

Teresa Chase, Olivenhain Municipal Water District





San Diego County's Water Supply



Who Is The Coalition?



Using a Regional Approach

- Interconnect Systems
- Decentralize Treatment
- Move Supply to Demand
- Match Water Quality to Use
- Optimize System Costs
- Maximize Use of Infrastructure



Landscape Recycled Water Rules and Regulations

Sean Peterson, Olivenhain Municipal Water District



OCTOBER 2018

Recycled Water Landscape Rules, Regulations, Inspections, and Testing

Outline of This Talk

- Rules and regulations
- Maintain the irrigation system
- Training
- Inspections
- Cross connection test



Rules and Regulations Governing the Use of Recycled Water



United States Environmental Protection Agency (US EPA)





CA State EPA – State Water Resources Control Board

CA Department of Environmental Health (DEH)

Water Purveyor



Recycled Water Use Site Rules

- 1. Notification that recycled water is in use
- 2. Protect public health by not wasting water
- 3. Maintain the irrigation system
- 4. Train and inform workers



Notify that Recycled Water Is in Use

- Signs with international symbol "RECYCLED WATER - DO NOT DRINK" "NO TOME EL AGUA" (NO BEBER)
 4 inches high by 8 inches wide
 - Located at all entrances and exits





Notify that Recycled Water Is in Use

- All facilities/appurtenances are properly color coded
 - Sprinkler heads are purple
 - Risers have warning sticker or are purple
 - Any exposed piping has a sticker every 10 feet or is purple
 - Valves and outlets have warning tags
 - Quick couplers are ACME thread with purple covers
- Underground piping on conversions do not need to be replaced
- All repairs and new piping need to be purple



Protect Public Health

- Use of recycled water shall at no time create odors, slime, deposits, become a public or private nuisance, or create a trespass of any kind
- Public areas are protected from recycled water spray, mist, or runoff
 - Drinking fountains and designated outdoor eating areas
 - Benches and sitting areas
 - Playground equipment
- Overspray, runoff, and ponding are kept to a minimum



Protect Public Health

- Irrigate during times when public is not in area
 - Allow an adequate dry-out time before the irrigated area will be used by the public
- No hose bibs on recycled water systems
- All backflow prevention assemblies remain in compliance
- No connections exist between recycled water system and any potable water system
- Use area shall be maintained to prevent the breeding of flies, mosquitoes, or other vectors





Train and Inform Workers

- Ensure that all on-site operations personnel are trained and familiarized with the use of recycled water
 - Do not drink recycled water
 - Do not wash equipment with recycled water
 - Wash with soap and drinkable water after coming into contact with recycled water
 - Do not eat, drink, smoke, or vape until you have washed your hands with soap and drinkable water



Recycled Water Site Supervisor

- Designate a recycled water supervisor who is responsible for the recycled water system at each use area
 - This individual shall be familiar with
 - Plumbing systems within the property
 - Basic concepts of backflow/cross-connection protection
 - Recycled water rules and regulations
 - Specific requirements of a recycled water system
- Recycled Water Site Supervisor Training must be approved by County DEH and Water Board





Inspection Requirements

- No broken or misadjusted heads and no leaks or breaks in irrigation system
- No overspray or misting onto unapproved use areas
- No signs of ponding, such as puddles, algae, etc.
- All sprinkler heads on the recycled water system are marked in purple
- Recycled water irrigation boxes, valve boxes, and all enclosures are purple
- Sprinkler valves are purple or tagged with "Recycle Water-Do Not Drink" tags
- Recycled water quick couplers have Acme threads with a purple locking cover
- Proper separation between potable and recycled water irrigation systems
- Color-coded laminated charts located inside each controller (for new construction)
- Available as-built plans
- Site representative has attended recycled water site supervisor course



Cross Connection Testing

- Every four years, and before any new recycled water is approved, a shutdown test is conducted
- Two parts to the test
 - Irrigation system shutdown
 - Potable system shutdown
 - Potable water will need to be shut down on the site for a minimum of four hours
 - There can be no use of the potable water during the shutdown
 - To comply with California Regional Water Quality Control Board permits and DEH programs, all buildings with threshold valves will need to be closed, no drinking, flushing, etc., which means on-site personnel will have to be a part of the shutdown test



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Cross Connection Testing

- Irrigation system shutdown
 - Irrigation system will be shutdown for 24 hours
 - Pressure gauges will be placed on the system
 - System pressure will be reduced to 25 psi
 - All control valves opened (system will run overnight)
- Potable system shutdown
 - Potable water in the area will be shutdown on the site for a minimum of four hours
 - Pressure gauges will be placed on the system
 - System pressure will be reduced to 25 psi
 - All control valves are opened for two minutes each



Cross Connection Testing

- A cross connection is suspected if there are any spikes in the pressure during test
- There can be no use of potable water during the potable shutdown
- All buildings with threshold valves will need to be closed - no drinking, flushing, etc.



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Thank You

- Recycled Water Policy
 - https://www.waterboards.ca.gov/water issues/programs/water recycling policy/

San Diego County Department of Environmental Health

https://www.sandiegocounty.gov/content/sdc/deh/lwqd/lu_recycled water.html

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Ray Martinez, Carlsbad Municipal Water District







Landscape Recycled Water Management

Mike Huck, Irrigation & Turfgrass Services



OCTOBER 2018

Recycled Water in the Landscape (It can be complicated!)

Outline of This Talk

- Perspective: Value of potable water
- Recycled water quality: What is so different about it?
- Nutrients (N-P-K) and adjusting fertility programs
- Salinity tolerance of turf & ornamental plants
- Soil management
- Leaching requirements
- Importance of irrigation uniformity
- Tools and tips



Perspective: The Value of Water



\$175 AF to \$4,500 AF



\$351,980 AF





\$410,141 AF



\$724,114 AF

Sports Event, Airport, etc. \$3.00 / 16 oz

\$7,820,424 AF



Recycled Water Quality

- Total Salts Vs Specific (toxic) Ions
- Sodium, chloride, boron, sulfate
 - Sodium as a toxic ion vs sodium as SAR & soil structure impacts

			Boron (mg/L)	Chloride (mg/L)	Fluoride (mg,	Nitrate as N (mg/L)	pH (mg/L)	Sulfate (mg/l	Total Dissolv Solids (mg/L)	Total Suspended Solids (mg/L)	Turbidity (mg/L)
California Drinking Water Standards	(MCL)		NL=1	500	2	10	NA	500	1000	NA	5
San Diego County Water Authority	Range	Min. Max.	0.13 0.14	102 110	0.5 0.9	ND 0.9	7.4 8.6	229 240	615 650	NA NA	0.01 0.09
Northern San Diego	Range	Min. Max.	0.3 0.5	180 410	0.2 1.0	22 49	6.58 7.9	87 320	600 1236	0.1 4.4	0.12 5.0
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NORTH SAN DIEGO

Salt Tolerance

Cool Season & <u>Warm Season</u> Turfgrasses (Values Based on Soil Salinity)

Sensitive <3 dS/m	Moderately Sensitive 3 – 6 dS/m	Moderately Tolerant 6 – 10 dS/m	Tolerant >10 dS/m	
Annual Bluegrass*	Annual Ryegrass*	Seaside Bentgrass	Alkaligrass	
Colonial Bentgrass*	Chewings Fescue	Perennial Ryegrass*	<u>Bermudagrass</u>	
Kentucky Bluegrass	Creeping Bentgrass	Tall Fescue	Seashore Paspalum	
Rough Stalk Bluegrass*	Hard Fescue	Buffalograss	St. Augustine	
Centipedegrass	<u>Bahiagrass</u>	<u>Kikuyugrass</u>		
		Zoysiagrass		
				NORTH SAN DIEC WATER REUS

*Species most susceptible to rapid blight disease (Labyrinthula terestris) caused by high soil salt and sodium concentrations

Salt Tolerance

A FEW EXAMPLES—ORNAMENTAL SHRUBS, TREES, GROUNDCOVER (Values Based on Soil Salinity)

Sensitive ECe <2 dS/m	Moderately Sensitive	Moderately Tolerant	Tolerant ECe >10 dS/m
Star Jasmine	Yellow sage	Weeping bottlebrush	Brush cherry
Pyrenees Cotoneaster	Orchid tree	Oleander	Evergreen pear
Oregon grape	Southern magnolia	European fan palm	White iceplant
Photinia	Japanese boxwood	Blue drecaena	Purple iceplant
Tulip tree	Xylosma	Rosemary	Croceum iceplant
Crape Myrtle	Cherry Plum	Aleppo pine	Bougainvillea
		Sweet gum	

NORTH SAN DIEGO

Salt tolerance can vary between varieties of the same genus and species

Salt Damage Symptoms

- Total Salts or Specific Ion?
 - Chloride, Sodium, Boron
- Other "Look Alike" Problems
 - High Light Exposure (Shade Plants)
 - Herbicide Injury / Toxicity
 - Water Deficit / Excess
 - Nutrient Deficiencies
 - Air Pollution
 - Disease



Nutrients N-P-K

Brochure, bottom of Page 3 – based on 1" of applied irrigation

Recycled water contains some of the same elements as your basic lawn fertilizer. Recycled water will contribute approximately 10% of your fertilizer requirements.

- Nitrogen helps promote overall grass shoot growth and color
- P Phosphorus (phosphate) helps promote strong root growth
- K Potassium (potash) helps grass withstand stress from drought or disease

Basic recommendation for turf grass application of nitrogen per the US Department of Agriculture (USDA) and the Institute of Food and Agriculture Sciences (IFAS) (AE479) is 0.5 to 1.0 lbs in spring and 1.5 to 2.5 lbs in fall per 1,000 square feet (sft 2.0 to 3.5 lbs per year. For every 1,000 sf of lawn, 623 gallons of water is needed to provide 1-inch of coverage.

		Nitrogen	Phosphorus	Potassium
Standard Fortilizer Application for Turf Crassi	Ratio	20	10	20
Standard Fertilizer Application for Turr Grass*	lbs/1,000 sf	1.0	0.11	1.0
	mg/L	26	0.72 ²	0.06 ²
Recycled Water Contribution per Application	lbs/1,000 sf	0.14	0.004	0.06
		10%	0.004 3%	11%

Note: Supplemental fertilization may still be required.



- Avg fertilizer application for turf = 4 lbs. per 1,000 sq. ft. per year
- CIMIS #153 Escondido: 53.65" Annual Eto
 - 7.62 lbs. per 1000 sq. ft. Nitrogen
 - 0.02 lbs. per 1000 sq. ft. Phosphorus
 - 0.21 lbs. per 1000 sq. ft. Potassium



CIMIS #153 Escondido Recycled H2O Fertilizer Contribution per 1000 Sq. Ft. 100% ETO





Irrigation Uniformity, Efficiency & Leaching



Poor Efficiency with Good vs Poor Uniformity



Highest salt concentrations are at the leading edge of the wetting front

Tools and Tips

- Field EC (Electrical Conductivity) Meter
- Low Precipitation Rate Micro Sprinklers/ Soaker Hoses
- Tips
 - Maintain/improve surface and internal soil drainage
 - Improve irrigation distribution uniformity
 - Replace problem plants with salt tolerant species
 - Monitor soil EC to be certain you are leaching salts



ATER REUSE





Thank You

References

- Salinity Management Guide <u>http://www.salinitymanagement.org/</u>
- Abiotic Disorders of Landscape Plants A Diagnostic Guide UC ANR Pub# 3420 <u>https://anrcatalog.ucanr.edu/Details.aspx?itemN</u> o=3420



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Questions?

Thank You for Being Here!

