Make the Most of Your Water
by
Making the Most of Your Soil

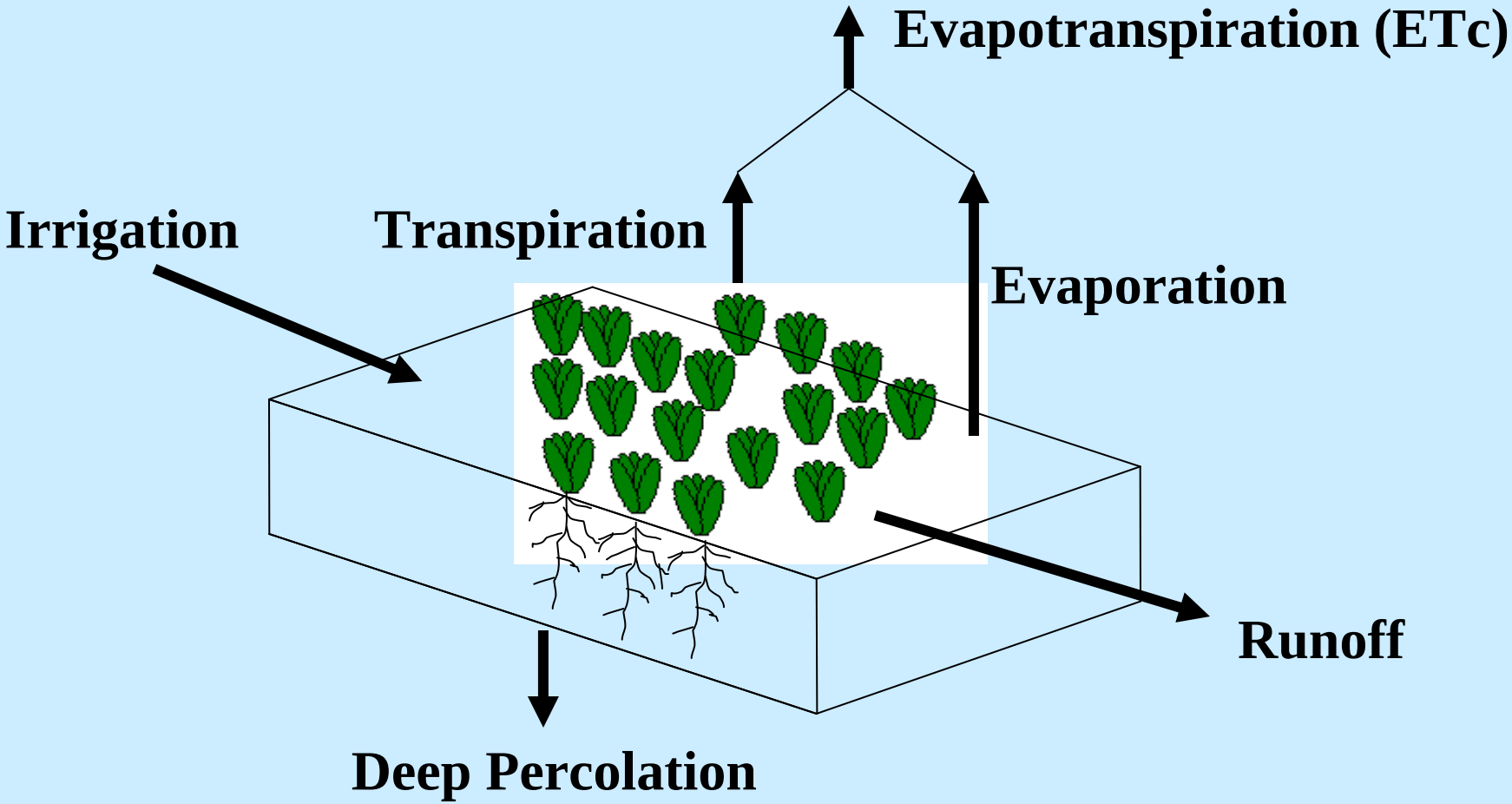
Irrigation Management Based on Your Soil

What you need to know about your soil.

How to Get data for your soil.

Calculate how much water to apply.

Irrigation Water Destinations



Soil Is Like An Irrigation Pond

Minimize Losses To:

Evaporation

Tail-water

Perched Water Table on restrictive layer

Deep Percolation

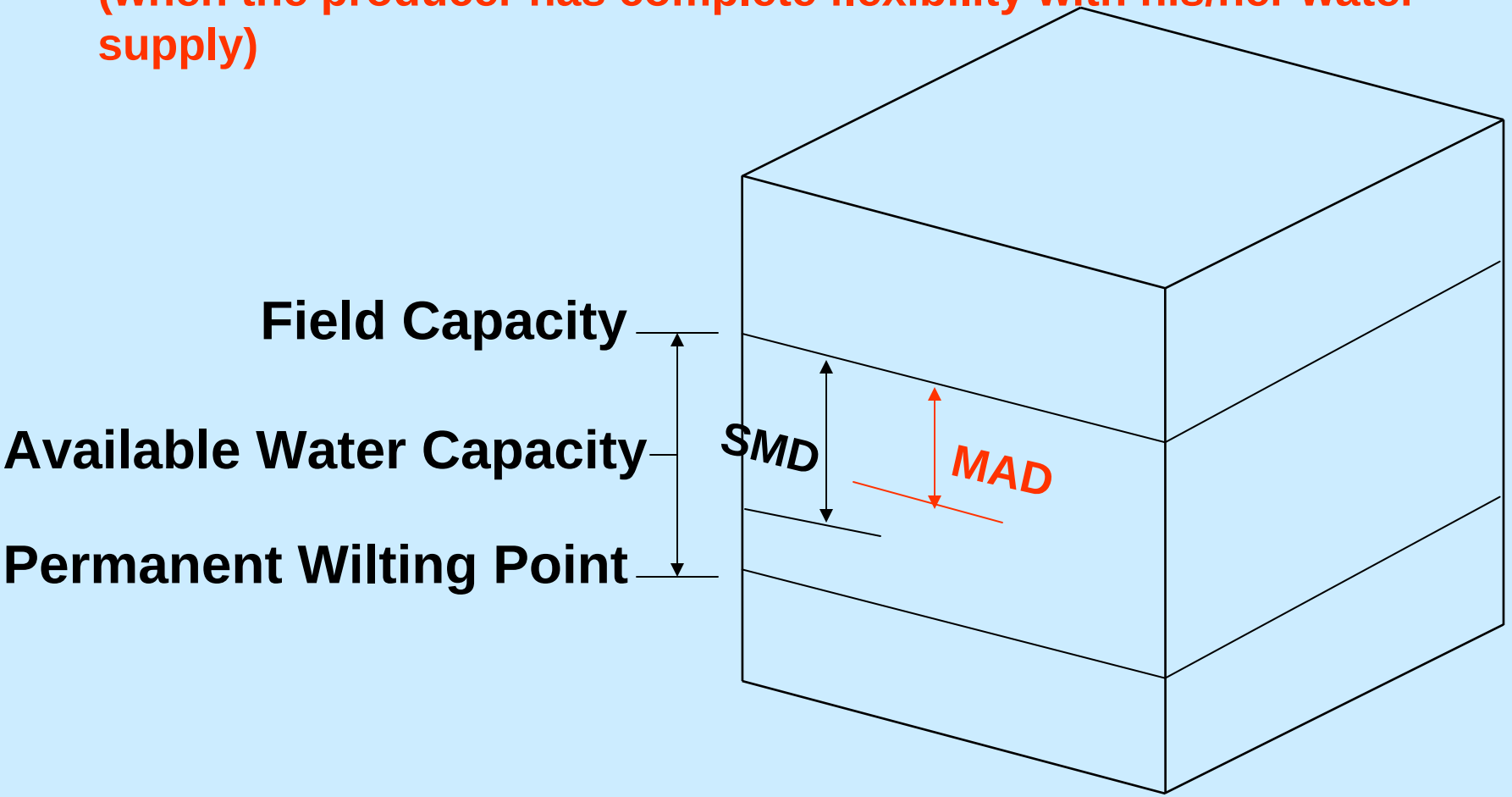
You need to know:

Rooting Depth
Infiltration Rate
Available Water Holding Capacity
Soil Moisture Depletion
Management Allowed Depletion

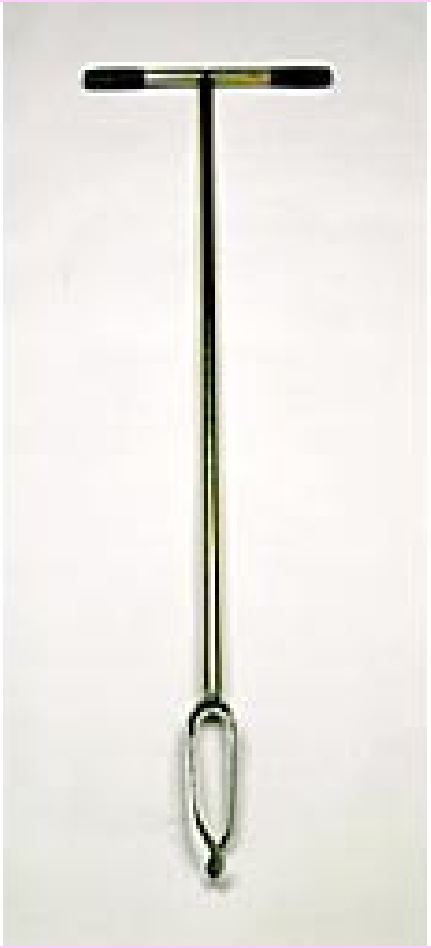
Soil Moisture Depletion

Management Allowed Depletion

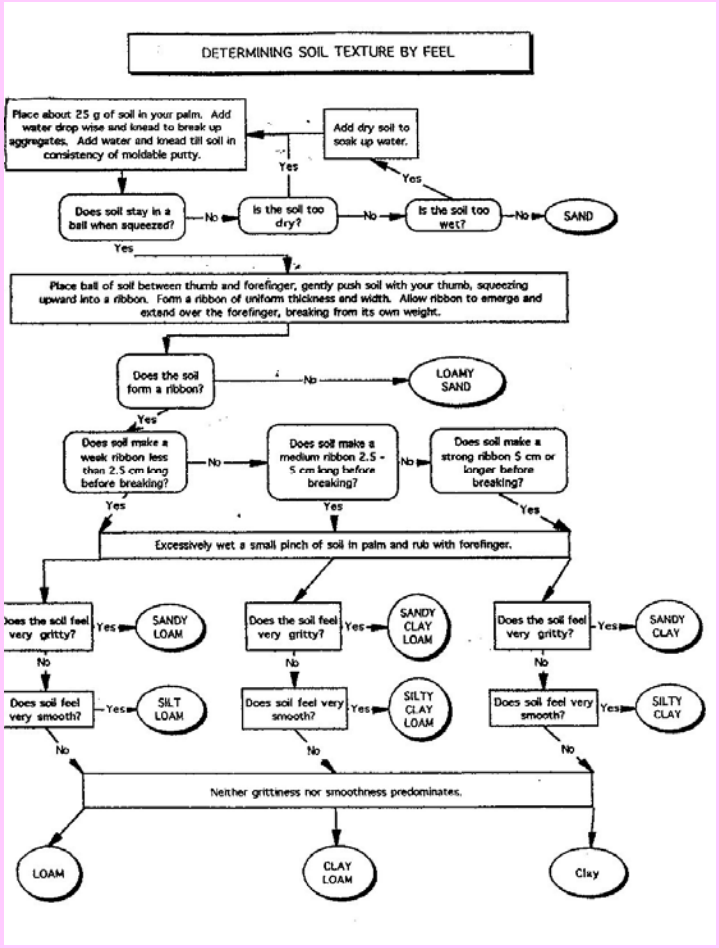
(when the producer has complete flexibility with his/her water supply)



Get It Yourself



Soil Texture By Feel

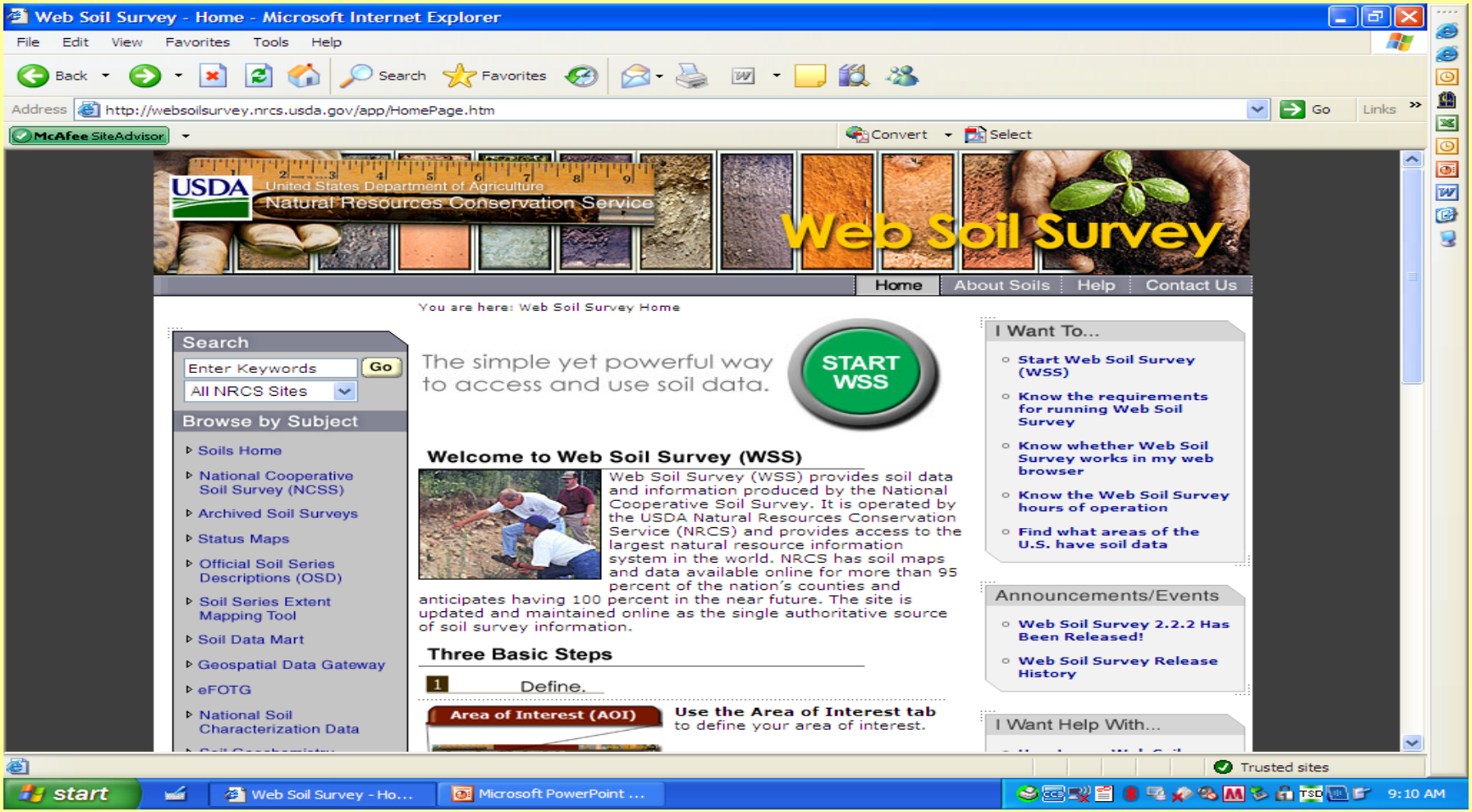


Get It On-line
Web Soil Survey

http://websoilsurvey.nrcs.usda.gov

http://websoilsurvey.nrcs.usda.gov

Home Page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Soil Data Mart
Geospatial Data Gateway
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National Soil Characterization Data
The simple yet powerful way to access and use soil data.
START WSS
Welcome to Web Soil Survey (WSS)
Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.
Three Basic Steps
1 Define.
Area of Interest (AOI)
Use the Area of Interest tab to define your area of interest.
I Want To...
Start Web Soil Survey (WSS)
Know the requirements for running Web Soil Survey
Know whether Web Soil Survey works in my web browser
Know the Web Soil Survey hours of operation
Find what areas of the U.S. have soil data
Announcements/Events
Web Soil Survey 2.2.2 Has Been Released!
Web Soil Survey Release History
I Want Help With...
Trusted sites
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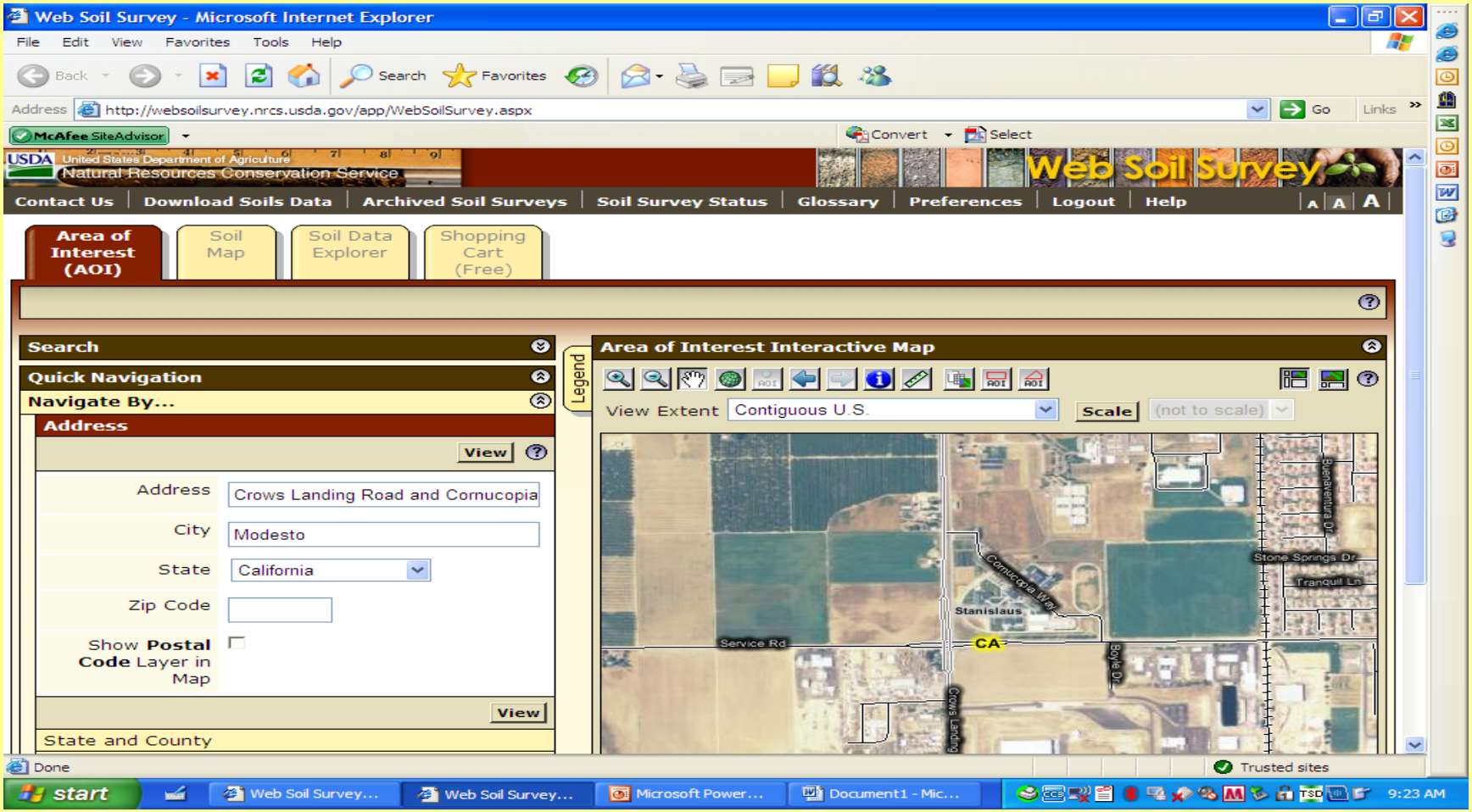
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Crows Landing Road and Cornucopia
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Show Postal Code Layer in Map
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Area of Interest Interactive Map
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Service Rd
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Stone Springs Dr
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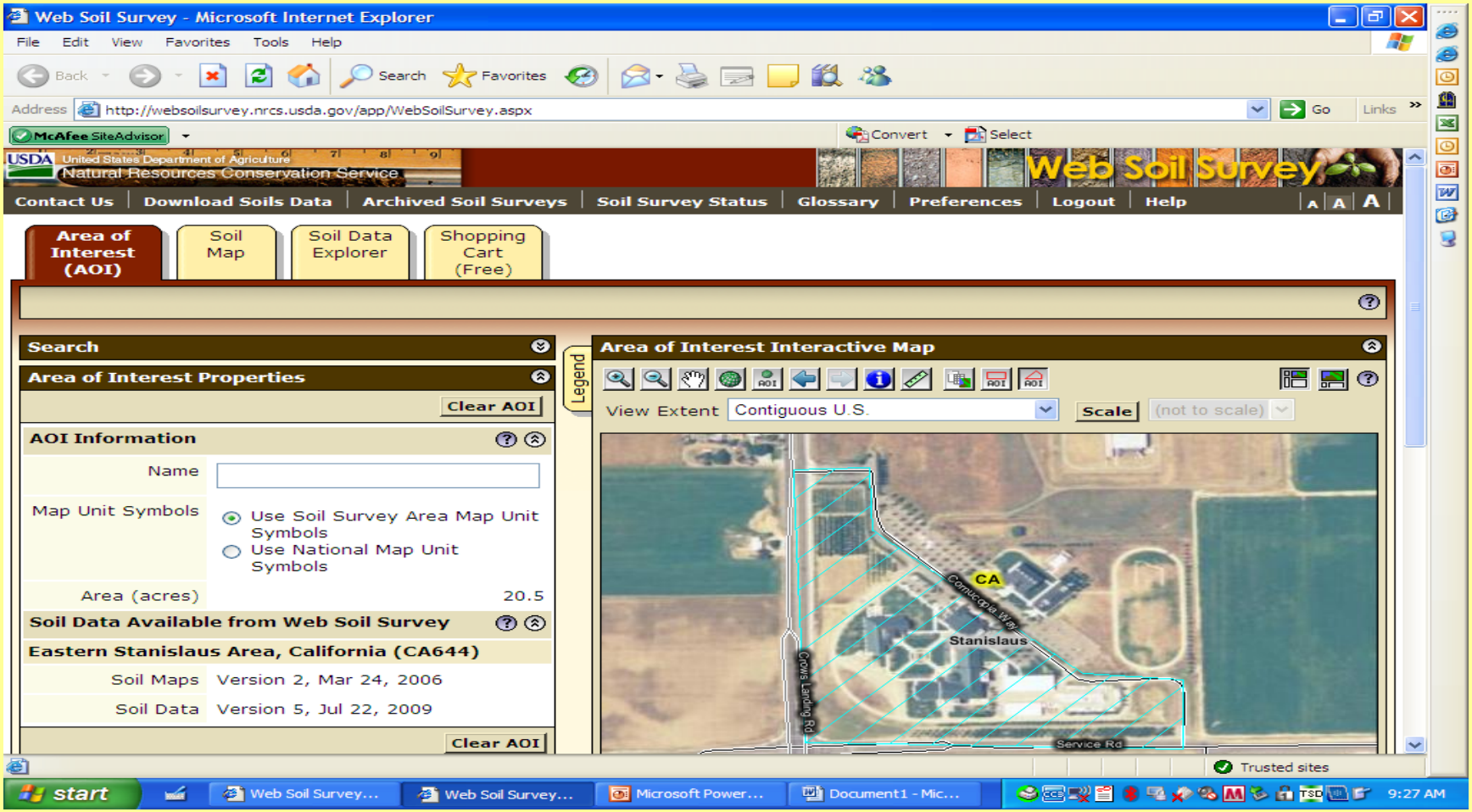
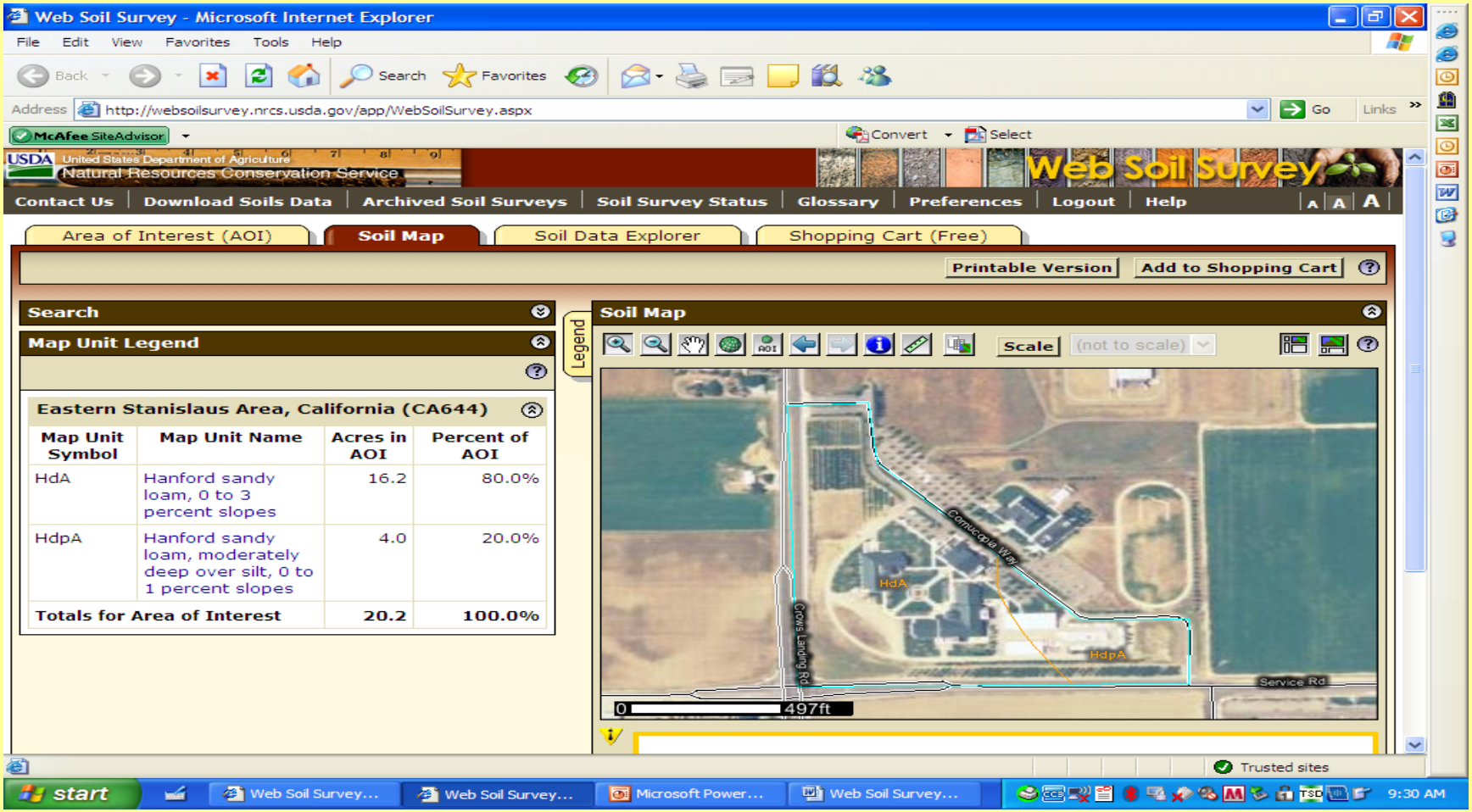
Area of Interest (AOI)



Soil Map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Area of Interest (AOI) | Soil Map | Soil Data Explorer | Shopping Cart (Free)
Printable Version | Add to Shopping Cart
Search
Map Unit Legend
Eastern Stanislaus Area, California (CA644)
Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI
HdA | Hanford sandy loam, 0 to 3 percent slopes | 16.2 | 80.0%
HdpA | Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes | 4.0 | 20.0%
Totals for Area of Interest | 20.2 | 100.0%
Legend
Soil Map
Scale (not to scale)
HdA
HdpA
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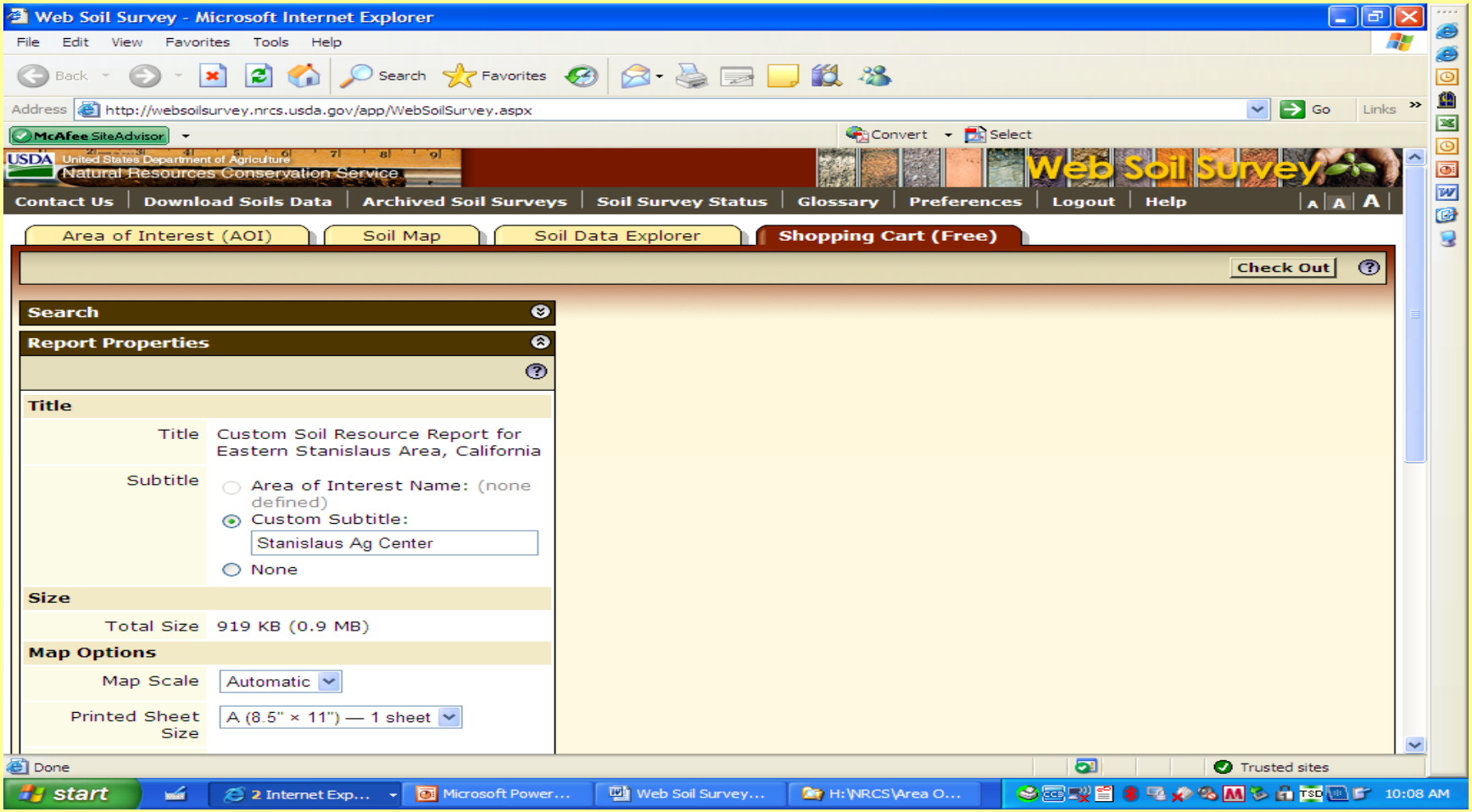
Report — Physical Soil Properties

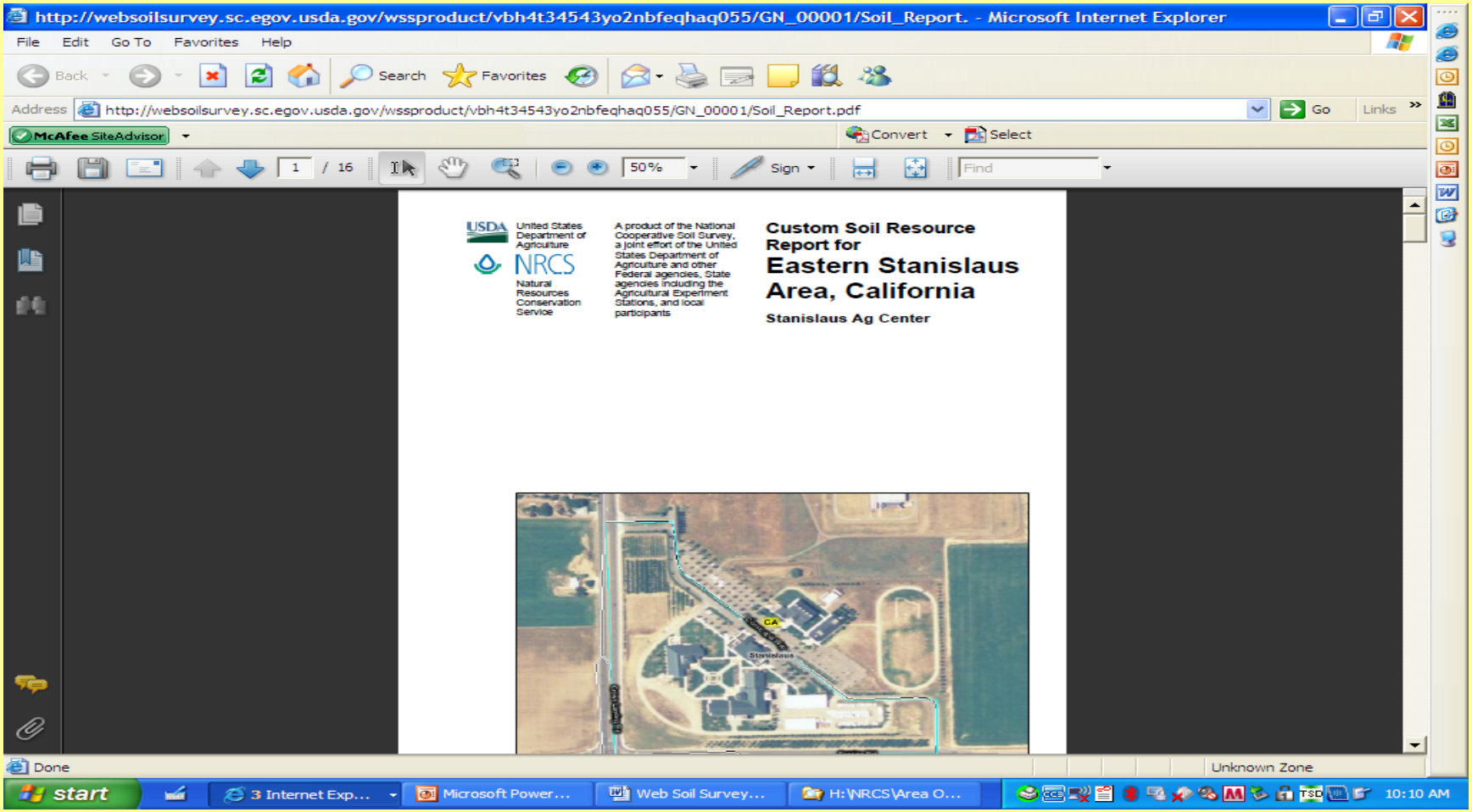
Eastern Stanislaus Area, California

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*
HdA—Hanford sandy loam, 0 to 3 percent slopes									
Hanford	0-12	-68-	-20-	7-13-18	1.50-1.60	14.00-42.00	0.11-0.13	0.0-2.9	0.5-1.0
	12-60	-68-	-20-	7-13-18	1.50-1.60	14.00-42.00	0.12-0.15	0.0-2.9	0.0-0.5
HdpA—Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes									
Hanford	0-12	-68-	-20-	7-13-18	1.50-1.60	14.00-42.00	0.11-0.13	0.0-2.9	0.5-1.0
	12-36	-68-	-20-	7-13-18	1.50-1.60	14.00-42.00	0.12-0.15	0.0-2.9	0.0-0.5
	36-60	-21-	-55-	20-25-30	1.45-1.55	1.40-4.00	0.15-0.18	0.0-2.9	0.0-0.5

Shopping Cart

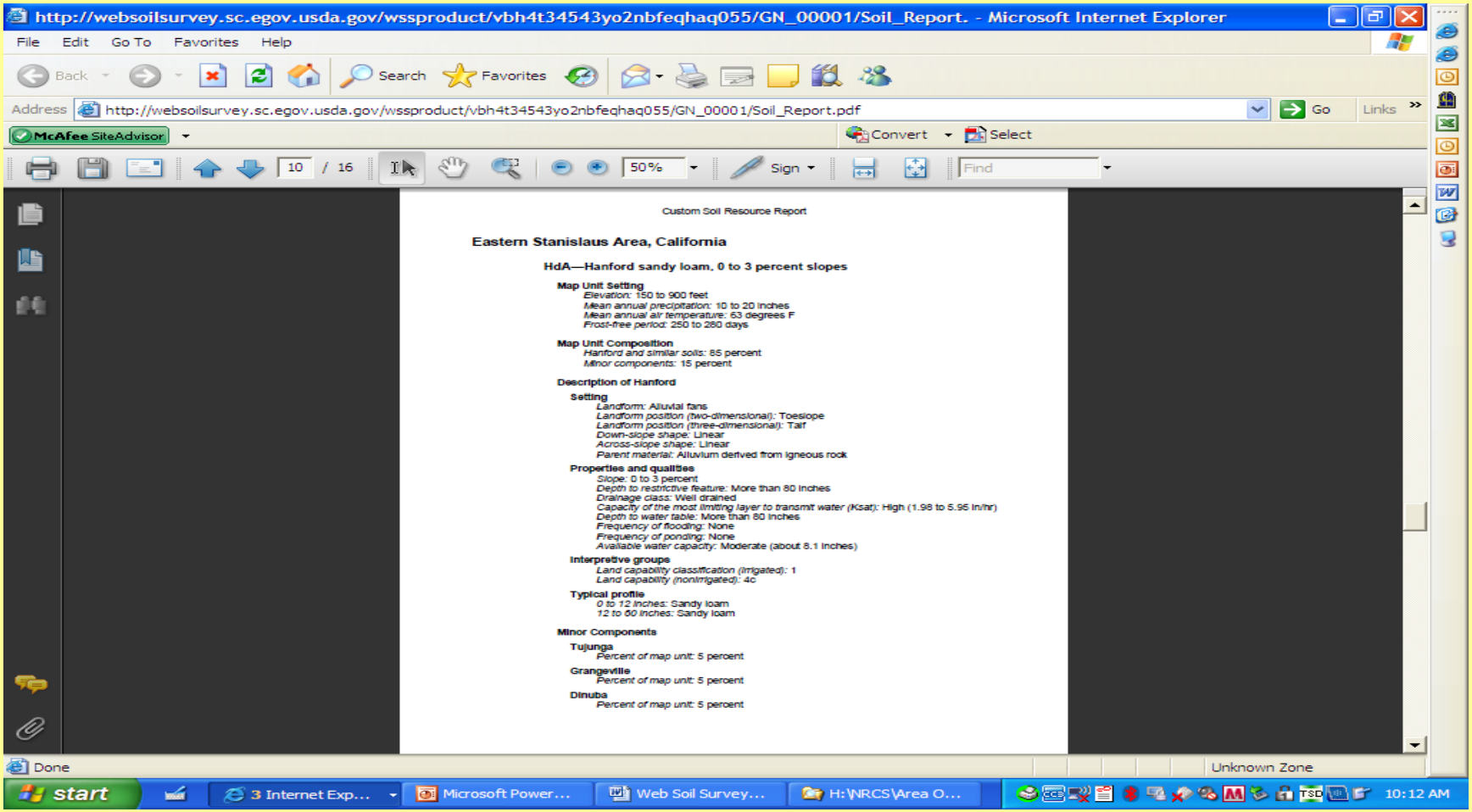


Custom Report: Cover

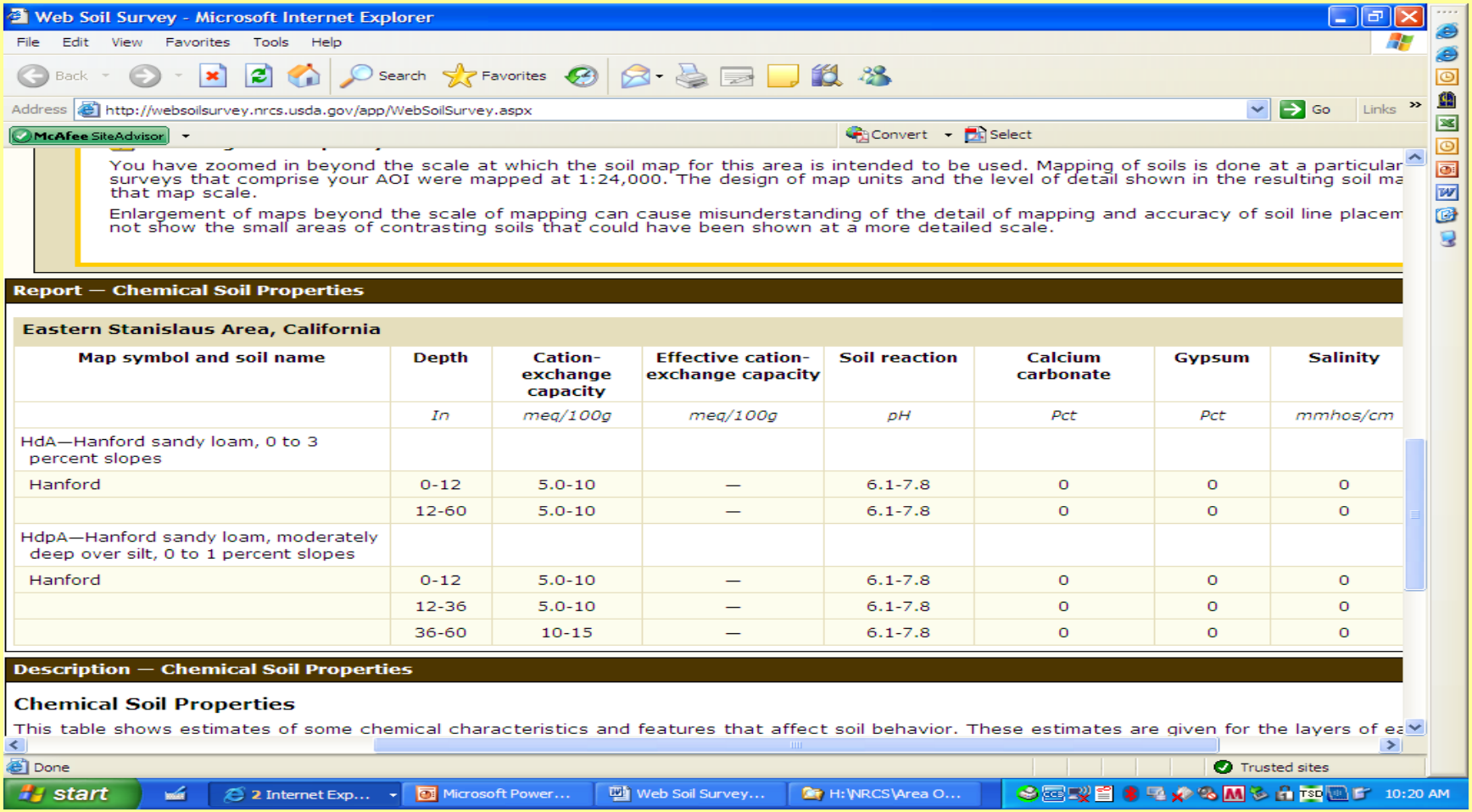


Custom Report: Soil Map

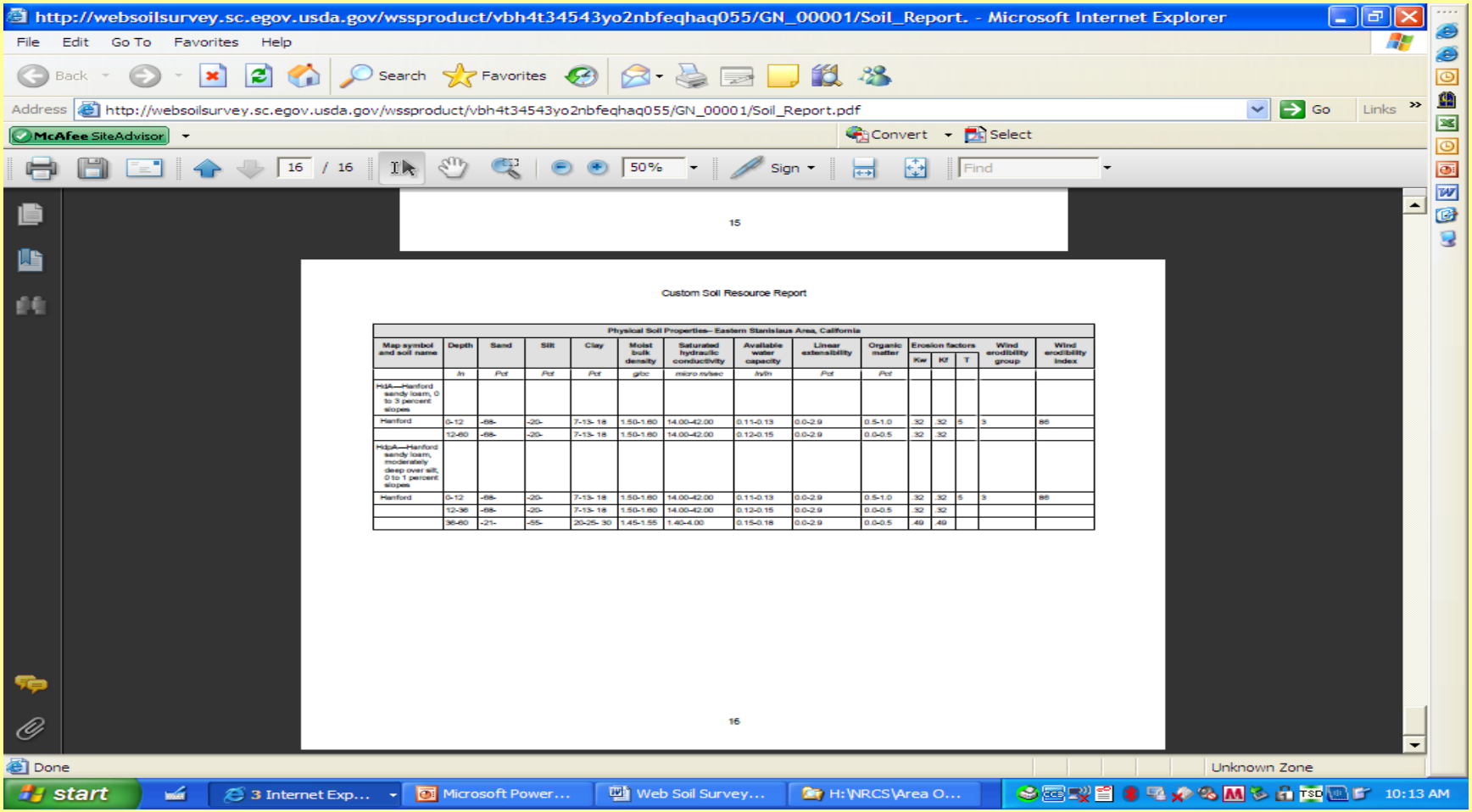
Custom Report:
Map Unit Description



Custom Report:
Soil Chemical Properties w/ Salinity



Custom Report:
Physical Soil Properties Table



Get Soil Moisture by Feel and Appearance

Appearance of fine sand and loamy fine sand soils at various soil moisture conditions.

Available Water Capacity
0.6-1.2 inches/foot

Percent Available: Currently available soil moisture as a percent of available water capacity.

In/ft. Depleted: Inches of water currently needed to refill a foot of soil to field capacity.

0-25 percent available
1.2-0.5 in./ft. depleted

Dry, loose, will hold together if not disturbed, loose sand grains on fingers with applied pressure. (Not pictured)

25-50 percent available
0.9-0.3 in./ft. depleted

Slightly moist, forms a very weak ball with well-defined finger mark

50-75 percent available
0.6-0.2 in./ft. depleted

Moist, forms a weak ball with loose and aggregated sand grains on fingers, darkened color, moderate water staining on fingers, will not ribbon.

75-100 percent available
0.3-0.0 in./ft. depleted

Wet, forms a weak ball, loose and aggregated sand grains remain on fingers, darkened color, heavy water staining on fingers, will not ribbon

Field Form for Soil Data

Sample Depth (inches)	Layer Thickness (feet)	Texture Name	Salinity (dS/m)	Available Water Holding Capacity (AWC) (inches/foot)	Cumulative AWC (feet)	Soil Moisture Deficit (SMD) (inches/foot)	Cumulative SMD (feet)
6	1						
12	1						
30	1						
42	1						
54	1						

Write Down Your Soil Data

Determine Available Water Holding Capacity (AWC) of your soil:
Hanford sandy loam

Soil Texture	Texture Depth (inches)	Layer Thickness (inches)	AWC (in. water/ in. soil)	Total AWC (inches)	Infiltration Rate (Ksat) mm/sec	in/hr
sandy loam	0-12	12	0.12	1.44	14-42	2-6
sandy loam	12-60	48	0.13	6.48	14-42	2-6

Total Rooting Depth: 60 **Total = 9.33**

How Much Water to Apply

Crop: **Trees**

Potential Root Zone: **60** inches

Effective Rooting (Upper 1/2 of maximum root zone): **30** inches

Zone of 90% of the roots by weight, and supplying 70% of the water.

Available Water Holding Capacity (AWC): **9.33/2 = 4.67** inches

Management Allowed Depletion (MAD): **50 % = 0.5**. Inches required = **0.5 * 4.67** AWC (inches) = **2.33**.

Lettuce: 25%

Alfalfa hay: 50%

Trees: 50%

Application Efficiency (AE): **80** % = **0.8**

Level border or furrow: 60-80%

Sprinkler (solid set): 70-85%

Micro spray: 85-90%

$$\text{Gross Inches} = \frac{\text{Net Inches Required}}{\text{AE}} = \frac{\mathbf{2.33}}{\mathbf{0.8}} = \mathbf{2.91}$$

When Salt Is an Issue

ECe = Salinity of the Soil (dS/m) = **4.0**

ECiw = Salinity of Irrigation Water (dS/m) = **2**

$$\text{Leaching Requirement (LR)} = \frac{\text{ECiw}}{(5 \times \text{ECe}) - \text{ECiw}} = \frac{\mathbf{2}}{(5 \times \mathbf{4.0}) - \mathbf{2}} = \mathbf{0.11}$$

$$\text{Gross Inches} = \frac{\text{Net Inches Required}}{(1 - \text{LR})\,(\text{AE})} = \frac{\mathbf{2.33}}{(1 - \mathbf{0.11})(\mathbf{0.8})} = \mathbf{3.69}$$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