

Recycled Water Use in the Landscape

How do recycled water and gray water differ? Where can they be used?

Recycled water is highly treated wastewater from various sources such as domestic sewage, industrial wastewater and storm water runoff. Most recycled water treatment plants produce tertiary treated water, meaning the water has been through three levels of treatment including filtration and disinfection. Tertiary treated recycled water can be used for landscape, agricultural irrigation, car washing, fish ponds, fire fighting, groundwater recharge and in fountains and recreational lakes where swimming is allowed. Gray water is untreated, non-disinfected wastewater that has *not* come into contact with toilet waste. Gray water includes wastewater from residential showers, bath tubs, bathroom sinks and washing machines which may be used in landscapes using an onsite collection system and must employ a subsurface irrigation method. Recycled water is cleaner, safer and has far less restrictions on its use than gray water. It does not require an onsite collection system and is delivered through a separate plumbing system. Most recycled water is applied by drip irrigation or conventional sprinkler irrigation.

By law, all pipes and equipment conveying recycled water must be purple or have purple markings as a universal sign to prevent cross connection with potable supplies. This includes flow control knobs, solenoids, valve boxes, sprinkler heads and of course all piping. In addition, public areas must post signs stating "Caution: Recycled Water Do Not Drink".

How good is the quality of recycled water?

The quality of recycled water depends upon the source water and the level of treatment. Generally recycled water will have a higher concentration of dissolved salts than drinking water. Water with high levels of salts can have adverse effects on plant health and appearance; however, most recycled water produced does not have harmful levels of salts for most plants. Irrigation constituents of greatest

concern to agricultural crops or ornamental species are chloride, sodium, bicarbonate, boron, and fluoride. Appropriate plant selection and good irrigation management can minimize the potential impacts of the salts or specific ions of concern.

Is the same amount of recycled water used as potable water when irrigating?

There is a potential for salt accumulation when using recycled water. As a result, it may be necessary to slightly over-water or leach plants irrigated with recycled water. A general rule of thumb is to allow for a 10% over watering depending on soil type and plant characteristics. Well drained soils and rainwater will help mitigate salt accumulation effects.

What are the effects on plants?

Plants sensitive to salts may be affected mostly by tip burning when recycled water with high saline content is applied by spray leaving salts behind when the water evaporates. Drip irrigation rather than overhead irrigation will minimize foliar injury. Two studies done by University of California at Davis showed low occurrence of injury to many common landscape plants. In fact, one study showed health ratings were equal or higher using recycled water over potable water in all species tested. In some cases, nutrient rich recycled water can be beneficial to plant growth and might reduce the need for additional fertilizers. Summaries of these studies are found in the UCD Department of Environmental Horticulture newsletter "Growing Points" Fall 2001 and Fall/Winter 1996/97 issues available on the internet at: <http://envhort.ucdavis.edu>.

What plants can be irrigated with recycled water?

Turf grasses, most annuals, and deciduous trees are more tolerant of saline water than evergreens. Turf grasses either have built in tolerance of saline conditions or do not accumulate high levels of salt because of frequent mowing. Deciduous plants don't accumulate salts in plant tissues because they shed their leaves each fall. A list of plants with high salt tolerance is on the reverse side.

Laws that regulate recycled water:

Water Recycling In Landscaping Act (SB 2095 year 2000):

<http://www.leginfo.ca.gov/>

Health and Safety Code, Water Code:

<http://www.leginfo.ca.gov/calaw.html>

Title 17, Division 1, Chapter 5:

<http://www.calregs.com/default.htm>

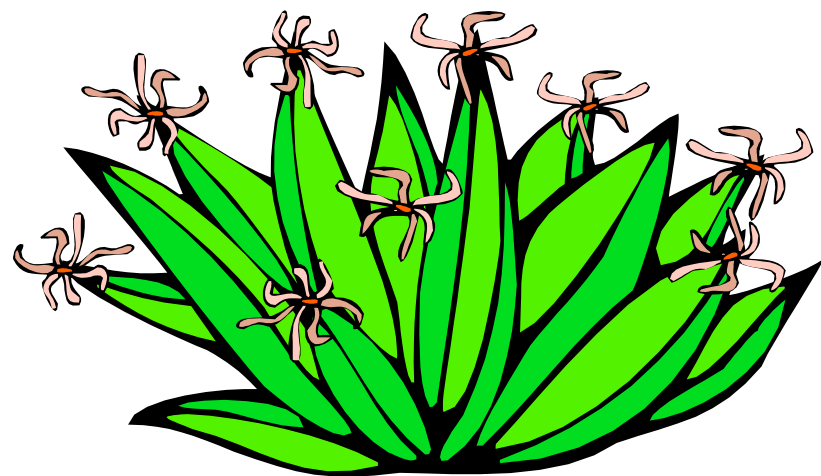
Title 22, Division 4, Chapter 3

<http://www.calregs.com/default.htm>

More info:

The Department of Water Resources has developed guidelines for the use of gray water in landscapes, available on the Office of Water Use Efficiency Website at:

<http://www.owue.water.ca.gov/landscape/pubs/pubs.cfm>



Plants with High Tolerance of Salt in Irrigation Water

Common Name	Scientific Name
Agave	Agave spp.
Alkali Sakaton *	Sporobolus airoides *
Aloe	Aloe spp.
Arizona Ash	Fraxinus velutina *
Modesto Ash*	
Beefwood	Casuarina stricta
Bermuda Grass	Cynodon dactylon
Bladderpod *	Isomeris arborea *
Blue Blossom *	Ceanothus thrysiflorus *
Blue Dracaena	Cordyline indivisa
Blue Palo Verde *	Cercidium floridum *
Blue Spruce	Picea pungens
Blue Wildrye *	Elymus glaucus *
Bougainvillea	Bougainvillea spectabilis
Breath of Heaven	Coleonema spp.
California Brome *	Bromus carinatus *
California Buckwheat *	Eriogonum fasciculatum *
California Fan Palm *	Washingtonia filifera *
California Fescue *	Festuca californica *
California Juniper *	Juniperus californica *
California Sycamore *	Platanus racemosa *
Callery Pear	Pyrus calleryana
Canary Island Palm	Phoenix canariensis
Cape Plumbago	Plumbago auriculata
Catalina Cherry *	Prunus lyonii *
Catclaw Acacia *	Acacia greggii *
Coast Live Oak *	Quercus agrifolia *
Coffeeberry *	Rhamnus californica *
Cushion Bush	Calocephalus brownii
Date Palm	Phoenix dactylifera
Deer Grass	Muhlenbergia rigens
Deodar Cedar	Cedrus deodara
Dwarf Coyote Brush *	Baccharis pilularis *
Dwarf Olive	Olea europaea "Montra"
Escallonia	Escallonia rubra
European Fan Palm	Chamaerops humilis
Evening Primrose	Oenothera speciosa
Evergreen Euonymus	Euonymus japonica
Evergreen Pear	Pyrus kawakamii
Feathery Cassia	Senna (Cassia) artemisioides
Firethorn	Pyracantha coccinea
Fortnight Lily	Dietes irioides
Gazania	Gazania spp.
Giant Honeysuckle	Lonicera hildebrandiana
Gum Trees	Eucalyptus sp.
Hardtack *	Cercocarpus betuloides *
Hedge Maple	Acer campestre
Hollyleaf Cherry *	Prunus ilicifolia *
Horsetail Tree	Casuarina cunninghamiana
Indian Hawthorn	Rhapiolepis indica
Italian Cypress	Cupressus sempervirens
Italian Stone Pine	Pinus pinea
Jacaranda	Jacaranda acutifolia
Japanese Boxwood	Buxus japonica
Japanese Honeysuckle	Lonicera japonica
Japanese Pagoda Tree	Sophora japonica
Jojoba *	Simmondsia chinensis *
Jujube, Chinese Date	Ziziphus jujuba
Lemon Bottlebrush	Callistemon citrinus

Lemonade Berry *	Rhus integrifolia *
Leyland Cypress	Cupressocyparis X leylandi
Melaleuca	Melaleuca spp.
Mexican Palo Verde	Parkinsonia aculeata
Mexican Pinon Pine	Pinus cembroides
Mirror Plant	Coprosma spp.
Myoporum	Myoporum parvifolium
Natal Plum	Carissa macrocarpa
New Zealand Christmas Tree	Metrosideros excelsus
Northern Red Oak	Quercus rubra
Oleander	Nerium oleander
Parney Cotoneaster	Cotoneaster lacteus
Pindo Palm	Butia capitata
Pride of Madeira	Echium fatuosum
Pt. Reyes Ceanothus *	Ceanothus gloriosus *
Purple Needlegrass *	Stipa pulchra *
Redolen Acacia	Acacia redolens
Rose Iceplant	Drosanthemum hispidum
Rose Moss	Portulaca grandiflora
Rosemary	Rosmarinus officinalis
Saltbush *	Atriplex spp. *
Sandhill Sage *	Artemisia pycnocephala *
Seashore Paspalum	Paspalum vaginatum
Silk Oak	Grevillea robusta
Skyrocket Juniper	Juniperus virginiana "Skyrocket"
Slender Hairgrass	Deschampsia elongate
Southern Flannel Bush *	Fremontia mexicana *
Southern Live Oak	Quercus virginiana
Spanish Bayonet	Yucca aloifolia
St. Augustine Grass	Stenotaphrum secundatum
Strawberry Tree	Arbutus unedo
Sugar Bush *	Rhus ovata *
Texas Ranger	Leucophyllum frutescens
Toyon *	Heteromeles arbutifolia *
Tree Mallow *	Lavatera assurgentiflora *
Tree Myrtle	Myrtus communis
Trident Maple	Acer buergerianum
Weeping Bottlebrush	Callistemon viminalis
Western Cottonwood *	Populus fremontii *
Western Redbud*	Cercis occidentalis *
White Ice Plant	Delosperma alba
Zoysia Grass	Zoysia tenuifolia
*California Native	
References:	
Abiotic Disorders of Landscape Plants: A Diagnostic Guide	
University of California, Agriculture and Natural Resources	
Costello, L. et al	
"Growing Points" Newsletter, Department of Environmental Horticulture, University of California, Davis Fall 2001, Fall/Winter 1996/1997	