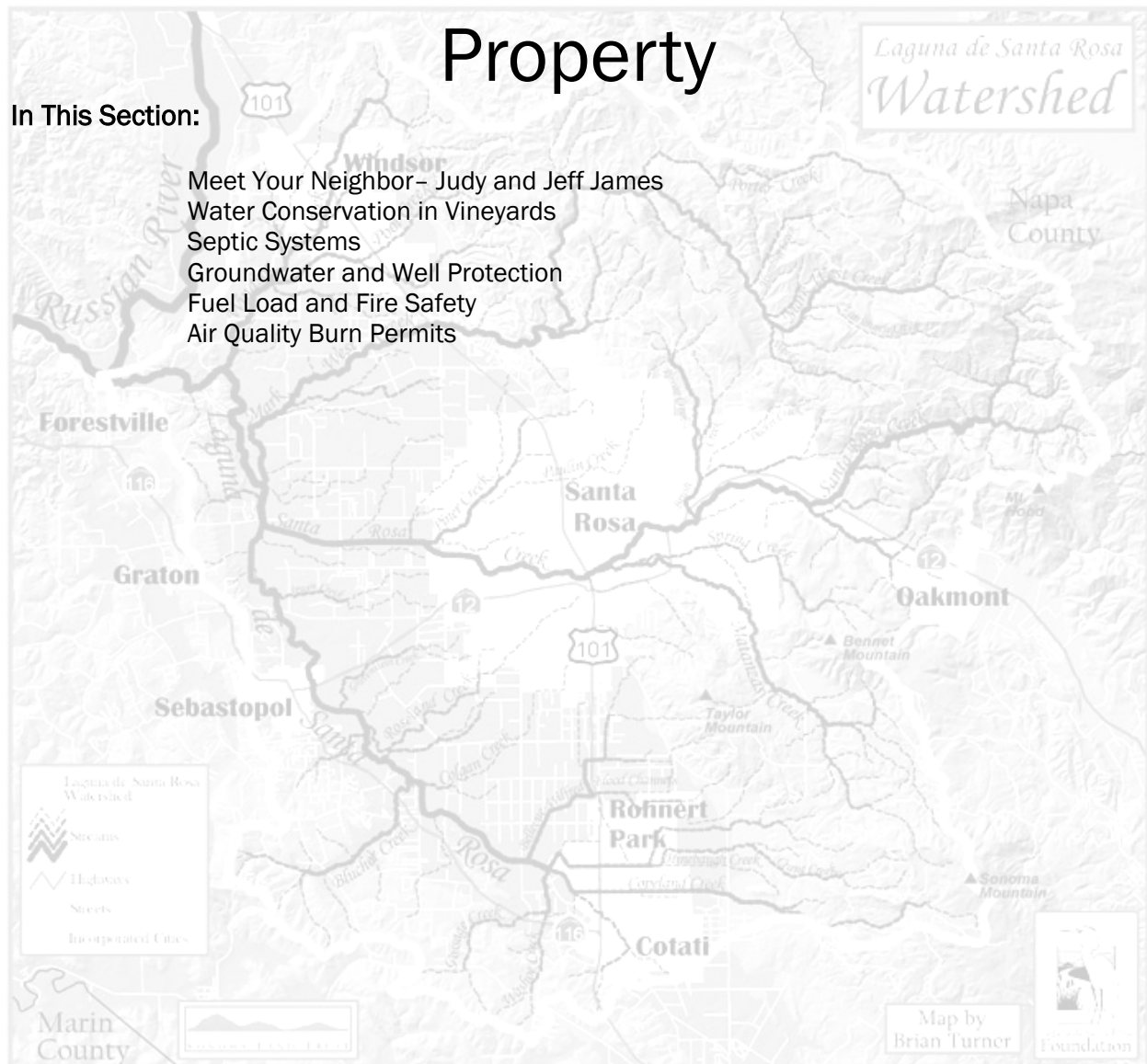
- Available source of water
- Access to suitable harborage
- Abundant food

Prevention practices include:

- Harvest fruits as soon as they ripen. Pick up all fallen fruit.
- Never leave uneaten pet food outside overnight.
- Thin and trim Algerian ivy, oleander, bougainvillea, and other thickly matted plants well away from roofs, walls, fences, utility poles, and trees.
- Store wood and lumber piles on racks at least 18 inches above the ground and 12 inches away from the walls; clean up debris piles.
- Repair leaky faucets; eliminate unnecessary standing water.
- Bird feeders– Don't let seed accumulate on the ground beneath.

Close Attention To The Areas of Your Home Depicted Here, Will Help Prevent A Rat Problem on Your Property





Meet Your Neighbor

James Family Vineyard An Interview with Judy and Jeff James

Judy James is a third generation agriculturist and Director of Community Relations for Clover Stornetta Farms of Petaluma. Judy and her husband Jeff, with their two sons Robert and Matt, live in the foothills above Cotati where they tend a small farm with wine grapes and 4-H projects. Judy is a well-known leader and role model in Sonoma County agriculture. Her credentials include a previous role as the Executive Director for the Sonoma County Farm Bureau for 12 years, winner of the 2003 Outstanding Women in Industry Award, and active representative for California Women in Agriculture. She also serves as an adjunct instructor of agribusiness at the Santa Rosa Junior College, and was an advisor to the SRJC Agricultural Ambassadors. The James Family has a small vineyard, which was established in part, as a family hobby, and as an opportunity for their sons to learn viticulture. They produce about three tons per acre of Pinot Noir grapes, which they maintain as a family and with some outside labor.



Challenges

As a small farm, grower contracts can be challenging. High fixed costs, and labor costs can be big factors for a small farm. The James family now sells directly to wineries on contract, but establishing that connection was no easier for James than other aspiring growers.

Innovation Through Stewardship

"Healthy soil, water and air are essential to keeping our land productive for the long run." This philosophy guides the James family approach to farming by reducing inputs as much as possible and minimizing the impact on natural resources wherever possible. Some of the on ground conservation practices followed by the James' include disking alternate vine rows each year to reduce the impact to their topsoil, utilizing drip irrigation, and conducting weekly moisture monitoring to increase the efficiency of their irrigation program.

A Plan for Success

The James family follows the California Sustainable Winegrowing Alliance's (CSWA) *The Code of Sustainable Winegrowing Practices* in their farming approach. CSWA is a combined effort of the Wine Institute and California Association of Winegrape Growers (CAWG). Through these efforts and their selected practices, the James Family Vineyard provides wildlife habitat for deer, migratory and local birds, fox, raccoons, snakes, rodents and beneficial insects.

Vineyard Water Management: Best Management Practices

Nighttime irrigation is more efficient than daytime irrigation

Irrigation avoidance:

- Wait until shoots growth slows noticeably before irrigating (assuming shoots are at proper length before stopping).
- Manage cover crop to minimize its competition (mowing or grazing is best).

Limit use of overhead sprinklers for cooling:

North or northeast row orientations are less sensitive to heat stress than east-west oriented rows.

- Leave enough canopy and laterals to protect fruit from direct sunlight.
- Leave one side of VSP loose to shade fruit.
- Limit or eliminate late-season sulfur and horticultural oil applications. They promote leaf burn during hot weather.
- Increase trigger temperature for programmed start-up of the irrigation system.
- Apply overhead sprinklers in pulses. Allow for evaporation between cycles. Aim for less than 50% duty cycle.
- Reduce system pressure. Use just enough pressure to get sprinklers to turn.



Irrigation reduction:

Smaller vines use less water – leaf area transpires water.

- Begin irrigation later in the season and hedge vines to constrain canopy.
- Short and frequent drip irrigation is better than large, infrequent applications
- Section drip tubes to selectively irrigate weaker zones and address soil drainage without irrigating the entire vineyard block.
- Use soil moisture devices in the weakest soils of each block to discover how long irrigation may be applied before water is wasted (i.e. moving past root zone).
- Employ a moderate deficit irrigation program while monitoring soil and/or vine water status.

Vine water status monitoring (using a pressure chamber or porometer) is highly desirable, since soil moisture instruments are not easily calibrated.

Reduce post-harvest irrigation:

- Refrain from using overhead sprinklers for irrigation of vines.
- Use drip irrigation for post-harvest fertigation and irrigation of the vines.
- Vine irrigation is not necessary if vines are senescing. Irrigate only if leaves are green following harvest.
- Some fertilizers (e.g. phosphorus, potassium and micronutrients) may be applied if vines are not active, but do not apply nitrogen if vines are senescing.
- Use overhead irrigation only for shallow irrigation of cover crop seeds.
- Use permanent (self re-seeding or perennial) cover crop to avoid re-seeding every fall. Consult UC Cooperative Extension, the Natural Resources Conservation Service, or Sonoma County Agricultural Commissioner for best practices for cover crops.

Water Conservation in Vineyards

Water Conservation in Vineyards

Improve system and irrigation efficiency:

- Perform frequent (once per week minimum) and repetitive inspections of drip laterals and associated parts.
- Look for leaks in the system. Repair any leaks immediately.
- Perform system uniformity evaluations at least once per season using timed collection of water output into catch cans. Less than 65% uniformity triggers system flush.
- Reduce height of drip emitters where possible to reduce evaporative losses from splashing.
- Apply mulch under the vines (or under drip emitters) to reduce surface evaporation. Use caution with mulch cover, however, if voles are a potential problem.

Perform rotational (nighttime) pumping:

- Pump during the night, when water demand on the river is at its lowest.
- Recharge ponds at nighttime or irrigate at night, if direct feed.
- Rotate with neighbor growers or within your own vineyard blocks.
- Electric pumps: Install a time-of-use meter to significantly save utility costs.

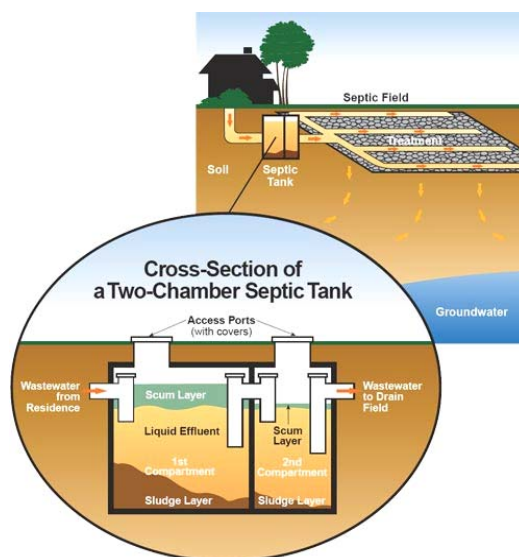
By the time a septic system shows obvious signs of failure, it is most likely beyond repair. It can cost \$50,000 to replace a failing system. Familiarize yourself with the route of your septic system from your home to the drain field. Keep the route clear. Protect your pipes leading from house to drain-field. Be aware of tree roots that may interrupt the flow in your sewage lines. Saturated soils above the drainfield reduces the ability of the drainfield to treat the waste water.

Septic Systems Tips

- Make sure they are at least 100 feet from well water systems.
- Get regular inspections.
- Keep drainfield free of standing water.
- Do not plant trees or shrubs on drainfield.
- Do not compact soils above sewage pipes.
- Keep livestock away from drainfield.
- Check for leaks (especially slow leaks).
- Do not pour household chemicals in the system.

Signs of Potential Septic System Failure

- Slowly draining sinks and toilets.
- Gurgling sounds in the plumbing.
- Sewage odors in the house or yard.
- Grass growing faster and greener in one particular area of the yard.
- Tests showing bacteria in well water.
- Sewage traveling the wrong direction.



None of these symptoms alone mean a septic system has failed, but the appearance of one or more symptom should prompt you to call for an inspection. Septic systems harbor bacteria, viruses, and microorganisms that pose risks to groundwater, human health, streams, and wildlife. Drainfields saturated in standing water reduce the ability of the drainfield to filter out these toxins and other pollutants from wastewater. By protecting the life and reliability of your septic system, you will protect your health and the health of your animals, as well as sensitive areas and water quality.

Illustration courtesy of City of Winnipeg, Canada; Water and Waste Department

Septic Systems

Groundwater and Well Protection

Get an annual private well checklist:

Homeowners with private wells are responsible for their own care and maintenance of well and water quality. The pattern of land use (commercial, residential, etc.) in the area, number of ground-water pumps, accidental spills, etc., can affect the quality, quantity, and recharge of water in an aquifer that supports your well.

California Groundwater Association suggests annual checkups by qualified contractors:

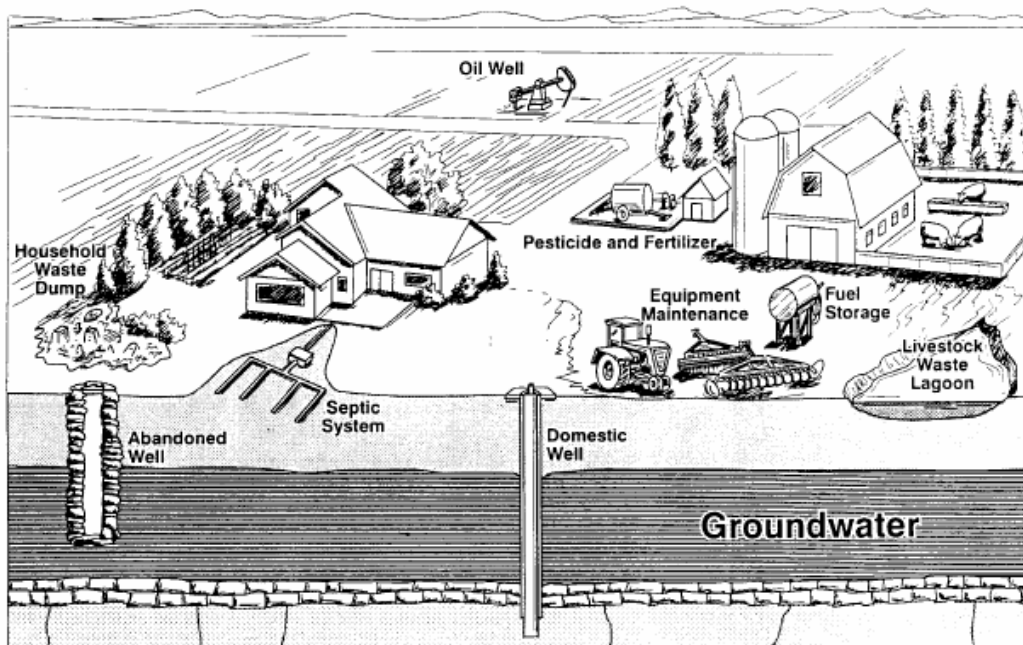
- Flow test: Check system output and water level before and during pumping.
- Well equipment: Inspect pump motor performance, pressure tank and pressure switch contact, and general sanitation.
- Water Quality: Test for coliform bacteria, nitrates, and other water constituents that might cause problems with health, plumbing, staining, water appearance, and odor.

Keep your well free and clear:

- Keep hazardous chemicals (paint, fertilizer, pesticides, motor oil, etc.) far away from your well.
- Maintain 100 feet minimum from kennels, livestock, waste systems, or chemical storage.
- Periodically check the well cover or well cap on top of the well casing to ensure it is in good condition and securely attached. The seal should keep out insects and rodents.

Need to disinfect your well?

The Sonoma County Permit and Resource Management Division provides a wealth of handouts on well and septic system maintenance. The link following provides step by step instructions to disinfect your well. <http://www.sonoma-county.org/prmd/docs/handouts/ws.html>.



Prevention Checklist

Access

- Two or more roads in and out.
- Maintain two lanes or construct turnouts 10' x 80'- every 400 feet
- Post signs "dead-end", "height & weight restrictions", etc.
- Provide a turning radius of 28' x 8' x 15' height for fire trucks
- Show address at curb/house with reflective signs visible from 100 feet in both directions
- Provide maneuver space such as 40' x 40' open backup area

Water supply

- Water hydrant system- pressurized fire hydrant within 300 feet marked (300-1,000 ft)
- Hydrant piped to storage tank with 2,500 gallons, pond or stream
- Pond, pool or stream where firefighters can park within 15 feet

Other fuel load reduction tips

Within 10 feet of home, other buildings:

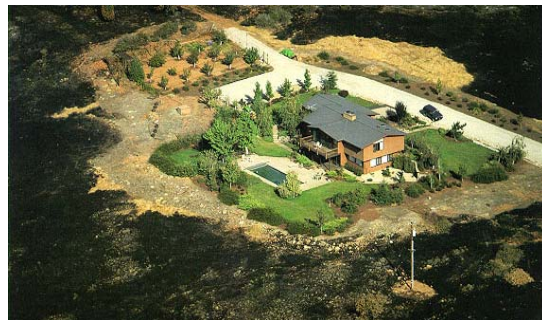
- Remove all dead material hanging over/near roof and on the ground
- Clean roof and gutters, and mow grasses

Within 30 feet of home, other buildings:

- Trim all lower branches on trees up to height of 10 feet
- Maintain 3x height difference between shrubs to the nearest overhead branch
- Keep vegetation low and green
- Locate propane tank a minimum of 10 to 30 feet from buildings

Within 30 to 100 feet: reduce fuel load area

- Know wind directions and vulnerable areas of property
- Space shrubs 10' apart on level ground; 8' apart on moderate slope
- Space trees 10' apart on flatter ground; 20' apart on mild slopes (20-40%)
- Stack firewood more than 30 feet away from structures
- Do not attach wooden fences to house
- Replace landscape plants with 'fire wise' species
- Locate pond as fire barrier on windward side



Fuel Load and Fire Safety

Burn Permits

Where Can I Get a Burn Permit?

You will need to take the following steps to determine where to get a permit, when it is permissible to burn, and what you can and cannot burn. Burning without a permit is often illegal. Burning at the wrong time of year will lead to a citation and fine. For agricultural burns, you may need a burn permit regardless of whether it is an open burn day or not. It is important to contact your air pollution control district to learn about specifics for:

- Open burning periods (agricultural burns only)
- Closed burning periods
- Residential burn requirements and bans
- Disease and pest related burning
- Agricultural Commissioner approved “waivers” to burn

Northern Sonoma County Air Pollution Control District (NSCAPCD)

NSCAPCD will help prepare permits if you are within their district. They will also notify associated agencies that need to know of your authority to burn.

Bay Area Air Quality Management District (BAAQMD)

BAAQMD does not help prepare permits. They require that you to complete a specific form that notifies and shows proof of your permit and authority to burn. If you live within this district, it is best to call your local fire agency and inquire about permit requirements first.

Local fire agencies in BAAQMD that may require a burn permit include:

- Unincorporated area north of Santa Rosa
- Rincon Valley Fire Protection District
- Gold Ridge Fire District
- Rancho Cotate Fire District

Burning during fire season?

If you live within an unincorporated area, you are likely within the California Fire and Fire Protection's State Responsibility Areas (SRA). CDF will also require a permit to burn during fire season.

For permits in the Northern Sonoma County Air Pollution
Control District please call (707) 433-5911.

Make Mulch Not Fire Curb it, Chip it, or Compost it

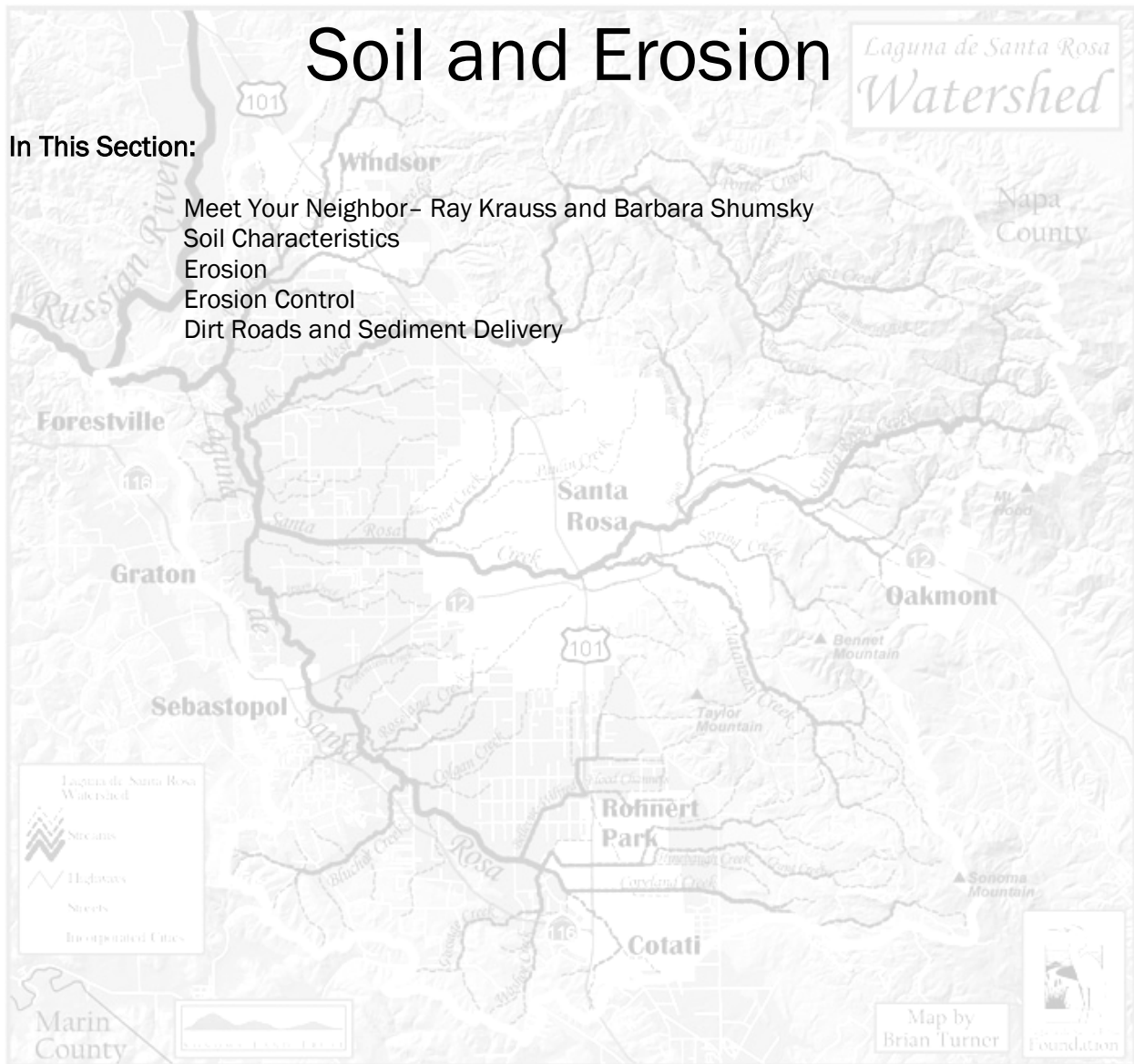
Use the yard waste bin for appropriate materials
Drop off clean untreated wood at the transfer stations for less than garbage fee rates
Chip woody materials to make a weed suppression mulch
Compost your clippings and yard waste.

Soil and Erosion

*Laguna de Santa Rosa
Watershed*

In This Section:

Meet Your Neighbor – Ray Krauss and Barbara Shumsky
Soil Characteristics
Erosion
Erosion Control
Dirt Roads and Sediment Delivery



Meet Your Neighbor

Ray Krauss and Barbara Shumsky Mark West Creek Landowners/ Retired Market Gardeners

Ray Krauss and his wife Barbara reside in the hills above Santa Rosa, within the Mark West Creek Watershed. In the last thirty years, Ray has seen a significant replacement in the number of working farms to rural residential living. In the 1970's the Sotoyome Resource Conservation District prepared a ranch plan for the property, which has influenced the use and conservation of resources since that time. Until recently Ray managed the forested areas of the property and Barbara managed the farm.



Barbara operated a large organic market garden and managed fruit and nut production from more than one hundred trees. At its peak, the garden employed two full time employees and a full-pickup load of produce and flowers went to market five days per week. All of their commodities were sold direct at farmers markets. Barbara has since retired from the market garden business operated on their property.

Challenges

Market gardens can be challenging. Barbara tried a wide variety of different vegetables and herbs over the years, settling on those that proved most reliable and produced the highest cash return for the space and effort. Fruit depended on the year, but pears and fig sales carried the farm consistently.

Innovation Through Stewardship

Ninety percent of the property itself is reserved for wildlife habitat and is managed to restore the oak and mixed woodlands that once covered the area. As a private consultant in resource management, this is a well suited task for Ray. What is planted and produced for market or consumption utilizes drip irrigation for water conservation. A cover crop is maintained in the orchards, reducing erosion potential and providing additional management benefits.

Managing for Change and Community Participation

Ray and his wife are members of the Friends of Mark West Creek Watershed, a group dedicated to preserving, protecting, and restoring the Mark West Creek and its watershed as a natural and community resource. Mark West Creek is a high quality tributary with Coho salmon and steelhead trout. Ray and his neighbors, representing approximately 60 landowner properties, worked with the Sotoyome RCD and Pacific Watershed Associates with funding from the California Department of Fish and Game, on a rural road sediment reduction project to significantly reduce sediment that covers spawning gravels for fish, and other water quality impairments. US Congress member Mike Thompson presented an Environmental Stewardship Award to the Friends of the Mark West Creek Watershed in 2007 for their efforts working with Sotoyome RCD on this project. Ray's leadership on the project helped to mark it as the largest cooperation of landowners to date on a rural road restoration within the north coast of California.

Keeping Agriculture Strong

As Ray says, "There is something about Ag itself that keeps you strong. You work from dawn to dusk for well under minimum wage. For some reason you love every minute of it. Oh, you eat well too."

About Soil

Soils vary widely, even across your backyard and pastures. To begin to know how best to manage you land, you must know the soil type and its water carrying capacity, texture, and productivity. There is a USDA soil survey of Sonoma County that can provide good information about what soils are mapped on your property as well as the soil capabilities and limitations. The online web soil survey tool can be located at <http://websoilsurvey.nrcs.usda.gov/app/>.

Soil type determines:

- Filtering of nutrients from animal and human wastes
- Amount of fertilizers and/or composted manure to apply
- Placement and durability of structures
- If your land had a wetland
- Planting and tree rooting depths

A typical composition of soil is:

- 45% Minerals (clay, silt, sand, gravel, stones)
- 25% Water (varies depending upon precipitation and the water-holding capacity of the soil)
- 25% Air (an essential ingredient for living organisms)
- 5% Organic matter or humus (both living and dead organisms).

Mineral sizes (diameter):

Sand: 2 mm to 0.05 mm (gritty texture)

Silt: 0.05 mm to 0.002 mm (flour texture)

Clay: < 0.002 mm. (sticky when wet).

Professional soil testing

Identify the soil lab and test options, appropriate forms and shipping requirements before you begin. In general, the procedure is:

- Remove top debris, residue, or turf thatch from the soil surface before taking the sample.
- Sample gardens, trees, shrubs, flower beds, and orchards 6-8 inches deep.
- For the lawn, lift the sod and sample 3 inches deep.
- Sample a row crop field or garden between rows to avoid fertilizer bands.
- Sample when soils are suitable for spading or plowing.
- Take separate samples from fields that have received different fertility programs.
- Take separate samples from soils that are distinguishable by color (i.e. light vs. dark), drainage, or other factors.

The test results are only as good as the sample taken. It is extremely important to provide a representative sample to the testing lab so that a reliable test and recommendations can be made for the entire area. A good representative composite sample should contain 10-15 cores or slices. Each core or slice should be taken at the same depth and volume at each site. Sample at random in a zigzag pattern over the area and mix the sample together in a clean plastic bucket. Contact the UC Cooperative Extension Sonoma County for a list of professional soil lab services.

Soil Characteristics

Erosion

Erosion is a natural process. It shapes our hillsides, valleys, rivers and streams; it creates fertile floodplains and it helps distribute nutrients throughout the watershed. Erosion provides necessary sediments to creeks and rivers and allows them to create a rich variety of habitats such as spawning gravels, deep pools and sandbars where new vegetation can take hold. Erosion in upper watersheds is needed to form our coastal beaches.

In stable watersheds, the rate of erosion is slow and in balance with natural restorative cycles but in many watersheds, human use of the land has accelerated the rate of change beyond nature's short-term healing capabilities, in some places even beyond long-term recovery. There are several types of erosion:

Rainstrike and Wind Erosion : Raindrops scour bare ground and break the soil surface, causing erosion. Similarly, wind will erode that surface.

Rill Erosion : Rills are the little “valleys” often seen on the landscape on road systems. Rills generally occur on gentler slopes that have little vegetation. They can start out very small, but if not fixed, can become large ruts and washouts on unpaved roads.

Sheet Erosion : Water flows off a large area of land leading to a somewhat uniform, thin layer of soil removal. It generally occurs where vegetation is thick enough to prevent rill erosion, but not thick enough to prevent erosion completely.

Gully Erosion: Gullies are the most dramatic form of erosion, forming deep, raw channels. When left untreated, gullies can move upslope and deepen very quickly.

Mass Wasting: Landslides and slips are the most prevalent forms of mass wasting. In many cases, mass wasting is a natural process but it can be accelerated by changes in the landscape or from human activities. In general, mass wasting is not treatable.



Ways to Prevent Soil Loss on Your Property

Basic strategies to prevent erosion are:

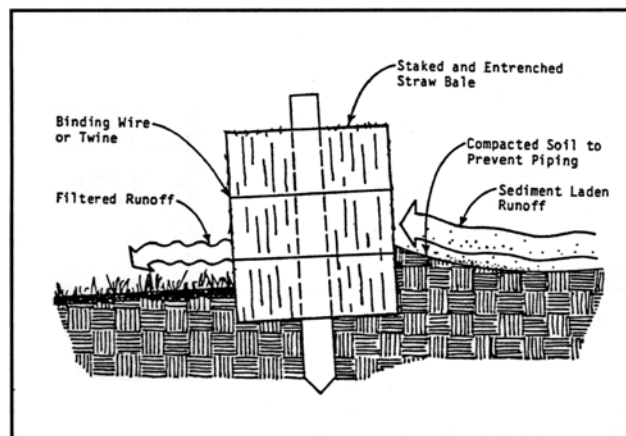
- Protect bare soil surfaces: Native trees, shrubs, grasses, and cover crops hold the soil in place and allow water to soak in to the soil.
- Use erosion and sediment control methods in construction areas.
- Minimize disturbing existing plants.
- Avoid concentrating water flows: Protect water or pipe outlets by using carefully placed rock..
- Limit livestock and human use near creek banks, gullies, seasonal, drainage areas, unsurfaced roads, replanted areas, and landslides.
- Seed and fertilize pastures.
- Use no till and minimum till cultivation: Planting seed through old stubble will not expose soil to winter rains.
- Maintain plant and/or grass borders around animal confinement areas to act as a filter.
- Develop springs or water troughs for livestock and horses that are located away from the creek.

Installation of straw bales as seen below, are an example of an erosion control tip.

Straw bales are an inexpensive and easy-to-install form of check dam for use in mild, shallow gullies. They perform best in gullies with relatively stable sides and some existing grass cover. Since the bales deteriorate in two to three years, it is essential that vegetation be well established on the deposited sediment within that time.

- Bales should be keyed into the bank as shown and secured with two pieces of rebar or stakes per bale.
- Multiple bales can be used in a row across the gully floor with a low area in the middle of the row so water does not erode at the sides.
- Use rebar with caution, once the bales disintegrate, the standing rebar can hurt grazing animals or people.

Resource Conservation Districts (RCD) are an excellent source for technical information and workshops on this topic.



Erosion Control

Dirt Roads and Sediment Delivery



Photo: Typical Erosive impact from rural roads. The culvert is set too high in the bank fill and is undersized for the flow it handles.

Dirt roads are a major source of erosion and sedimentation on most forest and ranch lands. Sediment is considered the number one impairment to water quality in the Russian River Watershed. In many areas of northern coastal California, these roads were built many years ago, often to access logging or remote ranchland, and have been plaguing watersheds ever since.

Our historic rural roads along hillslopes on the north coast of California have road and culvert features that were not designed correctly, compacted road surfaces increase the rate of runoff, and road cuts intercept and bring groundwater to the surface. Ditches concentrate storm runoff and can transport sediment to nearby stream channels.

By today's standards, culverts leading to creeks were often undersized and improperly set in the fill. Road drainage standards based on 100 year storm flow events provide for lower long-term maintenance costs. Paved roads are not typically a solution, as the impervious surface increases the volume of water delivered to the creek.

Tips to reduce sediment on your roads:

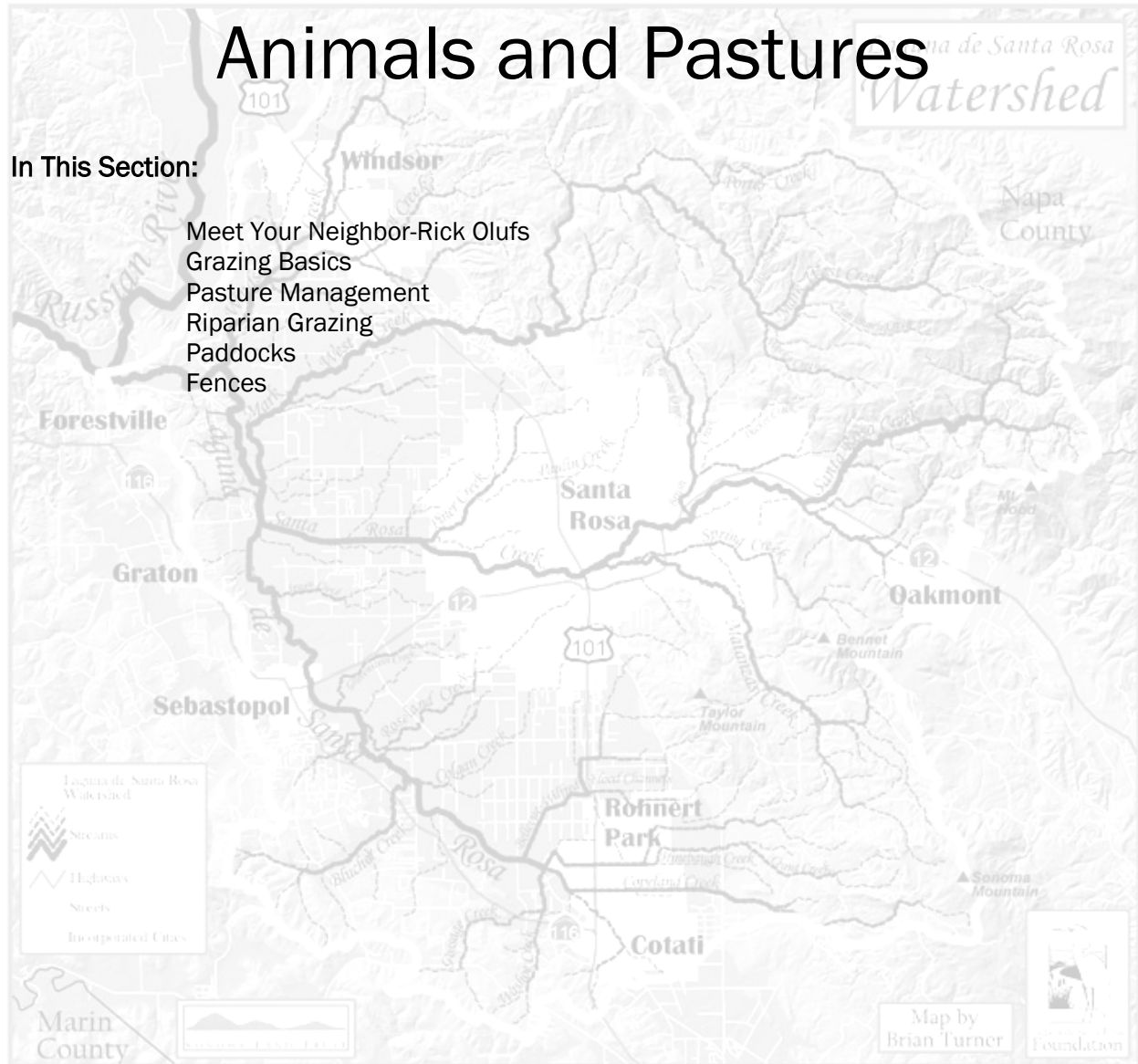
1. Aim for a road that approaches "hydrologic invisibility." The existence of a road will interrupt the natural movement of runoff moving downhill. This means minimizing the distance water travels in an inboard ditch, and having a culvert sized and placed to handle the quantity of water released during larger storms.
2. If you are part of a rural road association, work with your maintenance contractor on specific annual maintenance tasks that align with the standards outlined in Pacific Watershed Associates, "Handbook for Forest and Ranch Roads."
3. When considering replacement culvert costs, avoid the short-term savings that result from poly culverts if you live in a fire prone area with fuel load issues. These culverts can melt in higher temperature forest fires, reducing the life of your culvert significantly.
4. When considering placement of culverts, avoid installing your culvert "down the road a bit" from stream crossings in order to save on purchasing an additional a length of culvert. This action typically redirects the stream course by 90 degrees when it reaches the road crossing, then re-directs it back again to the original course on the downhill side of the road.
5. Seek experienced professional help for repairing significant road drainage problems, all culvert and bridge installation, and designing and building new roads.

Contact your local RCD for more information about resources and funding for rural road sediment reduction projects.

Animals and Pastures

In This Section:

- Meet Your Neighbor-Rick Olufs
- Grazing Basics
- Pasture Management
- Riparian Grazing
- Paddocks
- Fences



Meet Your Neighbor

The Oluf Farm An interview with Rick Olufs

At the gateway to modern day Windsor, where motorists on 101 rumble past WalMart and Home Depot, a quieter family farm sits just across the way with a rich tradition dating back more than 56 years. Rick Olufs works hard to maintain his family's farming tradition, which started as a dairy farm with 50-70 Holstein Cows. He is a rancher dedicated to the success and sustainability of local agriculture in Sonoma County.



As a small farm operator, Rick has diversified his approach to farming. As the sole operator of his family's ranch, he runs a beef cattle operation, operates a seasonal pumpkin patch from late September through October, and manages his livestock through grazing contracts. Most of his commodities are sold locally. Rick currently has 10 mother cows and 13 calving heifers. At one time, the Oluf operation included 75 cows, but development has decreased the amount of land available to support that herd size today.

Challenges

Of the challenges ranchers face, Rick finds it particularly difficult to find open land with good fences. As he said, "there is enough open land, but not enough money for good fences for the land." Since Rick wants to expand his beef operation, he continues to look for property to graze. His knowledge and reputation in grazing management has enabled him to take on additional leased properties for grazing.

Innovation Through Stewardship

Rick's approach to grazing turns cattle into a vehicle for restoration. Through contract grazing services, he manages the timing and intensity of planned grazing to help maintain desired species. His clients include public and private landowners in areas of vernal pools and within mitigation easements. He represents a growing number of ranchers with specialized experience to graze lots in a way that maintains and improves habitat protection for endangered species. He has managed over 40 small fields for private owners. As is the nature of hardworking and resourceful ranchers, Rick bales his own hay from the properties he manages.

Managing for Change and Community Participation

Rick is transitioning his cattle operation to grass fed. He started with two grass fed cattle this year and expects to move to a completely grass fed operation as demand increases, eventually supporting up to 40 head of cattle. Ranching is a challenge and opportunity. He looks at his future farm and envisions a butcher shop, sheep, hogs and goats, and Ag Bags (portable silos) to provide a feed mix to other small farm operators. Recognizing the importance of working with the local community, The Oluf Pumpkin Patch is a field trip destination for school groups and the public. Activities include a petting zoo, hay and corn mazes, hay pyramid, face painting, and more. The interest in the Oluf Farm Pumpkin Patch has in turn, led to an increased sale of his locally produced beef.

Keeping Agriculture Strong

Rick understands that to maintain a viable agricultural operation in Sonoma County, he needs to interact off the farm. He recognizes the importance of community and works with local groups to promote agriculture through his family business. He plans to continue expansion of his agricultural operations for the purpose of maintaining sustainability.

Grazing basics

The type and number of animals to graze will depend on the interest of the landowners and the carrying capacity of the land, water table, slope and other considerations. When management practices are applied, grazing intensity can be held in check with pasture re-growth.

Observe the land first

Observe the land during a typical rainfall and temperature year prior to taking on any quantity of livestock. The growth cycle for existing grasses, water movement and flooding during storms, and research into your soil types can help guide the type of animal best suited for the land and guide improvement or avoidance areas once grazing is initiated.

Determine how many animals

Planning is necessary to determine a reasonable carrying capacity, the number of animals, and the timeframes they may be able to graze. If animals are carried year round, supplemental feed will be required. Carrying capacity is usually based on an animal unit month. An animal unit is a 1,000 pound animal, usually one mature cow or five sheep. An animal unit will consume approximately two to three percent of its body weight per day, depending on its nutritional requirements. Therefore, on average, an animal unit will require 900 pounds of forage per month or five tons of hay or its forage equivalent on a yearly basis. From this knowledge, a landowner can make decisions on what type of animals to graze on their property.

Beef cattle

Small beef enterprises, whether raised for a niche market, commercial operation or just a hobby can be feasible on some small acreage. Fences for beef cattle need to be adequate for the age and type of cattle.

Sheep

Sheep can be a great small acreage venture. Good fences are needed, for containment and protection from predators, neighborhood dogs, coyotes or even mountain lions. Niche marketing of wool, lamb or breeding stock can be profitable on a small acreage operation. Sheep require more labor than cattle, i.e., shearing, so labor and facility requirements need to be analyzed.

Horses

Many small acreage landowners live where they do in order to own and enjoy horses. Therefore, in order to own horse, landowners need to be aware of horses nutritional needs. Horses can consume large quantities of forage so it may be necessary to feed a supplement to the horses, to prevent over grazing of pastures. When pastures are good, limited grazing can stretch the pasture resource without additional supplemental feeding of the horse.

Llamas and alpacas

Llamas and alpacas are also grazing animals, which may fit nicely with the disposition and interests of the small acreage landowner. Investigate the llama and alpaca business very carefully before determining if there is any profit potential.

Manure management

With grazing animals come manure. Successful manure management provides an additional resource to small acreage farms.

Grazing Basics

Pasture Management

Management Practices

Pastures are typically improved by seeding and fertilizing. Preparing the site (i.e. mowing) prior to seeding increases sunlight penetration and retains some seed protection.

- Basic steps to pasture preparation for seeding two inch height.
- Seed in the fall prior to heavy winter rains. Practical seeding methods include hand-operated seed broadcaster (up to ten acres may be reasonable) and no till-drill method.

Long-range weather records show that the most favorable period to seed is from October 1 to October 31. The University of California Cooperative Extension can help you determine what types of seeds and fertilizer to use, answer questions on exotic versus native grass performance, and provide more information about grazing in general. Plan early and order seed in advance.

Pasture Management

Newly planted pastures are less efficient and more sensitive. A newly seeded pasture will be approximately 60 percent of future yield. Once a new pasture has been seeded:

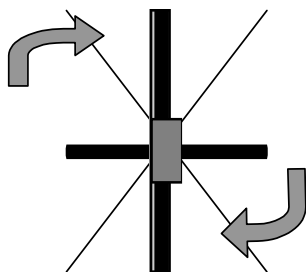
- Lightly graze three to four months after seeding, when soil is firm.
- Pull animals off new pastures when soil is wet.
- Remove grasses during winter to favor sunlight on clover growth.
- Time your grazing to allow plants to rest and re-grow.
- Pastures should be managed to maintain animal health requirements while maintaining the needs of the desired plant species.



Grazing Systems

Traditional grazing:

Traditional or conventional grazing allows livestock to graze at will. Traditional grazing requires less management of the livestock. However, livestock can overgraze the desired species and leave invasive plants intact. Left in the pasture too long, the desired species may be depleted and can not re-seed. Invasive plant species, such as thistles, then become more dominant. In addition, livestock entry into riparian areas raises increased public scrutiny and potential for water quality impairments.



Rotational grazing:

Rotational grazing has become a preferred and more common grazing approach. This concept involves moving animals more frequently through a systemized approach. One concept divides the pasture like a wheel, with the water source in the middle. There are several different design types: An example is the “cheese wheel” which divides pastures like “slices” of a cheese wheel. Livestock encouraged to graze in a certain direction or rotation offers rest time for each individual pasture. Rotational grazing provides more uniform grazing control of the land, and can keep invasive weeds and preferred forage in check. Rotational grazing also reduces over and under grazing effects. Rotational grazing is more intensive and requires active management. Livestock are moved more frequently as dictated by vegetation growth. Fences and water development, increased labor, materials and commitment are required.

Riparian Grazing Tips

An excerpt from the Sotoyome RCD's Grazing Handbook

1. Off stream water should be provided so animals don't have to enter the stream to drink. If this isn't possible, controlled stream access points should be provided to encourage animals to drink in specific, managed locations.
2. Supplements should be strategically placed away from riparian areas to encourage grazing in upland areas.
3. Riparian grazing should be avoided when streamside vegetation is the only green feed in the pasture.
4. Areas near streams should never be used to concentrate livestock. Corrals, paddocks, and feed racks should never be located within stream channels.
5. Livestock should be kept off saturated pastures near streams. Grazing on saturated stream banks can exacerbate erosion.
6. Timing of grazing will vary depending on seasonal weather patterns and grazing objectives.
7. Where human contact with pathogenic organisms are a concern, *Cryptosporidium* and other pathogen inputs into water should be minimized. Calves under six months of age should not be present when water is flowing.
8. Where ground and shrub-nesting protection is a riparian management objective, grazing should be eliminated, reduced, or closely managed during nesting season (March to July) to prevent trampling of nests, maximize the understory habitat value, and minimize foraging habitat for cowbirds. Alternatively, if riparian grazing is necessary during this time of year to meet other management goals, grazing should begin before March to prevent birds from building nests that could be trampled later. A thick riparian understory can also be critical to a successful rearing of young birds, so excluding part of the riparian area to allow understory development could also be a solution.

Before making decisions about grazing periods, know how much rest is needed.

- Walk the pastures that stock have already grazed to evaluate re-growth.
- If grass has grown a couple of inches in one to two weeks, plan relatively short rest periods (30-45 days).
- If not much re-growth has occurred in one to two weeks, plan for longer rest (60-120 days).

Riparian Grazing

Paddocks

Managing Confined Spaces

Paddocks or corrals, are small, non-irrigated, non-grazing confinement areas, often next to stalls, and used as an exercise area. These areas, sometimes called “sacrifice areas” may appear bare from heavy use.

Paddocks should be managed to protect water and soil resources:

- Provide at least 600 square feet per horse
- Locate the paddock on a slope less than five percent
- If possible, avoid north facing exposure
- Avoid chronically muddy areas
- Minimize contaminated runoff by adding sand and drainage features
- Direct drainage to a buffer area of vegetated filter strip– never directly to the creek
- Minimize hoof contact with wet soil to prevent hoof and parasite disease
- Maintain at least 100 feet from well or septic systems
- Route clean stormwater drainage from rooflines or other areas away from paddock.

Fencing considerations:

- Build a fence free of sharp or jagged protrusions. Never use barbed wire
- Wood rail fencing is suitable though requires more maintenance
- Confined horses will chew wood or other materials
- Consider a non-toxic repellent to the wood to discourage chewing
- Consider pipe or metal railing.



Traditional livestock fencing used since the mid-1800's consists of woven wire with two or three strands of barbwire on top. Temporary and permanent fencing developed since can increase some grazing options. The right fence depends in part on what one wants to keep in and out

Portable Electric Fence Types



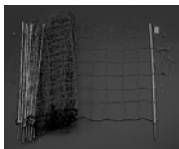
Tape; typically used for horses

Electrical fence used mostly for horses. Consists of thin wire woven into a plastic tape. The fence is a mental and visual barrier to animals. Materials consist of the tape, non-conductive posts and a power supply.



Poly-wire; typically used for livestock

This type of fencing is used for livestock as well as short-duration high-intensity grazing or a temporary exclusion. The fence usually consists of four strands of thin wire woven into a plastic string (poly-wire) and acts as a mental barrier.



Electro-netting; any type of animal

Semi-portable fence typically consisting of thin wires woven into a plastic net. The electro-net is a mental and physical barrier and can be used with any type of animal. This fencing is harder to fix than portable or tape fence, but generally the electro-net is more durable.



High tensile wire; any type of animal

This type of fencing can be used for any type of animal, and is the strongest and most durable electric fence. The fence consists of a strong wire that is wrenched tight and strung on very durable non-conductive posts, as well as a power supply. The fence can be either electrified or not.

Training Livestock for Electrical Fencing

The only way for the livestock to learn to not touch the fence is through exposure. The delivery of a shock establishes this learning. Once animals associate the fence with pain, they generally avoid the fence and the shock. Paddocks with two fencing systems work well because the animals are exposed to the electrical fence and learn by the sight of the permanent (physical) fence that they cannot break through.



Permanent Non-Electric Fence Types

Non-electric fences are generally permanent. A well constructed fence requires little maintenance and lasts for several decades. Many times, both mesh and barbed fences are combined to create fences that keep predators out as well as protect the fence from the livestock.



Mesh wire woven fences act as a physical barrier to keep predators out, and livestock in. There are many different sizes and gauges.

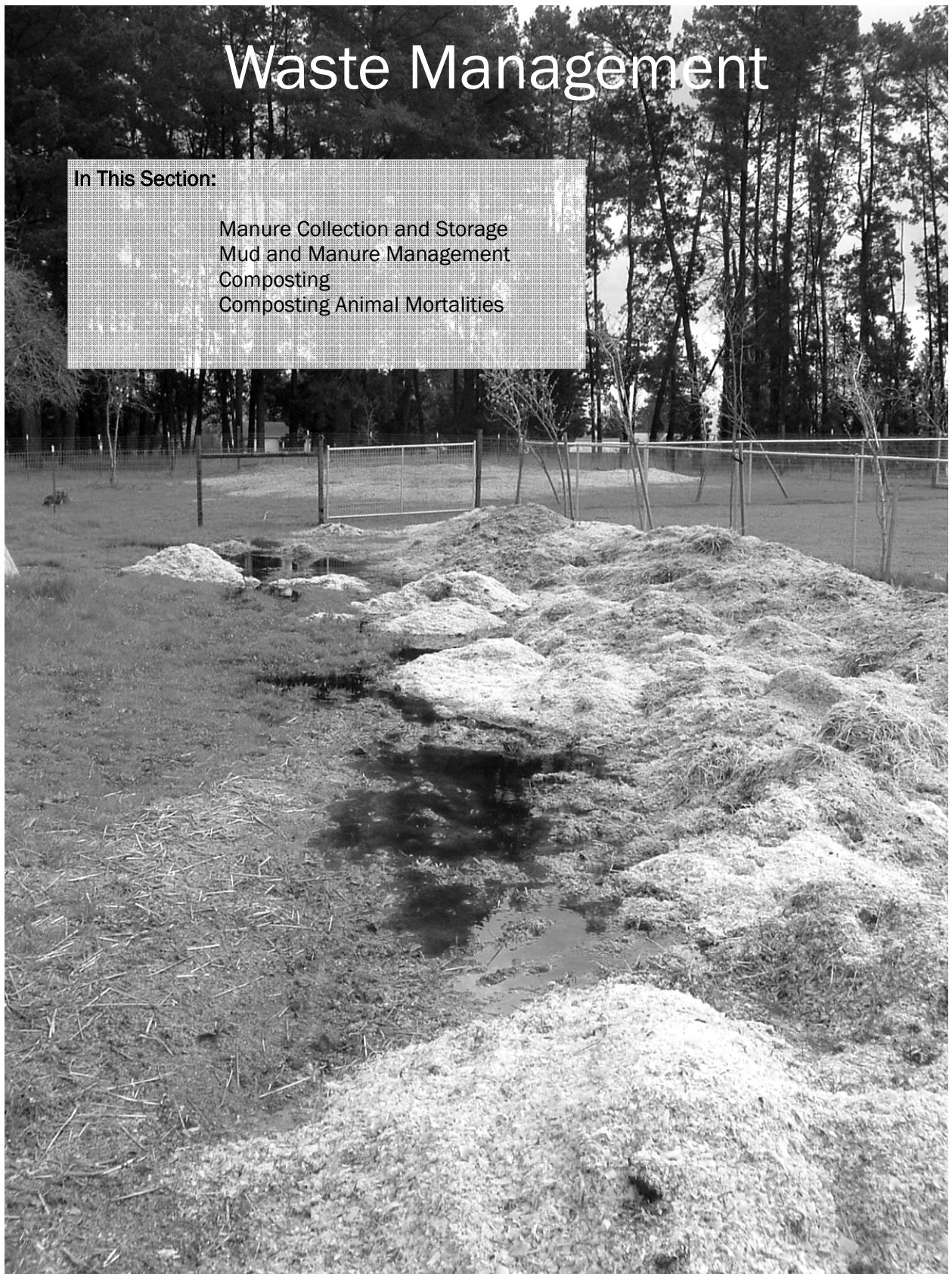
Barbed wire fences act as a physical and mental barrier. There are many different gauges, shapes, and barbed types.

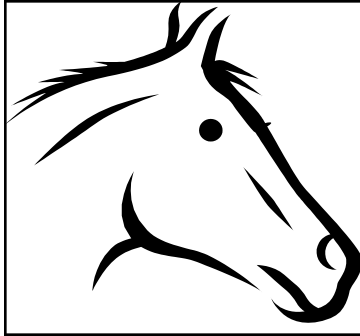
Fences

Waste Management

In This Section:

Manure Collection and Storage
Mud and Manure Management
Composting
Composting Animal Mortalities





General management routines for manure includes:

- Manure storage followed by removal elsewhere
- Manure storage followed by composting onsite
- Manure storage followed by pasture spreading or tilling.

General ABC's for manure collection:

Calculate the volume: For example, horses defecate approximately a cubic foot of manure every day. Identify the quantity of manure generated to properly size your collection/storage system (Equation: $n[0.75 \text{ ft}^3/\text{day}/\text{horse}]d=Ve$). The number of horses per facility, n , multiplied by expected manure volume per horse, per day, multiplied by the number of accumulating days, d , yields an expected volume (ft^3) of manure.

Establish an effective and clean routine:

- Clean all confinement areas of manure before a storm arrives.
- Place covered garbage cans outside each stall for soiled bedding. Clean regularly.
- Empty cans into a debris bin stored in a centralized location.
- Haul the debris bin away at least once a month.

Use the right tools and store them close to the area needed:

- Manure fork, flat shovel (coal shovel), metal rake, wheelbarrow, and tractor with front loader/box scraper.

Manure Storage

- A 30 day or less storage period is reasonable .
- Bedding accounts for 50-75% of the volume from a cleaned out stall.

Storage Tips

- Store manure in an enclosed or vented/screened container that prevents access by flies and to block rainwater entry.
- Carefully control drainage from pile.
- Divert clean rainwater from mixing with contaminated pile.
- Design and divert water as appropriate by constructing a filter strip, grassy swale, or other NRCS recommended practice.
- Keep pile at least 100 feet away from highest water line of creeks or waterways.

Composting

- Can reduce volume by 50% and lower disposal expense.
- Produces a soil amendment from the manure and bedding mix.

Manure Collection and Storage

Mud and Manure Management

Mud to a horseman or ranch owner is usually a mixture of soil, water, and manure. In order to protect animal health and the surrounding creeks and waterways, property owners must prevent any mud or manure from entering a nearby creek or water flowing into a creek. The tips below are applicable to all animals.

Manage horses differently during storms

Identify your heavy use areas

Allow animals to graze and exercise in between, not during storms, when the ground is dry

Create a sacrifice area with a rock or sand surface

Pick up manure daily in paddock or sacrifice areas

Develop a grass filter (buffer) strip to catch any run off surrounding sacrifice and heavy use area.

Slopes require special attention

The size of a buffer or filter strip should be determined by the slope of the land.

Hillsides, pastures, & grassy areas should have residual vegetation at all times.

Don't place horses back into the pasture too fast

This can cause colic or founder, and will reduce the chance for pasture grasses to get established.

Talk to your local equestrian or feed store about seed mixtures available. Often, a combination of erosion control and dry land pasture grasses work well for horses.

Pay special attention to these heavy use areas

Entrances to paddocks

Gates, and walk ways

Feeding areas and water troughs.

Keep clean water clean

Each one inch of rain water on 1000 square feet of roof yields 600 gallons of clean runoff to the ground.

Pay special attention to stormwater runoff areas.

Install rain gutters and down spouts directing clean water away from where the horses are, where manure is stored, or any containment area. Harvest rainwater or construct a groundwater recharge system.

Effective runoff control

Open ditch to grassy swale

Culvert to grassy swale

Grassy swale

Detention pond

Potentially illegal runoff

Open ditch to creek

Culvert to creek

Flow straight to creek



Composting is a biological process that turns organic matter back to a soil nutrient. When you build a compost pile, you can manage the rate and efficiency of decomposition. A compost pile provides “habitat” for bacteria and other micro-organisms. These organisms act as the main decomposers.

Beneficial bacteria exists within the material you intend to compost. Through a symbiotic loop, the type of bacteria which multiply and thrive depend on factors within a compost pile.

Heat- Compost piles which sustain a 150-165 ° F for a minimum of three days are effective in killing weed seeds and aiding with disease suppression. In order to achieve a thermophilic pile, it is important to reach an optimal carbon to nitrogen ratio of 30:1, coupled with ample air flow at an appropriate moisture level.

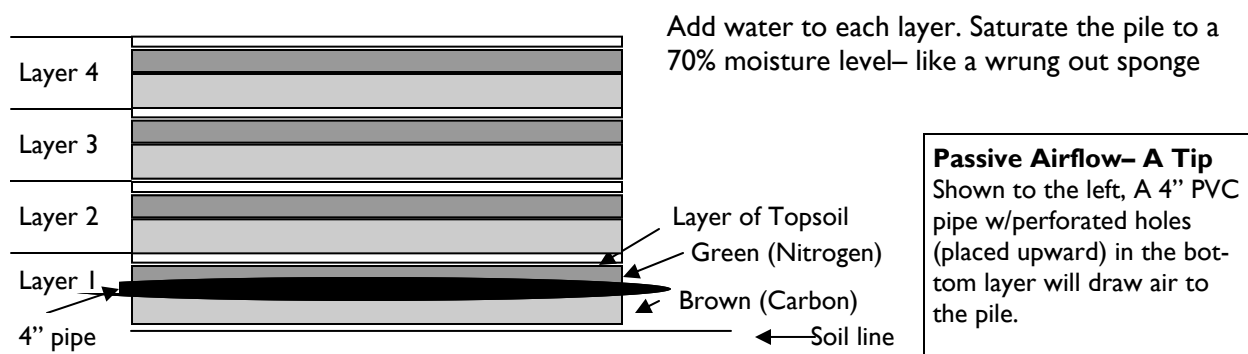
The California Oak Mortality Task Force cites research from 2003 onward that hot, managed compost piles are effective in suppressing *phytophthora ramorum*, responsible for Sudden Oak Death. Similarly, The UC Cooperative Extension in Sonoma County showed in 2004 that incidence of vine mealy bug found within winery waste can be suppressed through similar composting techniques.

**Try to reach a “Feedstock mix”
20:1 to 40:1 for rapid composting.**
Typical C:N Ratio (Brown: Green)

Coffee Grounds	20:1
Corn Stalks	60:1
Cow Manure	20:1
Fruit Wastes	35:1
Grass Clippings	20:1
Horse Manure w/ Litter	60:1
Leaves	60:1
Newspaper	50-200:1
Oak Leaves (Green)	26:1
Peat Moss	58:1
Pine Needles	60-110:1
Rotted Manure	20:1
Sawdust / Wood	600:1
Sawdust Weathered	325:1
Straw	80-100:1

Composting with red wiggler worms. Vermicomposting can be an effective way to manage the decomposition process. A “hybrid” of the composting process, compost piles that range from 55°F to 85°F support the basic habitat requirements for such worms. Within a single cubic foot, 2,000 - 4,000 worms can thrive and consume up to 2lbs of food daily. The most effective method for composting with worms is to build a contained bin with drainage, protect it from outside temperature extremes, inoculate it with a starter quantity of worms, fill the box with at least 4” of bedding such as moist finished compost or shredded paper, and avoid placing meat and dairy products. The book *Worms Eat My Garbage* by Mary Applehof, provides a complete overview for a home-scale system.

Build a compost pile. The sandwich method. Create a hot compost pile by build it at least three feet in width and length, but not more than five feet in height. Make sure all feedstock of interest to rodents and critters is covered by two to four inches of soil or material on all sides.



Composting

Composting Animal Mortalities

Most farms lose some of their animals each year. Typical handling includes rendering, burial onsite, burial at the landfill, and incineration. Some disposal methods can create adverse effects on groundwater and air quality. Composting is an option to return nutrients to the soil while minimizing environmental risks. The biological processes of composting animal mortalities is similar to any thermal composting. Large animals, weighing more than 300 lbs. must be prepared and placed to facilitate tissue decomposition and fluid retention. Generally, small animal carcasses can be composted whole, the information below applies to small animals only.

The size of the composting area depends on the total weight of the carcass. As an example:

- The dimensions of the pile for 30 lbs of carcass (small animals) must be a minimum of 36 inches in height and 40 inches in length on any side. Maximum height should not exceed 5 feet.
- The dimensions must be sufficient to retain heat in the mass of the pile.

Composting an animal carcass requires that you “pre-heat” the bottom third of the compost bin prior to adding the carcass. This can be achieved by:

Step 1 Prepare the Mix

- Add a feedstock mix that is 1/3 of the total height – a mix of dense manure and porous materials. Example: 2 parts manure to 1 part straw in 6 inch layers
- Add water to achieve a “wrung out sponge” consistency
- Monitor with a long stem temperature probe until it reaches 140 degrees F Pathogen kill is maximized when the pile reaches and maintains at least 130 degrees F for three days.

Step 2 Place the Carcass

- Dig a hole in the pile 3x the size/volume of the carcasses
- Small animals can be placed side by side in layers no more than 8 inches thick with 6 inches compost mix between and around the layers
- Pour water over the carcass equivalent to 1/3 the volume of the carcass
- Cover the carcasses with a dry compost mix 3/4 the volume of the carcass
- Make sure the carcass has a minimum of 6 inch cover on all sides
- You can continue to add carcasses daily up to a five foot maximum height.

Step 3 Monitoring

- Monitor the temperature until it falls to less than 130 degrees F
- When the temperature falls, turn/move the pile to a secondary bin and cover any exposed carcass with an addition of a minimum of six inches of compost mix on any side
- Monitor the pile– the carcass should reduce to bone within 10-20 days.

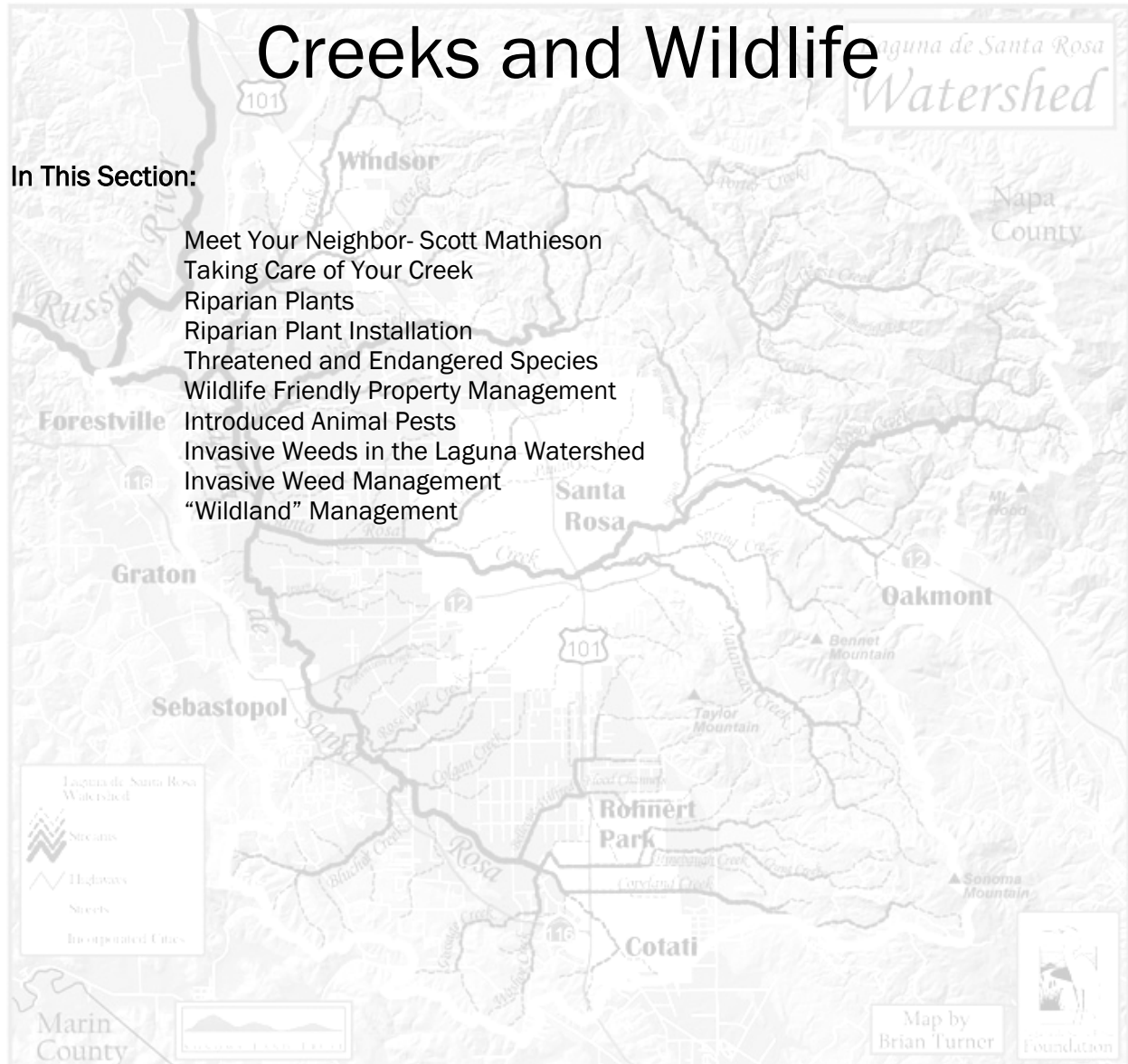
Step 4 Finished Compost

- When the majority of the materials appear composted, turn again and put the material in a curing pile for a minimum of 30 days before field spreading. Alternatively, 1/3 to 1/2 of the composted mix can be retained to start a new pile.

Creeks and Wildlife

In This Section:

Meet Your Neighbor- Scott Mathieson
 Taking Care of Your Creek
 Riparian Plants
 Riparian Plant Installation
 Threatened and Endangered Species
 Wildlife Friendly Property Management
 Introduced Animal Pests
 Invasive Weeds in the Laguna Watershed
 Invasive Weed Management
 "Wildland" Management



Meet Your Neighbor

Laguna Farm An interview with Scott Mathieson

Scott Mathieson is owner /operator of Laguna Farm, a farm located in the heartland of the Laguna. The family farm was passed down from Scott's grandfather. The farm is home to the largest Community Supported Agriculture (CSA) program in the watershed. Members pay monthly dues to receive farm fresh vegetable and fruit baskets picked up or delivered weekly.



About 40 different varieties of vegetables, fruit trees, berries, and grapes dot the landscape of this farm. The 500 member CSA program and additional farmer's markets and wholesale sales help the operation gross an average of \$300,000 each year.

Challenges

One of the greater challenges to Scott's operation is cost. It is expensive to do business in Sonoma County. Without the family land as a base he would see a significant challenge to sustain Laguna Farm's "beyond organic" production approach, to meet the standards of an excellent employer, and still make it.

Innovation through Stewardship

Laguna Farm has a deep tradition of farming with nature. Co-existence of nature and agriculture has always been one of Scott's lead themes. Production areas are set far back from riparian habitat on the main Laguna channel and two tributaries that feed his land. "Beyond Organic" means that Scott subscribes to standards above and beyond certified organic operations, and delivers that promise by encouraging his CSA members to step foot on the farm and experience it firsthand. In this way, 500 people manage and influence the production process.

There is also a significant amount of land the farm does not till. This hands-off /setback approach provides both benefits and challenges from increased natural insect predators to happy bunnies. When questioned once about their approach to insect and other pest management, Scott explained how a few extra rows of crops get planted and they still meet their production standards. The farm has also become a hub for innovative green building materials, solar, and bio-diesel.

Managing for Change and Community Participation

One of the benefits of operating a small farm is the diversified production and local sales that can be managed and sustained. Looking towards the future, Scott sees no increase in their current production, by design. They recently capped their CSA at 500. They feel they have reached the capacity of this farm, with both wildlife needs and production in mind, in its present form.

Benefits of a Healthy Creek and Watershed

A watershed is a geographic boundary that encompasses the land area that drains into a common waterway. This watershed area includes the geologic framework, soils, surface and ground waters, vegetation and all of the landscape features built upon them. The more disturbed the land within a watershed is by roads, buildings, invasive plants, dams, reservoirs, etc., the more the bi-products of these features can impact the natural function of the watershed.

A healthy, well-functioning watershed keeps water quality high, provides food and shelter for fish and wildlife, controls soil from washing into the creek, maintains creek flows in the dry season, and reduces flooding. Healthy watersheds deliver clean water to estuaries and bays. In a well-functioning watershed, water quality and other resources are maintained for the benefit of both humans and wildlife. These benefits lead to increased property values, cleaner drinking water, and safer, healthier recreation areas. River or stream systems consist of the water flowing through them, the channel and its floodplain, and the community of plants and animals living in and next to the water. The water in river and streams comes from rain runoff and groundwater.



Tips to Protect Your Creek Bank and Riparian Area

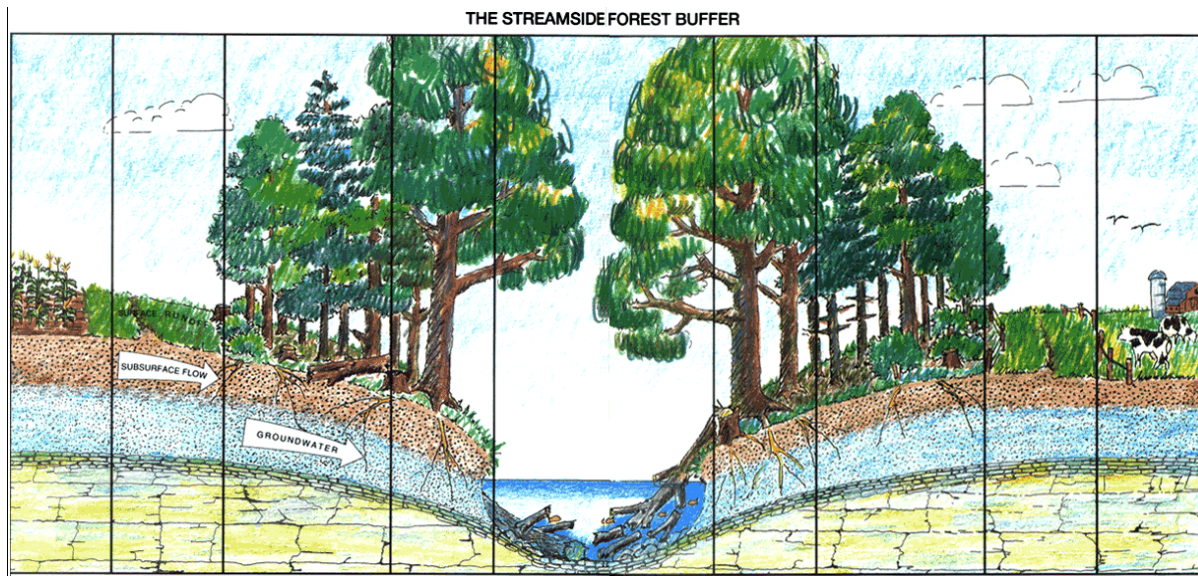
- Leave native plants on the banks: If clearing must occur leave as many plants as possible and replant with native plants. Contact your local RCD
- Leave Rocks in the Creek: These are homes for creek critters, don't remove them for your landscaping project.
- Brush, weeds, grass clippings, or other small material should not be thrown into a creek or stored near creek banks. The brush may create a debris jam downstream on someone else's property or block a culvert, which can cause flooding and erosion or block fish passage.
- Divert water only if it is legal for you to do so: Water diversions have many legal requirements. Contact the State Water Resources Control Board, Division of Water Rights, and the California Department of Fish and Game (DFG) for information.

The Importance of Woody Debris

- Woody material should be left in the creek whenever possible.
- In some cases, woody material may need to be modified or removed. Woody material can redirect water to accelerate bank erosion or dam flow to create potential flood hazards. In an emergency, you have the right to modify or remove the material, but must notify the DFG prior to, or within two weeks of the work. In a non-emergency, contact DFG for advice or information on obtaining a permit.
- In an emergency, trim smaller branches that catch other material first. Otherwise, modify woody material so that the mainstem log or root mass remains intact. Keep log lengths at least 1½ times the stream width.
- Most fish can swim through or around log clusters. If you know that fish can't swim through a barrier, contact DFG.

Taking Care of Your Creek

Riparian Area



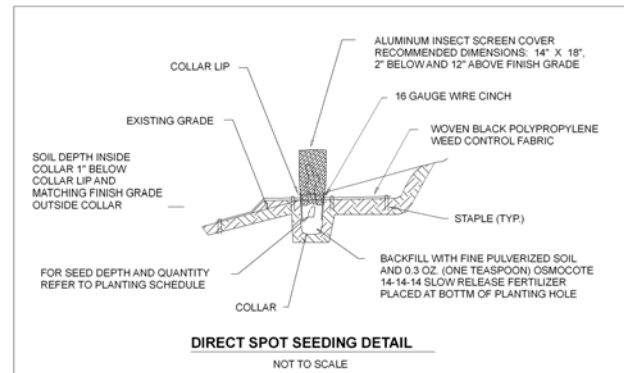
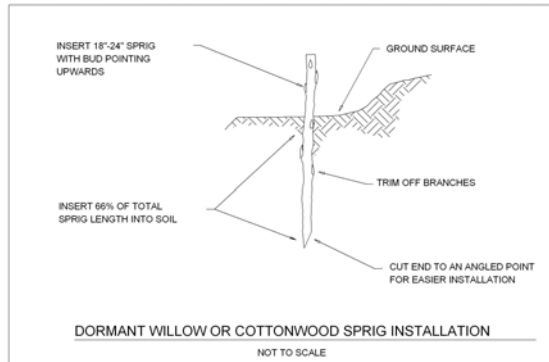
The riparian zone consists of the area that borders a stream channel and its floodplain, and consists of the community of plants and animals living in and next to the water. The native vegetation found in a riparian zone has adapted to the dynamic stream side conditions of winter flooding and dry summers. A healthy riparian zone is an elegant and functional thing, the plants are organized by their structure and function in ways that maintain quality habitat, i.e. they stabilize the stream banks and reduce channel erosion, shade the channel, and provide food and shelter to a wide range of fish and wildlife species.

It is estimated that approximately 90% of historic riparian forest in California have been destroyed due to changes in land use. Loss of riparian habitat is loss of habitat for a wide range of wildlife. Besides being vital habitat for aquatic dependents such as fish and amphibians, riparian corridors serve as necessary habitat for birds and mammals. By increasing the amount and diversity of riparian vegetation, habitat for a wide variety of insects, birds, amphibians and mammals will be created and enhanced. With the exception of alteration of the stream channel and direct removal of native riparian trees, introduced exotic plants are one of the biggest threats to native riparian habitat. Non-native, invasive plants can spread rapidly and take over streamside habitat. Invasive plants have a variety of impacts that are detrimental to the riparian area ranging from excluding regeneration and establishment of native vegetation to increased water consumption and fire danger.

Tips for Managing Your Riparian Area

- Manage your riparian area to preserve and/or enhance native plant populations.
- Where possible, leave as wide a buffer zone as possible between upslope land uses and the creek.
- Reduce direct impacts to the riparian zone by fencing out livestock and creating off-creek water sources. Often riparian areas will regenerate on their own once grazing pressure is reduced.

- Plant in the fall and/or winter months to allow the plants to establish a health root system before the energy required for spring growth is needed.
- Irrigate native plants the first three dry seasons.



Native Plants to Encourage in Your Stream Area

The following is a basic list of native plants that can be used to re-vegetate your riparian area. Keep in mind that although the following plants are all suited to the riparian corridor, they each have different growing requirements.

Common Name

Grasses

Creeping wildrye
Meadow barley
'Molate' red fescue
Sedges
Rushes

Botanical Name

Leymus triticoides
Hordeum brachyantherum
Festuca rubra 'Molate'
Carex spp.
Juncus spp.

Groundcovers

Lady fern
Western sword fern
Wood-sorrel

Athyrium felix-femina
Polystichum munitum
Oxalis acetosella

Shrubs & Vines

Blackberry (native)
Coyote brush
Currant
Elderberry
Hawthorn
Hazelnut
Honeysuckle

Rubus ursinus
Baccharis pilularis
Ribes sanguinem
Sambucus mexicana
Crataegus douglasii
Corylus cornuta
Lonicera hispidula

Shrubs & Vines (Cont)

Rose, California
Snowberry
Thimbleberry
Wax myrtle

Botanical Name

Rosa californica
Symphoricarpos mollis
Rubus parviflorus
Myrica californica

Trees

Box Elder
Big Leaf Maple
Bay-laurel(pepperwood)
Buckeye
Coast redwood
Coffeeberry
Coast live oak
Femont cottonwood
Valley oak
California black walnut
White alder
Willow (local native)
Oregon Ash

Acer negundo
Acer macrophyllum
Umbellularia californica
Aesculus californica
Sequoia sempervirens
Rhamnus californica
Quercus agrifolia
Populus fremontii
Quercus lobata
Juglans hindsii
Alnus rhombifolia
Salix spp
Fraxinus latifolia

Native Plant Installation

Threatened and Endangered Species

Wetland and riparian areas are known for their ability to support multiple kinds of organisms. The Laguna de Santa Rosa Watershed supports the second largest freshwater wetlands in northern California. Agricultural and urban land uses play a leading role in the impact to biodiversity in the watershed. Large scale shifts in land use for farm and urban conversion beginning in the early 1900's has resulted in wildlife habitat loss in the Laguna de Santa Rosa flood plain, thereby imperiling a wide variety of flora and fauna and rendering their populations as Threatened or Endangered.

An endangered species is a population of an organism which is at risk of becoming extinct because it is either too few in number, or threatened by changing environmental or predation pressures. Species that are recognized as Federally Threatened or Endangered are awarded legal protection.

The Laguna de Santa Rosa Watershed hosts:

15 federally-listed species
38 state-listed species
43 locally designated species



Photograph by Gerald and Buff Corsi © California Academy of Sciences

While many of the plants and animals living in the Laguna thrive elsewhere, for some, the Laguna de Santa Rosa Watershed is the only place they exist in this region. These organisms are classified as endemic. Endemic signifies that the species can survive only in a specialized habitat within a specific geographic location. Once a species that is endemic to the Laguna de Santa Rosa is lost, that species is entirely extinct and unrecoverable.

Examples of Declining Biodiversity in the Laguna de Santa Rosa Watershed:

- The oak woodland/vernal pool complex has been reduced by 92%.
- Sebastopol meadowfoam, Sonoma sunshine, Burke's goldfields, Many-flowered navarretia, and the California tiger salamander have been officially recognized as endangered species by the state and federal government.
- Steelhead trout, Chinook, and Coho salmon are listed as threatened due to ~95% reduction in population.
- Few studies exist about potentially rare and specialized invertebrate populations inhabiting the vernal pools.

Tips to Conserve Habitat for Threatened and Endangered Species

- Habitat conservation and increasing habitat connectivity is a way to protect imperiled species and sustain populations of plants and animals that are not yet imperiled. Consider placing a conservation easement on your property to protect existing habitat resources. Contact the Sotoyome RCD for more information.
- Restoring creeks and wetlands can enhance and even create habitat to sustain our sensitive species. Cutting edge techniques for wetland creation and enhancement are being developed in the Laguna de Santa Rosa Watershed.



Photograph by Jo-Ann Ordano © California Academy of Sciences



Most of us live in this area, at least in part, due to the natural beauty of the region. The surrounding wildlife is one of the things that sets rural areas apart.

Regardless of whether Threatened or Endangered species occur on your property, your property management activities affect wildlife habitat both directly and indirectly. Increasing your awareness about how your property management approaches affect the surrounding wildlife can illuminate how small modifications in your management strategy can support a wide variety of wildlife.

In some cases, wildlife directly impacts your landuse and is not desirable or particularly welcome. Particularly if you are growing a garden or crop, discouraging pest species, from weeds to gophers, can be a major management goal. Using natural predator-prey relationships and structuring your property management to encourage the presence of certain species, particularly predator species that prey on wildlife that has impact to your favored landuse, is encouraged.

Tips for managing your land in a wildlife friendly manner

- Carefully consider your pesticide use. Bald Eagles, now de-listed from the Endangered Species Act, have rebounded in part due to legal changes and farmer response from the ban of DDT pesticide in 1972. Several resources exist on Integrated Pest Management Options, and education offered by the Cooperative Extension in Sonoma County can guide your pest management approach and options.
- Practice Backyard Conservation. Wetland development, hedgerows, and setbacks from riparian and wetland areas provide needed habitat and may increase your natural pest control. Consult the US Fish and Wildlife Service for grant opportunities through the Partners for Fish and Wildlife program.
- Protect your surface water. Creeks that pass through your property may or may not be a spawning ground for returning salmon and steelhead trout, but they may depend on the conditions in the creek to pass through your property. For more information on how to manage your creek for fish and wildlife, contact your local Resource Conservation District or the California Department of Fish and Game.
- Don't plant a pest- Exotic, invasive species of plants as well as domestic animals gone feral can lead to broad scale change and costly solutions. Feral cats, for example, hunt native songbirds. Exotic plants, such as Giant Reed, require up to 30 times more water than native plants.
- Take a look at your property and the multiple organisms it supports- Wild Farm Alliance produces a publication entitled "Farming with the Wild: Enhancing Biodiversity on Farms and Ranches" to help you manage your land for minimal impact to the natural flora and fauna.

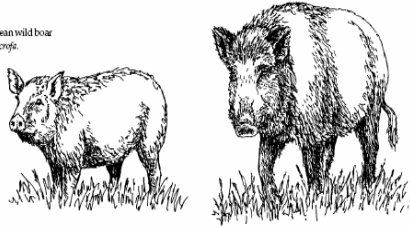


Wildlife Friendly Property Management

Introduced Animal Pests

There are a wide variety of animals, plants, and other organisms that can become a pest in the environment. Feral pigs and domestic housecats gone feral are just two examples. Escaped bullfrogs, wild turkeys, and other organisms that rapidly take over habitat can cause an extensive imbalance to the natural environment over a short period of time.

Fig. 1. Feral hog (left) and European wild boar (right). Both are the species *Sus scrofa*.



Wild Pigs

Feral Pigs cause a variety of damage:

- Rooting (sometimes called grubbing)
- Damage to farm ponds and watering holes
- Predation on domestic stock and wildlife

Rooting by wild pigs:

- Destroys pasture, crops, and native plants
- Causes soil erosion

Producers in Texas and California reported that 1,473 sheep, goats, and exotic game animals were killed by wild pigs in 1991.

Tracks of adult hogs resemble those made by a 200- pound (90-kg) calf. Where ground is soft, dewclaws will show on adult hog tracks.

Feral hogs associated with domestic livestock can contract and transmit Cholera, swine brucellosis, trichinosis, bovine tuberculosis, foot and mouth disease, African swine fever, and pseudo-rabies.

If you have determined that feral pigs exist on your property, contact the California Department of Fish and Game to learn more about your management options, including issuance of a depredation permit for hunting.

Feral Cats

There are three types of feral cats:

Total Feral - Negative or no human contact

Semi-Feral - Some positive human contact

Converted Feral - Abandoned domestic cat

Feral cats are a significant predator of native birds and wildlife.

Multiplication Chart for Cats

Two uncontrolled breeding cats create two litters a year at a survival rate of 2.8 kittens per litter with continued breeding can create the following:

Year 1 =	12 cats.
Year 2 =	66 cats
Year 3 =	2,201 cats
Year 4 =	3,822 cats
Year 5 =	12,680 cats
Year 10 =	80,399,780 cats

Forgotten Felines provides spay and neuter services for trapped feral cats as well as domestic cats. Contact them for more information about options on your land.

	Latin Name	Common Name	Rank	Habitat of Concern; Examples of Location
Aquatic	Invasive <i>Ludwigia</i> sp.	Invasive water primrose	High	Aquatic habitats; Rohnert Park flood control channels, Laguna from Occidental to Guerneville Road
Riparian	<i>Arundo donax</i> ∅	Giant reed, Arundo	High	Riparian areas; Santa Rosa Creek, Peterson Creek, others.
	<i>Rubus discolor</i>	Himalayan blackberry	High	Riparian areas, marshes, oak woodlands; widespread through Laguna watershed
	<i>Lythrum salicaria</i> * ‡ ∅	Purple loosestrife	High/B	Horticultural weed of wetlands, riparian areas; Blucher Creek near confluence with Laguna and further upstream at Sonoma County Horticultural Nursery
	<i>Sesbania punicea</i> * +	Scarlet wisteria tree	High	Horticultural weed of riparian areas; flood control channel near Spring Lake
	<i>Lepidium latifolium</i> * ‡	Perennial pepperweed, Tall whitetop	High/B	Marshes, riparian areas, wetlands, grasslands; multiple locations in Laguna and tributaries.
	<i>Vinca major</i> +	Periwinkle	Moderate	Horticultural escape to riparian and oak woodland; multiple tributaries and drainages to the Laguna
Upland	<i>Tamarix ramosissima</i>	Saltcedar	High	Santa Rosa Creek, Llano Road
	<i>Aegilops triuncialis</i> ‡	Barbed goat grass	High/B	Grasslands, overgrazed pastures; spring lake, pastures near Mark West Creek
	<i>Centaurea solstitialis</i>	Yellow star thistle	High/C	Grasslands; disturbed areas in Laguna grasslands.
	<i>Genista monspessulana</i> ‡	French broom	High/C	Oak woodlands, grasslands; Spring Lake and High School Road
	<i>Cortaderia jubata</i>	Pampas grass, jubata grass	High	Disturbed or exposed sites; Reclamation pond banks, Santa Rosa Creek.
	<i>Taeniatherum caput-medusae</i> ‡	Medusa-head	High/C	Grasslands; Laguna de Santa Rosa Ecological Preserves (Todd Road) and Wright Preservation Bank
	<i>Centaurea calcitrapa</i> ‡	Purple starthistle	Moderate	Grasslands; grazed pastures

Cal-IPC/CDFA Ranking Thresholds: Ranking aids in the management of noxious weeds and helps categorize the likelihood of successful eradication efforts. A key to symbols is below:

*Red Alert: Species with potential to spread explosively; infestations currently restricted

‡ California Listed Noxious Weed; † Federal Listed Noxious Weed; + On Draft Cal-HIP list to be phased out of nursery production; ∅ Global Invasive Species Database list of 100 of the world's worst invasives.

California Invasive Plant Council (Cal-IPC) ranking: Plants are categorized as High risk based on documented impacts, potential for spread, and the range of habitats they tolerate.

California Department of Food and Agriculture Ranking (CDFA): Noxious weed is a legal or regulatory term for pest plants recognized as “troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate.” It is illegal to disseminate seeds of noxious weeds within the state; other laws and quarantine restrictions can apply. CDFA gives listed plants a rating, A-D, or Q, to reflect the pest’s statewide impacts, the potential for successful control or eradication, and its distribution statewide.

Invasive Weeds in the Laguna Watershed

Invasive Weed Management

Management of Invasive Weeds

Invasive species are one of the most serious environmental problems of the twenty first century. They crowd out native species, disrupt natural processes, and impose tremendous costs on human communities. Identifying the weed, understanding its life cycle, and learning more about the variety of ways it can appear or persist will assist in its control. Visit the California Encycloweedia, hosted by the California Department of Food and Agriculture at <http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/>.

Early Detection and Eradication

The key to eradication are detecting a new infestation early, responding quickly, and monitoring it carefully. If you see a plant you've never seen before try to find out what it is by asking an expert or keying it out (using the *Jepson Manual*, for example) Mapping the problem can help to identify occasional to persistent infestation areas.

There is no single right way to control weeds.

When deciding what method to choose several factors should be considered:

- The nature of the infestation
- The tools and techniques available to you
- The biology of the target species
- Terrain where the species is located

Management

Once the weed and soil characteristics have been identified, a proper control method can be implemented. Not all invasive plant infestations are the same. Some contain only a few plants, while others cover acres. Pulling the weeds out by hand might make sense when you have a few plants, but if the population is large, other techniques, like mowing might be more effective. Grazing can be an effective weed management tool.

Mechanical Removal

- Remove small infestations by hand or hoe.
- Mow annual weeds prior to seed head development. Timing and frequency is critical.
- Perennial weeds can not be managed by mowing. Mowing may increase the problem.
- Consult the Agricultural Commissioner's office for precautions, recommendations and restrictions. They can also provide a list of recently banned chemicals, such as Diazinon.



Prescribed Burning

- Prescribed burning can be effective at managing against weeds. See the Home and Property section for permits, restrictions, and recommendations related to burn permits.
- Burn when the weed has a green seed head, and there is ample fuel load on the ground to keep the fire burning hot enough to kill seeds.

Re-vegetation

- Seed pasture with desirable species intermixed with legumes to increase competition against weeds.

Biological Controls and IPM

- Biological control introduces natural predators for multiple goals. Ex: to control pests of native grasses, disrupt insect life cycles.
- Integrated Pest Management takes into account cultural practices and management techniques that diminish the ability of weed to take hold or to manage an infestation. Examples include mating disruption, soil preparations, irrigation management, pest life cycle tracking, etc.

Chemical

- The specific weed and life cycle of the plant will determine the timing of application and type of product. Examples include pre-emergent/post-emergent herbicide, insecticides, etc.
- Read and follow the label directions.
- Over-application of pesticides, and spraying near creeks or under certain weather conditions can be unsafe, illegal, and dangerous to humans, organisms and water quality.
- Consider soil types- Less pre-emergent herbicide is required per spray event for weed control on sandy, light soils. Low rates of herbicide should be used on sandy soils or those low in organic matter.

Invasive Weed Management

“Wildland” Management

More often than not, a property will have an area, often in “the back” or around the edges, that is not directly used or managed. It doesn’t have a structure or dwelling, garden or crop, and isn’t directly used for grazing livestock. These areas, where plants and animals exist with little or no human interference, are often left unmanaged and are essentially wildlands. These areas comprise some of the best and most layered and complex habitat.

The term habitat is often tied to a specific species and land is often managed to support a particular species. This is true for an agricultural system (i.e. land managed to support a specific crop) and also of “habitat” management, where land is managed for a particular wildlife species, usually one that is threatened or endangered. When discussing the management of wildlands as habitat, we are not targeting a specific species, but instead providing an area for an assemblage of many species, all living together.

Habitat Fragmentation

The old adage, “Good fences make good neighbors” certainly has some truth to it. But considering that a significant percentage of the Laguna de Santa Rosa Watershed is divided into small acreage parcels, our landscape has become a mosaic of land use and property management approaches all divided by fences. That’s a lot of fencing, much of which is unnecessary, and it has a significant effect of the connectivity of habitat for a wide variety of wildlife. Just as fencing the livestock out of a section of creek can often allow the native vegetation to recover, eliminating unnecessary fencing can create habitat connectivity for a wide range of wildlife.

Perhaps the best way to ensure functional habitat is to protect existing wildland areas from conversion or disturbance. Consolidating or creating connectivity between wildland “islands” can greatly increase biodiversity, essentially creating habitat value that is greater than the sum of its parts.

Tips for Managing “Wildlands”:

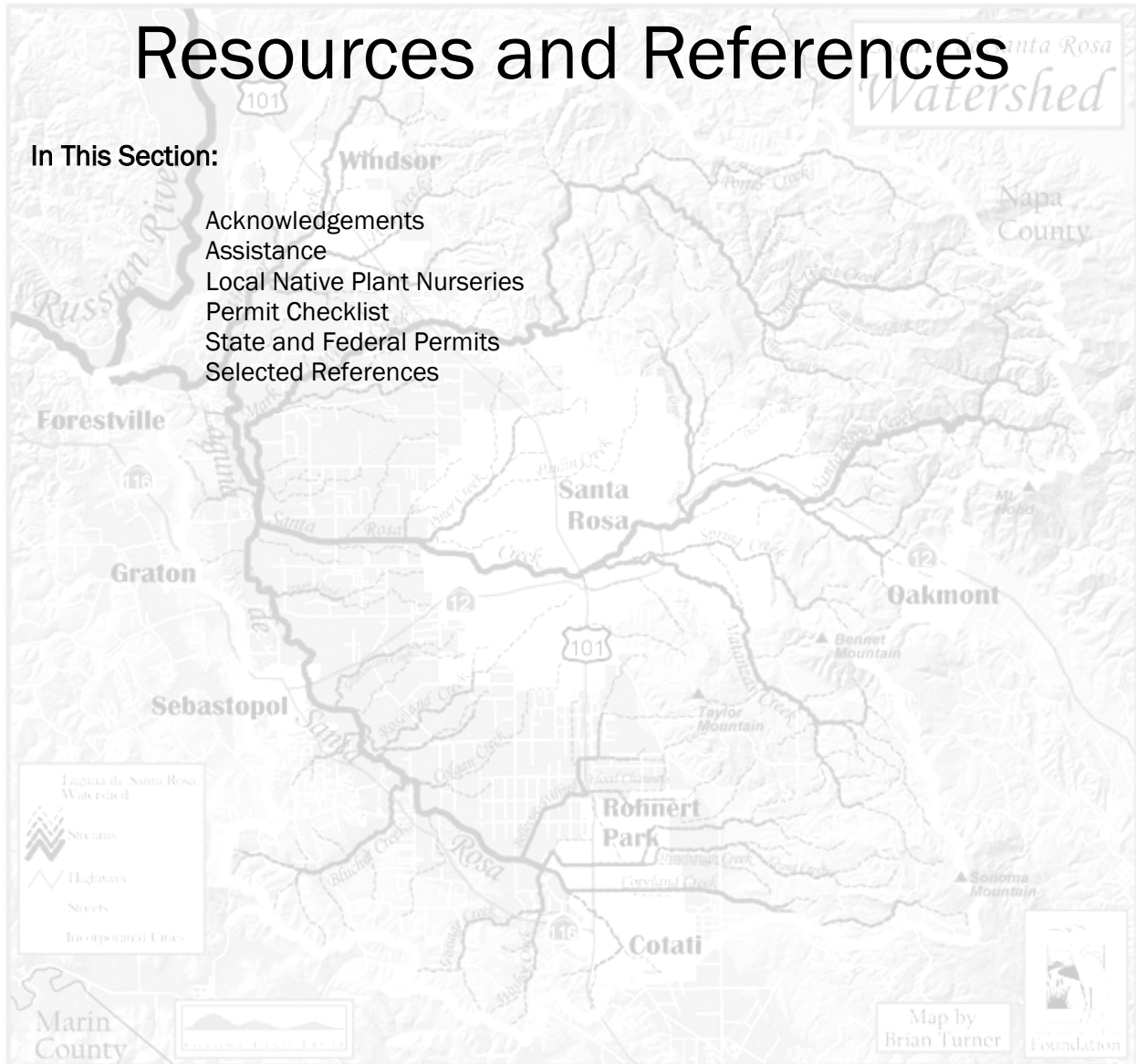
- Encourage the connectivity of wildland habitats, both on your property and between yours and neighboring properties. Look at ways to connect existing habitat to increase the total wildland area, thereby uniting “islands” and decreasing the “edges”.
- Encourage complex habitat. If it isn’t easy to walk through, it is likely great habitat for birds and small mammals.
- Reduce invasive plants where possible and encourage native plants.
- Reduce or eliminate unnecessary fences. Property boundaries can be marked by leaving the fence posts but removing the connective wire.
- Being mindful of fire protection and defensible space for structures, considering leaving dead trees and snags standing.
- Consider protecting large tracts of existing wildlands on your property by utilizing a conservation easement to protect these areas while getting a tax benefit.



Resources and References

In This Section:

Acknowledgements
Assistance
Local Native Plant Nurseries
Permit Checklist
State and Federal Permits
Selected References



Acknowledgements

Acronyms:

SRCD- Sotoyome Resource Conservation District

UCCE- University of California Cooperative Extension

NRCS- Natural Resources Conservation Service

PRMD- Permit and Resource Management Department

SCWA- Sonoma County Water Agency

Cover Photo: Ruth Ark, Sotoyome RCD

Preface/Introduction

Contributing: SRCD

Photo: Ruth Ark, SRCD

Small Acreage Map

Laguna de Santa Rosa Foundation

Local Setting

Contributing: SRCD, Laguna de Santa Rosa Foundation

Regional Picture

Contributing: SRCD

Map: Circuit Rider Productions, Inc.

Our Changing Relationship

Contributing: Larry Robinson, Sebastopol City Council

Impacts of Development

Contributing: SRCD

1942, 2000 Aerial Maps Sonoma County PRMD,

Wetland Conservation

Santa Rosa Plain Conservation Strategy Task Force

Managing the Watershed

Contributing: SRCD, Russian River Interactive Information System at

www.russianriverwatershed.net.

Making a Plan

Contributing: Whatcom County Conservation District, NRCS, SRCD

Pollution Reduction at Home

Russian River Watershed Association, www.rrwa.org

Water Conservation At Home

Contributing: Brad Sherwood, SCWA; Water Wise Gardening - Gardensoft

City of Santa Rosa Turf Time Line

Harvesting Rainwater

Contributing: Brock Dolman: Occidental Arts & Ecology Center, SRCD

Illustration: "Groundwork," Marin RCD

Brad Sherwood, SCWA

Mosquito and Vector Control/Rat Control

Marin/Sonoma Mosquito Vector Control District

Meet Your Neighbor

Contributing: Judy and Jeff James and Family

Photo: Rick Kaye, SRCD

Water Conservation in Vineyards

Contributing: Brad Sherwood, SCWA

Photo: Sierra Cantor, SRCD

Septic Systems

Contributing: Sonoma County PRMD, SRCD

Illustration: City of Winnipeg

Groundwater and Well Protection

Sonoma County PRMD

Fuel Load and Fire Safety

Contributing: California Department of Forestry and Fire Protection brochure "Make your home FIRESAFE Why 100 feet?"

Photo of defensible space: County of San Diego

Burn Permits

Contributing: North Coast Air Quality Pollution Control District

Bay Area Air Quality Management District

Meet Your Neighbor:

Contributing: Ray Krauss & Barbara Shumsky

Photo: Ruth Ark, SRCD

Soil Characteristics

Contributing: SRCD, NRCS web Soil Survey, Whatcom County Conservation District

Erosion

Contributing: SRCD, Marin RCD, "Groundwork," 2007, 1987.

Sonoma County PRMD

Photo: Ruth Ark, SRCD

Erosion Control

Contributing: SRCD

Marin RCD, "Groundwork," 2007, 1987

Illustration: SRCD-adapted from NRCS

Dirt Roads and Sediment Delivery

Contributing: Pacific Watershed Associates, "Handbook for Forest and Ranch Roads," 1994. SRCD

Photo: Gualala River Watershed Council

Meet Your Neighbor

Contributing: Rick Olufs, The Oluf Farm

Photo; Rick Kaye, SRCD

Grazing Basics/ Pasture Management/ Fences

Contributing: Stephanie Larson, UCCE, SRCD

Riparian Grazing

Sotoyome RCD "Grazing Handbook," content by Lisa Bush.

Paddocks

Contributing: Sheila Barry, Alameda County RCD

Manure Collection and Storage/ Mud and Manure Management

Contributing: Michael Murphy, Sonoma County Horse Council

Composting/Composting Animal Mortalities

Contributing: Sonoma Compost

The Compost Club, Maryland Cooperative Extension Fact Sheet 717. Composting Animal Mortalities on the Farm.

Herbert Brodie, Lewis Carr University of Maryland

Meet Your Neighbor

Contributing: Scott Mathieson, Laguna Farm

Photo: Ruth Ark, SRCD

Taking Care of Your Creek

Contributing: SRCD, Southern Sonoma RCD, "Creek Care Guide"

Photo; Ruth Ark, SRCD

Riparian Area

Contributing:SRCD

Illustration; Whatcom County, Conservation District

Native Plant Installation

Contributing: Circuit Rider Productions, Inc.

Wildlife Friendly Property Management

Contributing: SRCD

Photo; Sierra Cantor, SRCD

Threatened and Endangered Species

Contributing: SRCD, US Fish and Wildlife, Wild Farm Alliance, CA Dept of Fish and Game

California Invasive Plant Council

Sonoma County Agricultural Commissioner

Laguna de Santa Rosa Foundation

Photo of California tiger salamander by

Gerald and Buff Corsi

© California Academy of Sciences

Photo of Sebastopol meadowfoam by

Jo-Ann Ordano

© California Academy of Sciences

Introduced Animal Pests

Contributing: Forgotten Felines, SRCD

Invasive Weeds in the Laguna Watershed

Contributing: Stephanie Larson, UCCE, California Invasive Plant Council

Invasive Weed Management

Contributing: SRCD, The Weed Workers' Handbook; A Guide to Techniques for Removing Bay Area Invasive Plants

Native Plants in the Creek Zone

Contributing: SRCD, Denise Cadman, City of Santa Rosa, City of SR/SCWA Creek Stewardship Program.

Acknowledgements

Assistance

Resource Conservation Districts (RCDs):

Most California counties have one or more RCDs that offer assistance to private landowners with technical assistance and development of projects that benefit water and soil resources. RCDs often fund watershed-wide studies and individual landowner projects in cooperation with many local, state, and federal agencies. Within the Laguna De Santa Rosa Watershed, there are two RCDs:

Sotoyome RCD (707) 569-1448

Gold Ridge RCD (707) 874-2907

California Association of RCDs: <http://www.carcd.org/>

Russian River Watershed Directory: Sotoyome RCD released a directory of useful references for watershed related work in the Russian River Watershed. Call (707) 569-1448, or go to <http://sotoyomercd.org/publications.htm> to download.

The Russian River Interactive Information System (RRIIS) THE RRIIS provides a wealth of background and study information for the watershed and its sub-basins. Russian River Watershed Council. www.russianriverwatershed.net.

USDA Natural Resources Conservation Service (NRCS):

NRCS can provide technical specifications; information about possible financial assistance from government cost-sharing programs; soils information; on-site advice on selecting an appropriate repair; and help with finding a contractor, consultant or unusual materials. They usually have well-stocked libraries of their own publications and other natural resource conservation references. Services of geologists, engineers, wildlife biologists, agronomists and a host of other specialists are available to the public. Petaluma field office, (707) 794-1242, <http://www.nrcs.usda.gov/>.

University of California Cooperative Extension (UCCE)

University of California's Agriculture and Natural Resources Department:

UCCE office with services including Viticulture, Watershed Management, Range Management, Integrated Pest Management, 4-H, nutrition, and family and consumer sciences. Master Gardeners are available to assist with gardening, plant resources, and pest control. extension staff make site visits to help with specific problems, offer financial assistance, and extensive libraries for the public. (707) 565-2621, <http://ucanr.org/index.cfm>

California Division of Mines and Geology:

Maps and reports on landslides and related geological features that both affect and help with ranch planning. A list of publications and prices is available from the department of conservation, division of mines and Geology, publications and information office. (916) 445-5716.

US Geological Survey (USGS): USGS studies and inventories geological and related resources. They have a wealth of maps, aerial photos, infrared photos and many other useful land management tools. California Water Science Center (916) 278-3000, <http://www.usgs.gov/>

US Fish and Wildlife Service (USFWS): USFWS can provide information on threatened and endangered species, and on enhancing and protecting wild animal habitat. Grant Program assistance to private landowners includes Partners for Fish and Wildlife and Private Stewardship Program. For more information, call (707) 578-8515 or go to <http://www.fws.gov/>

US Environmental Protection Agency (EPA):

Information clearinghouse pertaining to watersheds. Their non-point source pollution page has background information as well as technical reports and links to additional resources. For the Environmental information center call (866) EPA-WEST, or <http://www.epa.gov/owow/nps/categories.html>.

Appleton Forestry

Patricia Canfield
1369 Tilton Road, Sebastopol, CA 95472
707/823-3776

Bay Laurel Garden Center

2500 El Camino Real,
Atascadero, CA 93422
805/466-3449

Berkeley Horticulture Nursery

1310 McGee Ave.,
Berkeley, CA 94703
510/526-4704
www.berkeleyhort.com

California Flora Nursery

Somers & D St, P.O. Box 3,
Fulton, CA 95439
707/528-8813

Circuit Rider Productions, Inc.

Native Plants Nursery,
Windsor, CA 95492
Tel: 707/838-6641
<http://www.crpinc.org/>

Cornflower Farms

9811 Sheldon Rd., P.O. Box 896,
Elk Grove, CA 95759
916/689-1015
www.cornflowerfarms.com

Freshwater Farms/North Coast Native Seed Bank

5851 Myrtle Ave.,
Eureka, CA 95503
800/200.8969
www.freshwaterfarms.com

Glass Mountain Forest Tree Nursery

P.O. Box 440,
St. Helena, CA 94574
707/963-2372

Larner Seeds

235 Fern Rd., P.O.
Box 407, Bolinas, CA 94924
415/868-9407
www.larnerseeds.com

North Coast Native Nursery

P.O. Box 744, Petaluma, CA 94953
707/769-1213
northcoastnativenursery.com

Pacific Coast Seed, Inc.

6144 Industrial Way #A,
Livermore, CA 94550
800/733-3462

WHOLESALE ONLY**ConservaSeed**

P.O. Box 1069, 14423 Walnut Grove-Thornton
Road,
Walnut Grove, CA 95690
916/776-1200

Napa Native Plant Nursery, California Conservation Corps

P.O. Box 7199,
Napa, CA 94558
707/253-7783

Redwood Valley Rancheria

3250 Road 1,
Redwood Valley, CA 95470
707/485-0361

S&S Seeds

P.O. Box 1275,
Carpinteria, CA 93013
Tel: 805/684-0436 :
www.ssseeds.com

Local Native Plant Nurseries

Permit Checklist

Agency	Driveway and Road System	Neighbor	Slope	Soils	Water Rights	Existing Erosion	Vegetation	Stream and Riparian Corridor	Wet Areas
CDF	X						X	X	
CDFG	X						X	X	X
CDWR					X				
NCRWQCB	X		X	X		X		X	X
RCD	X		X	X		X	X	X	X
NMFS	X								
NRCS	X			X		X	X	X	X
SCAC			X	X			X	X	
ASSESSOR		X			X				
PRMD	X	X	X	X	X			X	
SCPW	X					X			
SUPERIOR COURT					X				
SWRCB-DWR					X				
USACOE								X	X
USEPA								X	
USFWS							X	X	X
UCCE				X		X	X	X	

CDF- California Department of Forestry and Fire Protection
 CDFG- California Department of Fish and Game
 CDWR- California Department of Water Resources
 NCRWQCB- North Coast Regional Water Quality Control Board
 RCD- Resource Conservation District
 NMFS- National Marine Fisheries Service
 NRCS- Natural Resources Conservation Service
 SCAC- Sonoma County Agricultural Commissioner
 ASSESSOR- Sonoma County Assessor Office
 PRMD- Sonoma County Permits and Resources Management Department

SCPW- Sonoma County Public Works
 SUPERIOR COURT- California State Superior Court
 SWRCB-DWR- State Water Resources Control Board- Department of Water Resources
 USACOE- United States Army Corps of Engineers
 USEPA- United States Environmental Protection Agency
 USFWS- United States Fish and Wildlife Service
 UCCE- University of California Cooperative Extension

Permit Checklist Courtesy of 2002
 UCCE-Sonoma County Vineyard Site Assessment Guide

Permits are often required to provide for orderly development, ensure compliance with applicable regulations, and minimize future adverse impact on a wetland or riparian area (i.e. streamside). Clearing vegetation, disturbing ground, or conducting work near a sensitive area requires permits from numerous agencies. These actions are common to habitat restoration projects. Permit applicants may be individuals, watershed groups, special districts such as resource conservation districts, or local, state, or federal agencies. Permitting agencies require different forms to be filled out for different types of applicants. Because the permitting process can be complicated and time consuming and there are often fees associated with permit applications, it is recommended that individuals work with a professional. The permit process is guided by the California Environmental Quality Act and National Environmental Policy Act.

California Environmental Quality Act (CEQA)

The main purpose of CEQA review is to identify and prevent potentially significant environmental impacts from proposed projects.

National Environmental Policy Act (NEPA)

NEPA's basic policy is to assure that all branches of the federal government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment. In order to reach an informed decision, NEPA requires a prescribed process, including public involvement, scientific analysis and potential mitigations. NEPA compliance is mandated when the Natural Resource Conservation Service (NRCS) provides financial assistance.

Encroachment Permits

All cities require an encroachment if your project impacts a public right of way. Examples would be:

- Lane closures
- Temporary sidewalk closures
- Constructing sidewalks, curb and gutter
- Construction Driveways
- Installing street lights
- Installing storm drains
- Installing water mains and services
- Installing fire hydrants and

Stormwater Ordinance (Stormwater Management Plan)

The following towns and cities have stormwater management plans that impact the construction requirements and erosion control measures used on sites and in and around waterways. For more information, contact:

Town of Windsor Engineering Public Works Department- (707) 838-5340

City of Santa Rosa Public Works Department (707) 543-3800

City of Rohnert Park Public Works Department- (707) 588-2232

City of Sebastopol Engineering Department (707) 823-5151

County of Sonoma (707) 565-2098

The above list is not a comprehensive list of county permits. Contact the Sonoma County Permit and Resources Department at (707) 565-1900 for information on your particular project.

Permit Information

State and Federal Permits

State Permitting Agencies

California Department of Fish and Game (CDFG)

The DFG requires a Streambed Alteration Agreement (1603 Permit) for any work that occurs in, on, over or under a waterway, from the bed of a stream to the top of the bank, any work that will divert or obstruct the natural flow of water, change the bed, channel, or bank of any stream, or use any material from the streambed. This permit is also required when removing exotic vegetation from a riparian area. For more information call (916) 445-0411.

State Water Resources Control Board (SWRCB)

The SWRCB Division of Water Rights requires a Water Rights Permit when there is intention to take water from a stream for storage or for direct use on non riparian land. For more information call (916) 341-5250

California Regional Water Quality Control Boards (RWQCB)

The RWQCB for the region requires a Federal Clean Water Act (CWA) Section 401 Water Quality Certification for every federal permit or license for any activity which may result in a discharge into any waters in the United States. Activities include flood control channelization, channel clearing, and placement of fill. Federal CWA Section 401 requires that every applicant for a U.S. Army Corps of Engineers CWA Section 401 permit or Rivers and Harbors Act Section 10 permit must request state certification from the RWQCB that the proposed activity will not violate State and Federal water quality standards. For more information call (510) 622-2330.

Federal Permitting Agencies

U.S. Army Corps of Engineers (ACOE)

The ACOE requires a Federal Clean Water Act (CWA) Section 404 Permit when work involves the intentional or unintentional placement of fill or discharge of dredged materials into any “waters of the United States.” This includes sedimentation from erosion. For more information call (415) 977 8659.

U.S. Fish and Wildlife Service (USFWS)

The USFWS requires an Incidental Take Permit if a project may result in “incidental take” of a listed species. The permit allows a non-Federal landowner to proceed with an activity that is legal in all other respects, but that results in “incidental taking” of a listed species. Take is defined under the federal Endangered Species Act as any activity that would harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Unless a project is being sponsored by a federal agency, a Habitat Conservation Plan (HCP) must accompany an application for an incidental take permit. When a project is sponsored by a federal agency, agency staff involved with the project can assist in obtaining an incidental take permit through a simpler inter-agency process. For more information call (800) 344-WILD.

(NOAA) National Marine Fisheries Service

The NMFS reviews Federally initiated, licensed, or permitted projects, which have the potential of altering aquatic environments and the habitats of aquatic organisms. Habitat may include spawning areas, rearing areas, food producing areas, or other areas necessary for the survival of those organisms. Some of the types of projects and activities which may cause damage to marine, estuarine, or anadromous resources include: dredging, filling, river alterations, drainage of wetlands, discharge of effluents, as well as certain construction or operational activities. For more information call (301) 713-2334

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Preface

About the Guide

More commonly than not, our negative impact to the environment is unintended. We acquire animals, projects, equipment, and build structures that end up causing problems we didn't foresee.

This informational guide provides landowners and residents living on two to forty acres with resource tips for managing natural resources on their land within the Laguna de Santa Rosa Watershed, home to a variety of diverse natural and human habitats. The guide also provides a context to understand how a property interacts within a larger geographical region. A high quality of living can be sustained in sensitive habitat and conservation areas when both individual property practices and regional practices support each other.

The Sotoyome Resource Conservation District developed this guide to synthesize a wide range of information and local knowledge. It features:

- Management techniques applicable throughout all portions of Sonoma County
- Interviews with neighbors about their land practices
- Background on the Laguna de Santa Rosa Watershed, a watershed with diverse topography, soils, and precipitation

Why write this guide? Two basic reasons:

- Good land management lowers your annual maintenance costs, keeps your land and animals healthy, and preserves the quality of the environment around you.
- The Laguna de Santa Rosa Watershed supports more than 50% of Sonoma County's population. The watershed basin is home to 92,851 distinct parcels, and includes the cities of Santa Rosa, Rohnert Park, Cotati, and portions of Sebastopol and Windsor. In a watershed that contains urban and rural regions, management of the environment is as much an urban issue as an agricultural responsibility.

For more information about the Small Acreages program or publication, please contact the Sotoyome Resource Conservation District at (707) 569-1448, or visit us on the web at www.Sotoyomercd.org.