

APPENDIX I

Resources for Homeowners

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I. Riparian Planting Guidelines

Choose the right species

Not all native California plants are indigenous to the San Geronimo watershed. Even those that have evolved to fit the local climate and soils have specific growing requirements that allow them to thrive in some locations and fail in others. Redwood trees, for example, need cooler, moister conditions than buckeyes. Conceptual Plan 1 in Appendix H shows a planting plan for two sample sites in San Geronimo Valley. It includes a list of appropriate plants for different bank elevations and planting specifications. Because California bay trees are a major host for the pathogen that causes Sudden Oak Death (SOD), they should be avoided or used with great caution. (See “California Bays and Sudden Oak Death” section of this appendix for more information.) Further guidance on native plant selection is available from MCSTOPPP at <http://mcstoppp.org>. SPAWN operates a native plant nursery with plants grown from seeds and cuttings collected in San Geronimo Valley.

Meet density targets

In woody riparian corridors, plant to achieve at least 75% tree and shrub canopy cover with 85-95% cover in the 35 feet closest to the stream. (See Action 1.) Where woody planting is either not feasible because of fire safety considerations or where soil conditions do not support trees and shrubs, plant for 90-100% herbaceous cover. Herbaceous plants do not have woody stems and include grasses, sedges, rushes, wildflowers, and low-growing ferns.

Plant for diversity

Most healthy riparian habitat in San Geronimo Valley should include trees, shrubs, and herbaceous species. All have important roles in maintaining riparian function. Trees and shrubs provide shade, woody debris, nesting and roosting habitat. The herbaceous understory is very important in filtering sediment and nutrients, supplying food and cover for many wildlife species, and providing a key element for winter flow refugia. A few streamside locations along upper grassland tributaries and in some serpentine soils may be dominated by native grasses, sedges, rushes, and other herbaceous species. Planting woody species at these sites may not be ecologically sound or successful.

Plant for cool water

Cool summer water temperatures are vital for salmonid survival and growth. Give priority to establishing trees on exposed north-facing banks or other areas where sunlight falls directly on the water for several hours or more each day.

Plant when dormant

The best time to plant most California natives is November through January. If planting needs to occur on stream terraces or lower streambanks, planting during this window is not feasible because of high flows. For those circumstances, plant earlier and provide water

until the rains begin. Willow sprigs will usually fail if they are cut and planted in the spring when new growth focuses in the leaves instead of the roots.

Take care of new plantings

Although native plants are well-adapted to our Mediterranean climate, most container plants will need water and weeding for one to three years until they become well-established. Many will need deer protection until they are large enough to survive browsing. Conceptual Plan 1 in Appendix H includes watering and protection guidelines to establish native plants.

2. California Bays and Sudden Oak Death

California bays are a dominant element of San Geronimo Valley's landscapes. They are the most common riparian tree species here, and play a primary role in shading and providing large woody debris to the creeks. These trees provide valuable food and shelter for wildlife species, are long-lived, and are a beautiful element of our riparian areas. Bays in riparian areas should be protected from disturbance. However, careful consideration should be given before planting bays due to their role in Sudden Oak Death.

California bays can be infected with *Phytophthora ramorum*, the plant pathogen that causes Sudden Oak Death. Bays are considered one of the primary "foliar hosts" of the pathogen. (Many other native species common in the San Geronimo Valley are also known to be foliar hosts of *P. ramorum*, including buckeye, bigleaf maple, toyon, buckeye, redwood, and Douglas fir, as well as many ornamental species. Researchers do not yet know how important these other species are in the spread of Sudden Oak Death.)

In foliar host plants, leaves or twigs are infected, but the plant itself generally survives. Foliar hosts can serve as breeding grounds for the pathogen, which can then infect and kill more susceptible species ["bole (i.e., trunk) hosts"] nearby. Common bole host species include coast live oak and tanoak (which can also be a foliar host). These species typically die if infected.

Given their key role in the spread of *P. ramorum*, bay trees should not be planted, however, bay trees growing naturally should be left in place. Other species which are not known to be susceptible to *P. ramorum* and may be suitable alternatives for bays in San Geronimo Valley include:

- Oregon ash (mainstem creek banks and terraces)
- white alder (mainstem and tributary banks and floodplain)
- arroyo willow (tributary banks)
- valley oak, live oak (tributary floodplains)

Many gaps remain in scientists' understanding of *P. ramorum* and its spread through our landscapes. As our understanding grows, recommendations for planting or working in susceptible woodlands may change. For more information about Sudden Oak Death, including visual guides to plant symptoms and an interactive map of *P. ramorum* occurrences, see the California Oak Mortality Task Force Website:

<http://www.suddenoakdeath.org>

3. Managing invasive plants

General guidelines for removing exotic invasive plants and replacing them with native species include:

1. New infestations, plants at the edge of an existing infestation, or infestations within high-quality native habitat are the highest priority for removal.
2. During removal, avoid impacts to existing native plants, which, if left intact, may help suppress the invasive species.
3. Persistence is usually needed. Monitoring, follow-up treatment, and replacement with native plants are important for successful eradication.
4. When removing invasives next to streams, take care to keep plant material out of the channel. Flowing water is an excellent way for many of these species to spread.
5. If invasive removal results in bare soil, especially on streambanks, use Best Management Practices (BMPs) to prevent erosion. See Appendix I for more information on BMPs.
6. Some wildlife species use invasive riparian plants for shelter and/or food. Scheduling work outside of bird nesting season, removing large infestations in stages, and planting with native plant species will help minimize negative effects on wildlife.
7. In many cases, hand removal is a relatively safe and effective treatment option. However, many infestations are too large for hand removal and mechanical removal may be more feasible. With mechanical removal, soil disturbance should be minimized.
8. In some cases, re-establishing disrupted natural processes such as flooding, fire, or shading may be effective ways of long-term management of invasive species. Along San Geronimo Valley's riparian corridor, increasing shade canopy may work to discourage French broom and Himalaya berry from re-establishing after they have been removed.
9. Other common tools for invasive management are livestock grazing, burning, and combinations of these.

Following are recommendations for removing five of the most common and problematic invasive plants in the San Geronimo watershed:

English ivy (*Hedera helix*)

Recommended management methods: Manual removal. Cut stems, then pull plants up from the ground and down from trees (where fertile branches typically grow) if possible. Dig out roots. Cutting vines at the base of trees will kill them. Take care to minimize disturbance when removing from forest floor; revegetate with appropriate natives if needed. Do not leave pulled plants on ground; these can continue to grow.

Other options: No biological control currently available. Feasibility of grazing unknown.

Himalaya berry (*Rubus discolor*)

Recommended management methods: Manual/mechanical removal. Cut back canes and then dig out rootstocks by hand with a tool such as a claw mattock. Any remaining pieces of root should be removed to prevent resprouting. If cut before seeds are produced, debris may be piled and left for wildlife use; or it may be chipped and used as mulch in revegetation. Piles may also be burned. Regrowth may be controlled by planting fast-growing shrubs or trees, since the species is intolerant of shade, or by grazing sheep or goats. Young plants may be pulled when soil is damp and loose. Mechanical equipment may be useful in areas that are not steeply sloping, or where soils are not highly susceptible to erosion or compaction.

Other options: Mechanical equipment may be useful for large infestations but not in steeply sloping or highly erosive settings. Using mechanical equipment is also non-selective (can't retain native plants present which may help control resprouts). If infestation too large to dig out rootstocks, repeated cutting may effectively deplete plant's energy supplies. No insect/fungal biological control available.

French broom (*Genista monspessulana*)

Recommended management methods: Manual/mechanical removal. In general, it is considered most effective to focus first on hand weeding from small infestations where native species are able to reseed and regenerate. Then, move on to intermediate infestations, and finally to dense infestations where large-scale manipulations are called for. Hand removal can be done with weed wrenches, though these do disturb the soil and may allow more broom seed to germinate. Brush hogs can be used for larger infestations but are more destructive. Deep (10 cm) wood mulch can be used to suppress germination. No biological control agents are currently available.

Periwinkle (*Vinca major*)

Recommended management methods: Hand removal is labor-intensive but effective if careful attention is paid to removing all root nodes and stolons. An effective method is to work inward from the perimeter of the patch and pull the periwinkle back in on itself to prevent further spread of the weed between removal sessions. Periwinkle can resprout from plant fragments, so mowing or cutting is not recommended. No biological control agents are currently available.

Cherry plum (*Prunus cerasifera*)

Recommended management methods: Because cherry plum does not tend to grow in dense stands, it is considered to be less of a threat to native habitats than the species described above, and little research has been done on its management. It is known to resprout readily, so a combination of cutting stems and removal of stumps is most likely to be effective.

Related References and Links

California Invasive Plant Council <http://www.cal-ipc.org/>

Invasipedia <http://wiki.bugwood.org/Invasipedia> Based on Nature Conservancy information. Extensive information on biology and control of many species.

Marin Sonoma Weed Management Area Weed Treatment Area
http://marinsonomaweedmanagement.org/resources/MSWMA_Weed_Treatment_Calendar20030423.htm Provides a concise summary of major treatment options and timing for major weeds. Not exhaustive. 2003.

MMWD reports on weed management alternatives and policy
<http://marinwater.org/controller?action=menuclick&id=437> Focus seems to be on fire hazard reduction. MMWD received an award from CalIPC for its invasive control program.

4. Landscaping to reduce fire risk

Native Plant Landscaping to Reduce Wildfire Risk. Recommendations for Landscaping Near San Diego's Canyons and Wildlands. *[Much of the information is also applicable to Marin County.]* California Native Plant Society. Available online at: www.cnpsd.org/fire/ReduceFireRisk.pdf

Firescape: Landscaping to Reduce Fire Hazard. 2003. East Bay Municipal Utilities District. Available online at: www.ebmud.com/conserving_&_recycling/conservation_publications/firescape_booklet.pdf

Fire Wise Native Plants. City of Oakland, Watershed Improvement Program.
Available online at: www.oaklandpw.com/creeks/fireplants.htm

Highly Flammable Plants. California Department of Forestry and Fire Protection,
Madera County. Available online at: <http://www.madera-county.com/firemarshal/pdf/Flammable-plants.pdf>

5. Rainwater Harvesting and Low Impact Development

Excellent resources to improve watershed impermeability are available through:

MCSTOPPP www.mcstoppp.org

EPA Low Impact Development website www.epa.gov/nps/lid/

Bay Area Stormwater Management Agencies Association www.basmaa.org

Low Impact Development Center www.lowimpactdevelopment.org

Rainwater harvesting help and information is available through:

WEBSITES

Salmon Protection And Watershed Network (SPAWN) www.spawnusa.org

American Rainwater Catchment Systems Assn. www.arcsa.org

Harvest H₂O – The Online Rainwater Harvesting Community
<http://www.harvesth2o.com/>

BOOKS

Design for Water: Rainwater Harvesting, Stormwater Catchment, and
Alternate Water Reuse - by Heather Kinkade-Levario. Publisher: New Society
Publishers. ISBN: 9780865715806 (2007)

Rainwater Collection for the Mechanically Challenged - by Suzy Banks with
Richard Heinichen Publisher: Tank Town Publishing. ISBN: 0966417003
(1997) www.rainwatercollection.com/rainwater_collection_how.html

Rainwater Harvesting for Drylands, Volume 1: Guiding Principles to
Welcome Rain Into Your Life and Landscape - by Brad Lancaster. Publisher:
Rainsource Press ISBN: 097724640X (2006) www.Harvestingrainwater.com

Water Storage: Tanks, Cisterns, Aquifers and Ponds - by Art Ludwig.
Publisher: Oasis Design. ISBN: 0964343363 (2005)
www.oasisdesign.net/water/storage

6. Septic System Care

The Stinson Beach County Water District has excellent information available on building new septic systems and maintaining existing ones, www.stinson-beach-cwd.dst.ca.us. Marin County Environmental Health also has good resources for taking care of home septic systems at www.co.marin.ca.us/depts/CD/main/comdev/ehs.

7. Best Management Practices for Erosion Control and Stormwater Management

Resources to consult for Best Management Practices* (BMP) to control erosion control and stormwater management:

Bay Area Stormwater Management Agencies Association. *Start at the Source: Design Guidance Manual for Stormwater Quality Protection* published in 1999. This helpful guide suggests various methods for reducing runoff on properties from homes to large industrial complexes. *Using Site Design Techniques to Meet Development Standards for Stormwater Quality* published in May 2003 is a companion document to Start at the Source. Both are available free online through the MCSTOPP website, as well as other helpful resources. <http://www.mcstoppp.org/newdevresources.htm>

FishNet 4C. *Guidelines for Protection Aquatic Habitat and Salmon Fisheries for County Road Maintenance* published in December 2004. The manual was designed specifically for county road maintenance but it also a valuable tool for protecting aquatic resources during road construction and maintenance. Available for free through the FishNet 4C website.

http://fishnet.marin.org/projects_roads_manual.html

CalTrans has extensive information about stormwater best management practices (BMPs) and stormwater pollution prevention plans (SWPPPs) on their website. A SWPPP template is available for public use.

<http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>

California Association of Stormwater Quality Agencies. *Stormwater Best Management Practice Handbooks* revised 2004. These helpful handbooks provide excellent guidance to the stormwater community and reflect the current practices and standard. They are available for free from the CASQA website. <http://www.cabmphandbooks.com/>

* Best Management Practices (BMP) is a technical term used to describe standard practices to control water pollution.

8. Horse Owner Resources

The MCSTOPPP website provides information for local horse owners to assist with the projection of water quality and management of horse manure. Two useful publications outlining conservation practices and on-site manure management include:

Horse Manure Management: A Guide for Bay Area Horse Keepers

<http://www.mcstoppp.org/acrobat/Horse%20Manure%20Mangement.PDF>

Horse Owners Guide to Water Quality Protection

<http://www.mcstoppp.org/acrobat/HorseWQ.pdf>