This presentation premiered at WaterSmart Innovations

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Irrigation Water Use and Soil Relations from Five Clark County School District Playfields in Las Vegas, Nevada

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Irrigation Water Use

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Tune the System

- Fix leaks, broken heads, mismatched heads, adjust pressure

Mismatched Heads

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Pressure too high - Misting

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Pressure too low – Poor Coverage

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Broken Head

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Measure Irrigation System Effectiveness

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Catch Cup Placement

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Catch Cup Measurements

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Distribution Uniformity (DU)

- An efficiency rating from 0-100% that describes how evenly or uniformly irrigation water is distributed about the zone.
- Minimum DU's:
  - spray 60%
  - rotors 70%

Bermuda Grass Water Requirements for Las Vegas

- Bermuda grass in Las Vegas requires 29 gallons per square foot per year.
- Our schools provided 28 to 58 gallons of water per square foot per year.

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Turf Performance Ratings

- For each school
  - Three locations per playfield
  - Vitality growth rating
    - Qualitative thickness/density, height of turf

Turf Performance

School	Gallons (per Sq/Ft)	Rating
Dooley	26	Fair
Galloway	37	Good
Findlay	56	Good
Greenspun	46	Fair
Eldorado	27	Good

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Interpretation

- Gallons used did not seem to determine turf performance.
- What does determine turf performance?

Soil Relations

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TOPSOIL QUALITY GUIDELINES for LANDSCAPING*

Category	pH	Soluble Salts dS/m or mmho/cm	Sodium Absorption Ratio (SAR)	Organic Matter %	Sand %	Silt %	Clay %	Texture Class
Ideal	5.5-7.5	<2	<3	≥2.0	<70	<70	<30	Loam (L), Silt Loam (SiL)
Acceptable	5.0-8.2	<4	3 to 7 SiL, SiCL, CL 3 to 10 SCL, SL, L	≥1.0	<70	<70	<30	Sandy Clay Loam (SCL) Sandy Loam (SL) Clay Loam (CL) Silty Clay Loam (SiCL)
Suspect	<5.0 >8.2	>4	>10	<1.0	≥70	≥70	≥30	Loamy Sand (LS) Sandy Clay (SC) Silty Clay (SiC) Sand (S), Silt (Si), Clay

*from "Topsoil Quality Guidelines for Landscaping", June 2002, AG/SO-02, prepared by Rich Koenig, Utah State University Cooperative Extension Soil Specialist, and Cable Jones, Von Isaman, QA Consulting and Testing, LLC.

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Topsoil Results for Las Vegas Schools

Sample Name	pH	Soluble Salts dS/m	Sodium Adsorption Ratio (SAR)	Texture Class (soil type)
Dooley	7.9	1.7	5.5	SiL
Galloway	7.5	1.0	3.9	L-f SL
Findlay	7.8	0.8	3.6	f SL
Greenspun	8.2	0.6	2.5	f SL
Eldorado	7.9	3.0	3.0	f SL-SiCL
Ideal	5.5-7.5	<2	<3	L, SiL
Acceptable	5.0-8.2	<4	3 to 7 SiL, SiCL, CL 3 to 10 SCL, SL, L	SCL, SL, CL, SiCL
Suspect	<5.0 >8.2	>4	>10	LS, SC, SiC, S, Si, C

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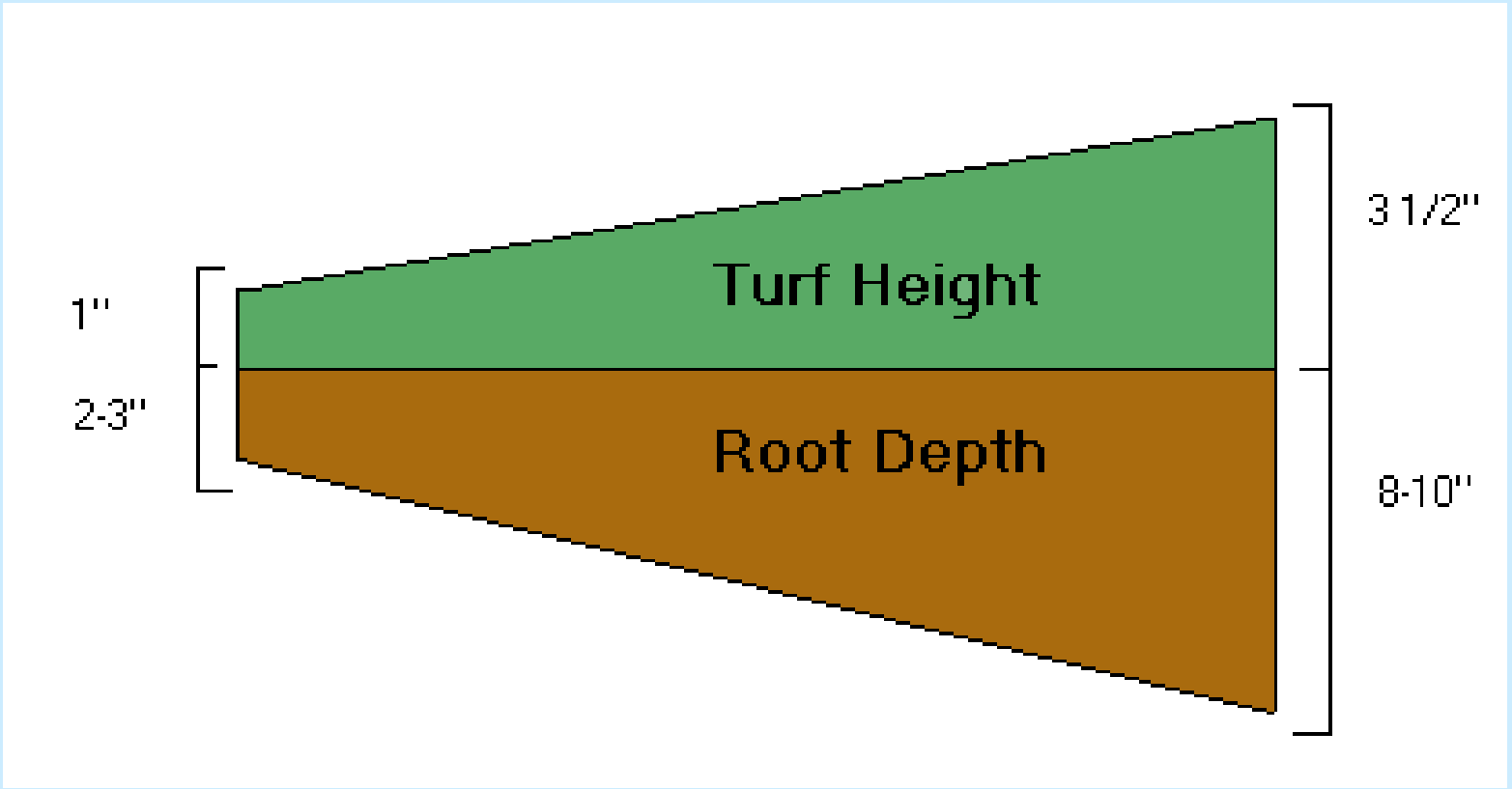
Caveat

- Soil fertility was not examined, but soluble salts can be an indicator of soil fertility. For our schools, soluble salt data was mixed.

Observation

- Turf performance was not related to irrigation amount (gal per sq/ft), soil chemical (pH, salts) or physical (texture) properties.

Turf Height/Root Depth



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Sandy Loam vs. Clay Loam

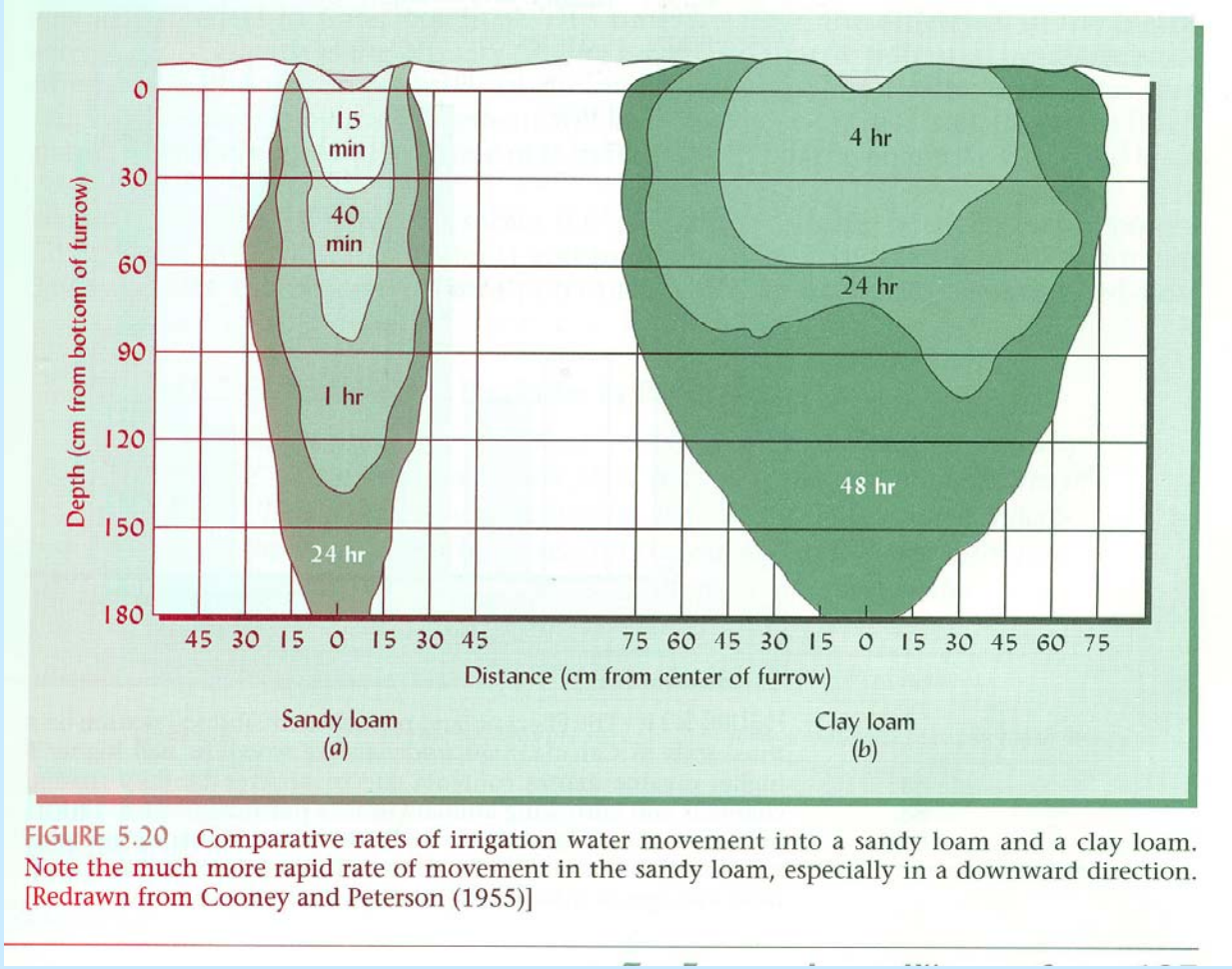

FIGURE 5.20 Comparative rates of irrigation water movement into a sandy loam and a clay loam. Note the much more rapid rate of movement in the sandy loam, especially in a downward direction. [Redrawn from Cooney and Peterson (1955)]

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Turf Root/Soil Characteristics

Sample Name	Excavate Depth (inch)	Root Depth (inch)	Probe Depth (inch)	Hard Pan Depth (inch)	Perc. Rate (in/hr)
Dooley	**4.5-8**	**4**-6	**3-4**	**4.5-8**	**>6-9.5**
Galloway	**7-8**	7	**8**	**7-8**	3.9-**8.2**
Findlay	**7.5**-10	**5.5**-8.5	**6**-19	**7.5**-10	5.5-**14.2**
Greenspun	**4**-10	**3.5**-6.5	**4-5**	**4**-10	3.7-**10.9**
Eldorado	10-11.5	**5**-7.75	37	none	2.9-**11.6**
Ideal	---	>8	---	---	2-3
Acceptable	≥10	6-8	≥10	≥10	3.1-6
Suspect	**<10**	**<6**	**<10**	**<10**	<2 **>6**

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Possible Reasons

- Variability of turf performance
  - Irrigation scheduling time
    - Manual vs. Maxicom
    - Winter turn-off
    - Water management control (Other vs. School District)
    - Catch cups vs. programmed precipitation rate

Possible Reasons cont.

- Landscape installation (year school built, time of year, seeding methods, etc.)
- Maintenance after installation, especially rotor head status (tilted, too low, no rotation)

Dooley

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Dooley (26 gal/sq ft, fair)

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Dooley (26 gal/sq ft, fair)

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Galloway

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Galloway (37 gal/sq ft, good)

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Galloway (37 gal/sq ft, good)

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Findlay

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Findlay (56 gal/sq ft, good)

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Findlay (56 gal/sq ft, good)

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Findlay (56 gal/sq ft, good)

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Greenspun

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Greenspun (46 gal/sq ft, fair)

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Greenspun (46 gal/sq ft, fair)

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Eldorado

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Eldorado (27 gal/sq ft, good)

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Eldorado (27 gal/sq ft, good)

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Where are we now?

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