

TOOLS TO TRANSITION LANDSCAPES: PRINCIPLES OF WATER ASSESSMENTS



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TACOMA WATER
TACOMA PUBLIC UTILITIES

OBJECTIVES

MAXIMIZE WATER USE, MINIMIZE WASTE

- AUDITING THE PERFORMANCE OF AN EXISTING IRRIGATION SYSTEM
- HOW TO IDENTIFY AND MANAGE HYDROZONES
- HOW TO MANAGE IRRIGATION TO PREVENT RUNOFF
- EVALUATE WATER CONSERVATION EQUIPMENT FEATURES
- SEASONAL IRRIGATION STARTUP AND SHUTDOWN

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MAXIMIZE WATER USE, MINIMIZE WASTE

DEFINITION OF AN IRRIGATION AUDIT

“PROCEDURE TO COLLECT AND PRESENT INFORMATION CONCERNING THE UNIFORMITY OF APPLICATION, PRECIPITATION RATE, AND GENERAL CONDITION OF AN IRRIGATION SYSTEM AND ITS COMPONENTS.”

IRRIGATION ASSOCIATION

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MAXIMIZE WATER USE, MINIMIZE WASTE

- IMPORTANT TO UNDERSTAND
- SOILS – TEXTURE, INFILTRATION RATES, FIELD CAPACITY
- PLANTS – WATER NEEDS, SUN REQUIREMENT, SOIL REQUIREMENT
- HYDROZONES – MICROCLIMATES, SLOPE, PLANT WATER NEEDS, IRRIGATION STATIONS
- IRRIGATION CONTROLLERS – WATER BUDGET FEATURE, PROGRAMS, RAIN SENSORS, MULTIPLE RUNTIMES, SMART CONTROLLERS, RUNTIMES
- WASTING WATER – BROKEN/MODIFIED EQUIPMENT, PRESSURE, MULCH, BLOCKED SPRAY, LEAKS, AND MUCH, MUCH MORE!

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MAXIMIZE WATER USE, MINIMIZE WASTE

GENERAL AUDIT STEPS

1. BEFORE YOU GO – KNOW WATER SUPPLY, WATER CONSUMPTION INFO, FIX OBVIOUS ISSUES IF POSSIBLE
2. WHO TO INVITE – CUSTOMER, PROPERTY MANAGER, WATER PURVEYOR
3. BEGIN WITH THE METER AND BACKFLOW
4. EVALUATE SOILS AND TURF ROOT DEPTH
5. CHECK THE IRRIGATION CONTROLLER SETTINGS
6. TURN ON IRRIGATION SYSTEM STATION BY STATION (ZONE BY ZONE)
7. PROVIDE SUGGESTIONS BEFORE YOU LEAVE

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WATER METER



- CHECK FOR LEAKS
- DETERMINE RATE OF STATION WATER USE

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BACKFLOW PREVENTION DEVICE



- CHECK FOR LEAKS
- DETERMINE STATIC PRESSURE AT THE LAST TEST COCK

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PRESSURE REDUCER



- CHECK FOR LEAKS
- KNOW WHERE IT'S LOCATED

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SOIL – TEXTURE AND ROOT DEPTH

DETERMINE SOIL TEXTURE

- Ribbon method



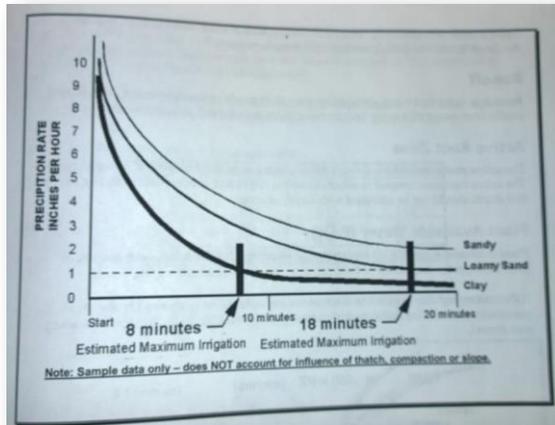
- DETERMINE ROOT DEPTH
- DEEPER ROOTS = HEALTHY PLANTS; WATER LESS



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SOIL – INFILTRATION RATE



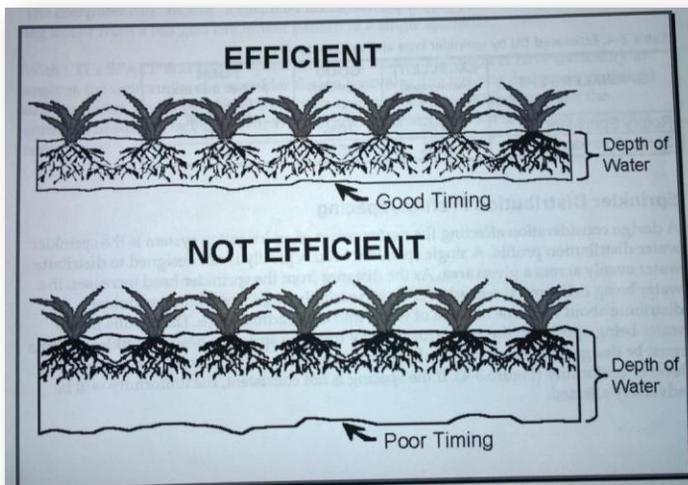
Taken from Certified Landscape Irrigation Auditor, Irrigation Association, 2004, pg. 69

COMPARE INFILTRATION RATE, PRECIPITATION RATE, AND STATION RUNTIMES

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SOIL – ROOT DEPTH AND RUNTIMES



Taken from "Certified Landscape Irrigation Auditor", Irrigation Association, 2004, pg.51

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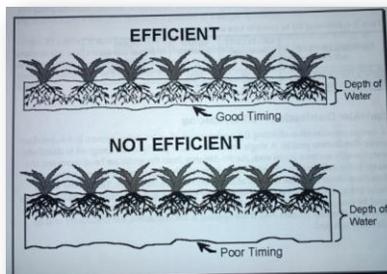


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REGARDING ROOT DEPTH

MAKING ROOTS GROW DEEPER

- PROPER NUTRIENTS (NPK – ESPECIALLY P)
- INFREQUENT IRRIGATION
- TURF – HIGH MOWING HEIGHT; SPECIES (TALL FESCUE)
- SUNLIGHT



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STANDARD IRRIGATION CONTROLLER

Water Budget - 100% Per Program

Time and Calendar

Start Times Per Program

Rain Sensor - Where is it?

Station Runtimes Per Program

Days of Operation Per Program

Programs A, B, C, and D

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WEATHER-BASED IRRIGATION CONTROLLER

- DATA DELIVERY METHODS**
- ONSITE WEATHER STATION
 - UPDATES THROUGH INTERNET
 - INTERNAL SOURCE - ZIP CODE
 - SOIL SENSOR



WEATHER-BASED IRRIGATION CONTROLLER



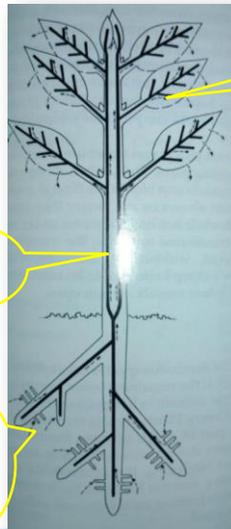
More Or Less
 - Make Minor Adjustments For Other Factors
 - Soil Type - Infiltration Rates
 - Low, Moderate, High Water Need Rates

OTHER FACTORS
 SLOPE
 SUN EXPOSURE

Standard Irrigation Functions



PLANTS, SOIL, WATER RELATIONSHIP



Xylem - carries water

Transpiration through open stomata

Root pressure pushes water up the plant

WHAT IF...
 SOIL WAS SATURATED?
 CLAY SOILS?
 SANDY SOILS?

Taken from "Botany for Gardeners"; Capon, Brian; 1990, pg. 143.



ZONE BY ZONE EVALUATION

SPRINKLER HEAD UNIFORMITY - HEAD-TO-HEAD COVERAGE



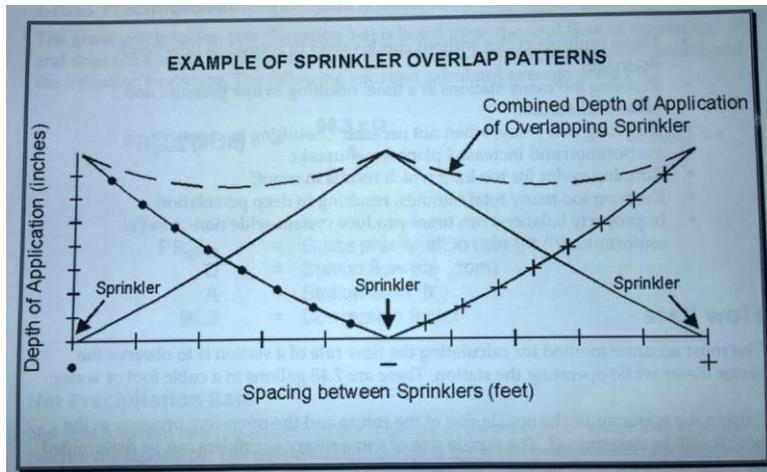
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ZONE BY ZONE EVALUATION

SPRINKLER HEAD UNIFORMITY - HEAD-TO-HEAD COVERAGE



Taken from "Certified Landscape Irrigation Auditor", Irrigation Association, 2004, pg. 55

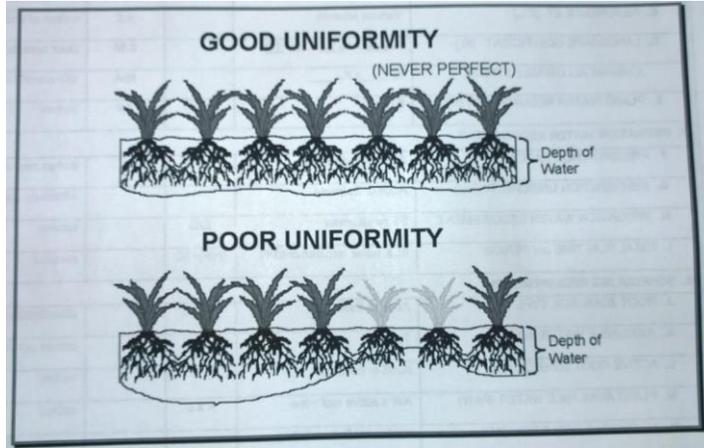
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ZONE BY ZONE EVALUATION

SPRINKLER HEAD UNIFORMITY - HEAD-TO-HEAD COVERAGE



Taken from "Certified Landscape Irrigation Auditor", Irrigation Association, 2004, pg. 50

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ZONE BY ZONE EVALUATION

BROKEN PIPES (BUBBLES IN THE GRASS), HEADS, AND NOZZLES



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ZONE BY ZONE EVALUATION

MISDIRECTED SPRAYS, OVERSPRAY, AND TILTED HEADS



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ZONE BY ZONE EVALUATION

BLOCKED SPRAY DUE TO GROWING VEGETATION OR SUNKEN HEADS



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ZONE BY ZONE EVALUATION

OTHER FACTORS TO WATCH FOR

LOW PRESSURE

HIGH PRESSURE (MISTING)

• psi: 30, 45, 60

LOW HEAD DRAINAGE

RUNOFF – CHANGE RUNTIMES;
MULTIPLE RUNTIMES

DRIP - BROKEN LINES, MISSING
EMITTERS, NO PRESSURE
REGULATION, OVERSIZED
VALVES

SATURATED LANDSCAPE AREAS
IS IRRIGATION NECESSARY

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ZONE BY ZONE EVALUATION

HYDROZONING

DEFINITION – PLANTS WITHIN AN
IRRIGATION ZONE HAVE THE
SAME WATER REQUIREMENTS
AND ENVIRONMENT

MICROCLIMATES – EXPOSURE, SOIL
TYPE, ASPECT, BUILDINGS, WIND,
MATCHED PRECIPITATION RATES

BENEFITS – APPROPRIATE AMOUNT
OF WATER USED, HEALTHY
PLANTS, LESS WASTE

CHALLENGES – COST

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ZONE BY ZONE EVALUATION

MULCH

LESS THAN 2 INCH
LAYER OF MULCH
CAN STILL ALLOW
WEEDS TO GROW

ADDS ORGANIC MATTER
REDUCES WATER LOSS
DUE TO EVAPORATION
BY 33% (RESEARCH
REFERENCED BY DR.
BERT CREGG –
MICHIGAN STATE
UNIVERSITY)



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WHEN ALL IS SAID AND DONE...

AFTER THE ZONE BY ZONE EVALUATION

SHARE PRIORITIZED
SUGGESTIONS WITH THE
PROPERTY
OWNER/MANAGER

MAKE CHANGES TO THE
IRRIGATION SCHEDULE

- www.iwms.org – Irrigation Water Management Society
- www.irrigation.org - Irrigation Association

WHEN IN DOUBT – 2 MINUTE
RULE

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SEASONAL STARTUP AND SHUTDOWN *SEE HANDOUT*

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QUESTIONS?

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