

Bioswales, aquifer recharge, rain gardens, & gray water systems

Bioswales are used to slow, spread and sink rain falling onto land before the rain goes into the sewer system

Aquifers can be recharged with rainwater using bioswales installed above the aquifer. San Francisco has aquifers that need to be recharged with rain.

Creek & Watershed Map of San Francisco - free from SFPUC

<https://www.sfwater.org/index.aspx?page=492>

San Francisco watershed maps available on line

<http://explore.museumca.org/creeks/1690-SFHighLites.html>

<http://explore.museumca.org/creeks/1696-RescSFDuneSW.html>

<http://explore.museumca.org/creeks/1680-RescLobos.html>

explore.museumca.org/creeks/1620-RescYosemite.html

<http://explore.museumca.org/creeks/1630-RescIslais.html>

<http://explore.museumca.org/creeks/1610-RescVisitacion.html>

<http://explore.museumca.org/creeks/1700-RescMerced.html>

<http://explore.museumca.org/creeks/1650-RescNBeach.html>

The following plants are recommended based on their original evolution in or nearby San Francisco's riparian plant community. These plants can survive a dry summer after 2 years of year around watering, although they prefer damp soil.

Many of these plants are understory plants and require shade. Plant these shade friendly plants 3 years after the taller shrubs and trees are tall enough provide the shade these shorter plants need.

If your bioswale is located at a street corner, please consider automobile, bicycle and transit sightlines when selecting plants and consider selecting shorter plants.

Groundcovers

Dwarf Mahonia (*Berberis aquifolium* var. *repens*)

Yerba Buena (*Clinopodium douglasii*)

Strawberry (*Fragaria vesca*, *chiloensis*)

Self Heal *Prunella vulgaris* var. *lanceolata*

Pacific Blackberry (*Rubus ursinus*) thorns

Creeping Snowberry *Symphoricarpos mollis*

Violets *Viola adunca* ssp. *adunca*, *Viola pedunculata* - summer deciduous

Wakerobin *Trillium chloropetalum*

Shorter flowers

Western Columbine *Aquilegia formosa*

Marigold *Bidens laevis*

Monkey Flower Savory (*Clinopodium mimuloides*)

Western Goldentop *Euthamia occidentalis*

Rosilla *Helenium puberulum*

Cow Parsnip *Heracleum maximum*

Harlequin Lotus *Hosackia gracilis*

Leopard Lily *Lilium pardalinum* ssp. *pardalinum*

Bush Monkey Flower (*Mimulus aurantiacus*)
Scarlet Monkeyflower *Mimulus cardinalis*
Seep Monkeyflower *Mimulus guttatus*
Kellogg's Yampah (*Perideridia kelloggii*)
California Buttercup *Ranunculus californicus*
California Bee Plant *Scrophularia californica*
Blue-eyed grass *Sisyrinchium bellum*

Grasses

Pacific Reedgrass (*Calamagrostis nutkaensis*)
Blue Wildrye (*Elymus glaucus glaucus*)
Meadow Barley *Hordeum brachyantherum*

Ferns

Lady Fern *Athyrium filix-femina* var. *cyclosum*
California Polypody *Polypodium californicum* - summer deciduous

Vines

Dutchmans Pipevine *Aristolochia californica*
Virgin's Bower *Clematis* (*Clematis ligusticifolia*)
Pink Honeysuckle (*Lonicera hispidula*)
Twinberry Honeysuckle *Lonicera involucrata*

Shrubs

Salal (*Gaultheria shallon*)
Cream Bush (*Holodiscus discolor*)
Pink Flowering Currant (*Ribes sanguineum glutinosum*)
Thimbleberry (*Rubus parviflorus*)
Snowberry *Symphoricarpos albus* var. *laevigatus*
Huckleberry *Vaccinium ovatum*

Trees

Big Leaf Maple (*Acer macrophyllum*)
California Dogwood *Cornus glabrata*, *nuttallii*, *sericea* ssp. *sericea*
California Hazelnut *Corylus cornuta* ssp. *californica*
California Wax Myrtle *Myrica/Morella californica* - can be sheared into an evergreen hedge
Blue Elderberry *Sambucus nigra* ssp. *cerulea*,

Rain gardens are used at home to slow, sink and soak rain falling onto land before the rain goes into the sewer system. Rain gardens can use all of the bioswale plants above.

Edible native plants can be planted in residential rain gardens. Please do not eat plants planted where they will get road rain run off due to toxic chemicals on roads.

Dwarf Mahonia (*Berberis aquifolium* var. *repens*)
Yerba Buena (*Clinopodium douglasii*)
Strawberry (*Fragaria vesca*, *chiloensis*)
Self Heal *Prunella vulgaris* var. *lanceolata*
Pacific Blackberry (*Rubus ursinus*) thorns
Violets *Viola adunca* ssp. *adunca*, *Viola pedunculata*

Monkey Flower Savory (*Clinopodium mimuloides*)
Salal (*Gaultheria shallon*)
Kellogg's Yampah (*Perideridia kelloggii*)
Pink Flowering Currant (*Ribes sanguineum glutinosum*)
Thimbleberry (*Rubus parviflorus*)
Huckleberry *Vaccinium ovatum*
California Hazelnut *Corylus cornuta* ssp. *californica*
Blue Elderberry *Sambucus nigra* ssp. *cerulea*,

Gray water systems are used at homes to reuse non-sewage water from laundry and/or sinks before the water goes into the sewer system

Gray water native plant list. These plants need or prefer damp soil year around.

Shorter flowers

Western Houndstongue (*Adelinia grande*)
Monkey Flower Savory (*Clinopodium mimuloides*) - OK with constantly damp soil and with dry summers after its 3rd irrigated summer
Pacific bleeding heart *Dicentra formosa*
Stream Orchid (*Epipactis gigantea*)
Leopard Lily *Lilium pardalinum* ssp. *pardalinum* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer
Scarlet Monkeyflower *Mimulus cardinalis* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer
Seep Monkeyflower *Mimulus guttatus* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer
Shooting star *Primula hendersonii*
Pacific Sanicle (*Sanicula crassicaulis*)
Yellow-eyed grass *Sisyrinchium californicum*
Hedgenettle *Stachys ajugoides*, *bullata*, *chamissonis*, *rigida*
Meadow Rue (*Thalictrum fendleri* var. *fendleri*)
Tellima (*Tellima grandiflora*)

Grasses

Slough sedge *Carex obnupta*
Pacific Reedgrass (*Calamagrostis nutkaensis*)
Common or Creeping Spikerush *Eleocharis macrostachya*
Blue Wildrye (*Elymus glaucus glaucus*) - OK with constantly damp soil and with dry summers after its 3rd irrigated summer
Common Horsetail *Equisetum arvense*
Scouringrush Horsetail *Equisetum hyemale* ssp. *affine*
Horsetail *Equisetum laevigatum*

Ferns

California Maiden Hair Fern *Adiantum jordanii*
Licorice Fern *Polypodium glycyrrhiza*
Leathery Polypody *Polypodium scolieri*
Dutchmans Pipevine *Aristolochia californica* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer

Shrubs

Salmonberry (*Rubus spectabilis*) thorns

Meadow Goldenrod (*Solidago elongata*)

Huckleberry *Vaccinium ovatum* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer

Trees

California Hazelnut *Corylus cornuta* ssp. *californica* - OK with constantly damp soil and with dry summers after its 3rd irrigated summer

California Wax Myrtle *Myrica/Morella californica* - can be sheared into an evergreen hedge

Shining Willow, *Salix lasiandra* - willows are keystone riparian species, the most valuable wildlife plant in a damp garden

Check your local water district's website. They may provide incentives to install bioswales, rain gardens and/or gray water systems.

Water Storage, by Art Ludwig, has excellent rain water storage and gray water system descriptions.

San Francisco's historical waterscape

<http://seepcity.org/>

Bay Model Visitor Center in Sausalito houses a scale model of Northern California's watershed from the Sierras to the Golden Gate bridge (free to visit)

<https://www.spn.usace.army.mil/Missions/Recreation/Bay-Model-Visitor-Center/>

California drought monitors and drought visualization

<https://droughtmonitor.unl.edu/>

<https://www.drought.gov/states/california>

<https://www.californiadrought.org/drought/current-conditions/>

<http://cdec.water.ca.gov/>

Jay Famiglietti - measuring aquifer content

<https://jayfamiglietti.com/>

Walter Jehne - water cycling and climate feedback loops

<https://soilcarboncoalition.org/walter-jehne-at-harvard/>

Rain gardens and bioswales design and installation best practices

<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=28568>

<https://www.napawatersheds.org/rainwater-harvesting>

https://www.napawatersheds.org/managed_files/Document/6014/rain_gardens_swales.pdf

<https://ag.umass.edu/landscape/fact-sheets/rain-gardens-way-to-improve-water-quality>

<https://photobotanic.com/news/bioswales-and-green-infrastructure/>

Native plant ethnobotany database includes how Indian tribes used native plants for food, medicine and tools.

Daniel Moerman's Native American Ethnobotany

<http://naeb.brit.org/>

Calscape is CNPS's plant selection tool with California native plant pictures, plant size at full growth, soil types, sun/shade needs, water needs, butterfly and moth caterpillar value (chewed leaves are the sign of happily fed butterfly caterpillars and are good!) and nurseries with plant availability.

<https://www.calscape.org/>

California Native Plant Society - Yerba Buena (San Francisco) chapter offers free plant lists & biodiversity resources, free hikes and free speaker series

<http://cnps-yerbabuena.org/>

<http://cnps-yerbabuena.org/biodiversity/biodiversity-resources/>