

Best Practices for Biosolids Management

Selecting Land Application Sites

April 16, 2013



Presentation Overview

- Regulatory Policy
- Important Considerations
- Online Soil Survey Information
- Summary of Tools
- Questions and Discussion

<http://www.deq.state.or.us/wq/biosolids/biosolids.htm>


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Water Quality
Biosolids Program
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- Biosolids Home
- Oregon's Biosolids Program
- Regulations
- Assistance
- Related Links
- Contacts

WQ Info Guides:

- by alphabet
- by category

Biosolids Program

The Department of Environmental Quality (DEQ) implements a statewide program that encourages the beneficial use of biosolids in a manner to protect public health and maintain or improve environmental quality. Almost all the biosolids generated by domestic wastewater treatment facilities in Oregon are applied to the land for agriculture, silviculture, and horticulture use. All wastewater facilities operate under either a National Pollutant Discharge Elimination System (NPDES) or Water Pollution Control Facility (WPCF) permit.

Program Topics

- ▶ [Oregon's Biosolids Program](#)
Program overview, a Fact Sheet on Biosolids as a beneficial resource, and an Internal Management Directive on program implementation issues.
- ▶ [Regulations](#)
Useful links to Oregon's and EPA's regulations on Biosolids.
- ▶ [Technical Assistance](#)
A checklist and template for developing a Biosolids Management Plan, a checklist for obtaining a Site Authorization letter, a form and certification statements for developing an Annual Report, and useful publications on Land Application.
- ▶ [Related Links](#)
Biosolids information from regional and national agencies and associations, and University academic and research.
- ▶ [Program Contacts](#)

Regulatory Chronology

- *July 21, 1978* - "Guidelines for Handling, Disposal and Use of Sewage Sludge."
- *1983* - The Oregon legislature mandates Oregon Administrative Rules (OARs) for beneficial use
- *August 10, 1984* - The EQC adopted rules (OAR 340 Div. 50)
- *July 7, 1995* - The EQC adopted revisions to the OARs to make the rules consistent with the 40 CFR Part 503 federal regulations.

Land Application Site Requirements

- All land application sites must be authorized in writing by DEQ prior to use considering:
 - Sensitive areas
 - Setbacks
 - Seasonal conditions
 - Soils
 - Crop management
 - Public comment

Criteria for site selection (340-050-0070)

1. Tillable, agricultural land
2. Site characteristics
 - a. Stable geologic formation
 - b. Groundwater depth
 - c. Topography (slope)
 - d. Soil depth
 - e. Saline or sodic soils
3. Proximity to residential areas and setbacks

Biosolids Land Application Site Authorization Request Documentation Checklist

- Site Information
- Soil information
- Crop Information
- Biosolids and Land Application Information
- Public Participation Information

NRCS Web Soil Survey Tool

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>



You are here: [Web Soil Survey Home](#)

Search

Enter Keywords

All NRCS Sites

Browse by Subject

- ▶ [Soils Home](#)
- ▶ [National Cooperative Soil Survey \(NCSS\)](#)
- ▶ [Archived Soil Surveys](#)
- ▶ [Status Maps](#)
- ▶ [Official Soil Series Descriptions \(OSD\)](#)
- ▶ [Soil Series Extent Mapping Tool](#)
- ▶ [Soil Data Mart](#)

The simple yet powerful way to access and use soil data.



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.

I Want To...

- [Start Web Soil Survey \(WSS\)](#)
- [Know the requirements for running Web Soil Survey — will Web Soil Survey work 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 2.3 has been released! View description of new features.](#)

Step 1 – Define Area of Interest

The screenshot displays the 'Web Soil Survey' web application interface. At the top, a large red banner reads 'Area of Interest (AOI)'. Below this, the navigation menu includes 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', and 'Shopping Cart (Free)'. The main content area is divided into two panels. On the left, the 'Area of Interest' panel contains a search bar, 'Open All' and 'Close All' buttons, and an 'AOI Properties' section with a 'Clear AOI' button. Below this is the 'AOI Information' section, which includes a 'Name' field, 'Map Unit Symbols' options (radio buttons for 'Use Soil Survey Area Map Unit Symbols' and 'Use National Map Unit Symbols'), and 'Area (acres)' listed as 710.4. The 'Soil Data Available from Web Soil Survey' section for 'Solano County, California (CA095)' shows 'Spatial Data Version 1, Aug 27, 2004' and 'Tabular Data Version 5, Dec 12, 2007'. At the bottom of this panel are 'Import AOI' and 'Export AOI' buttons, and a 'Quick Navigation' section with an 'Address' field. On the right, the 'Area of Interest Interactive Map' panel shows a satellite-style map of Solano County, CA, with a red polygon defining the AOI. The map includes a legend, navigation tools, a scale of 1:33,500, and a north arrow.

Step 2 – See Soil Map



Soil Map

USDA United States Department of Agriculture
National Resources Conservation Service
Web Soil Survey

Contact Us | Download Soil Data | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Logout | Help

Area of Interest (AOI) | **Soil Map** | Soil Data Explorer | Shopping Cart (Free)

Printable Version | Add to Shopping Cart

Search

Map Unit Legend

Solano County, California (CA095)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ce	Ceay silty clay loam	174.3	24.5%
Cc	Ceay clay	263.7	37.1%
CeA	Clear Lake clay, 0 to 2 percent slopes	98.3	13.8%
SeA	San Ysidro sandy loam, 0 to 2 percent slopes	63.1	8.9%
SiA	San Ysidro sandy loam, thick surface, 0 to 2 percent slopes	111.0	15.6%
Totals for Area of Interest		710.4	100.0%

FOIA | Accessibility Statement | Privacy Policy | Non-Discrimination Statement | Information Quality | USA.gov | White House

Step 3 – See Soil Data

Soil Data Explorer

Web Soil Survey

Area of Interest (AOI) | Soil Map | **Soil Data Explorer** | Shopping Cart (Free)

View Soil Information By Use: All Uses | Printable Version | Add to Shopping Cart

Intro to Soils | Suitabilities and Limitations for Use | Soil Properties and Qualities | Ecological Site Assessment | Soil Reports

Search

Suitabilities and Limitations Ratings

Open All | Close All

- Building Site Development
- Construction Materials
- Disaster Recovery Planning

Land Classifications

California Revised Storie Index (CA)

View Description | View Rating

View Options

- Map
- Table
- Component Breakdown
- Description of Rating
- Rating Options Detailed Description

Advanced Options

View Description | View Rating

Map – California Revised Storie Index (CA)

Scale: 1:34,100 @ 1%

2920ft

Tables – California Revised Storie Index (CA) – Summary By Map Unit

Summary by Map Unit – Solano County, California (CA095)





































Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
Cs	Clayey silty clay loam	Grade One - Excellent	Clayey (85%)	.174.3	24.5%

Step 4 – Printable Map and Report

The screenshot displays the 'Shopping Cart (Free)' interface of the USDA Web Soil Survey. At the top, a large red banner reads 'Shopping Cart (Free)'. Below this, the USDA logo and 'Web Soil Survey' are visible. A navigation bar includes links for 'Contact Us', 'Download Soils Data', 'Archived Soil Surveys', 'Soil Survey States', 'Glossary', 'Preferences', and 'Logout'. The main navigation menu has 'Area of Interest (AOI)', 'Soil Map', 'Soil Data Explorer', and 'Shopping Cart (Free)', with the latter highlighted in red. The 'Shopping Cart (Free)' window is open, showing a 'Checkout Options' dialog box with 'Delivery Options' set to 'Get now' and 'Download later'. The main content area displays report properties for a 'Custom Soil Resource Report for Solano County, California'. The report title is 'Custom Soil Resource Report for Solano County, California' and the subtitle is 'Area of Interest Name: (none defined)'. The total size is 937 KB (0.9 MB). The 'Map Options' section shows 'Map Scale' set to 'Automatic' and 'Printed Sheet Size' set to 'A (8.5" x 11") - 1 sheet'. The 'Table of Contents' is visible at the bottom left. The right side of the window displays detailed soil properties and qualities, including 'Freeze-free period: 260 to 290 days', 'Map Unit Composition' (Capay and similar soils: 85 percent, Minor components: 15 percent), 'Description of Capay Setting' (Landform: Rims on basin floor, Landform position (two-dimensional): Tosslope, Landform position (three-dimensional): Tall rise, Down-slope shape: Linear, Across-slope shape: Linear, Parent material: Alluvium derived from sedimentary rock), and 'Properties and qualities' (Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches, Drainage class: Moderately well drained, Capacity of the most limiting layer to transmit water (Kazc): Moderately low to moderately high (0.06 to 0.20 in/hr), Depth to water table: More than 80 inches, Frequency of flooding: None, Frequency of ponding: None, Calcium carbonate, maximum content: 5 percent, Maximum salinity: Nonsaline (0.0 to 2.0 meq/l/cm)).

Soil Map—Multnomah County Area, Oregon



MAP LEGEND		MAP INFORMATION	
<p>Area of Interest (AOI)</p> <p> Area of Interest (AOI)</p> <p>Soils</p> <p> Soil Map Units</p> <p>Special Point Features</p> <p> Blowout</p> <p> Borrow Pit</p> <p> Clay Spot</p> <p> Closed Depression</p> <p> Gravel Pit</p> <p> Gravelly Spot</p> <p> Landfill</p> <p> Lava Flow</p> <p> Marsh or swamp</p> <p> Mine or Quarry</p> <p> Miscellaneous Water</p> <p> Perennial Water</p> <p> Rock Outcrop</p> <p> Saline Spot</p> <p> Sandy Spot</p> <p> Severely Eroded Spot</p> <p> Sinkhole</p> <p> Slide or Slip</p> <p> Sodic Spot</p> <p> Spoil Area</p> <p> Stony Spot</p>	<p> Very Stony Spot</p> <p> Wet Spot</p> <p> Other</p> <p>Special Line Features</p> <p> Gully</p> <p> Short Steep Slope</p> <p> Other</p> <p>Political Features</p> <p> Cities</p> <p>Water Features</p> <p> Streams and Canals</p> <p>Transportation</p> <p> Rails</p> <p> Interstate Highways</p> <p> US Routes</p> <p> Major Roads</p> <p> Local Roads</p>	<p>Map Scale: 1:2,380 if printed on A size (8.5" × 11") sheet.</p> <p>The soil surveys that comprise your AOI were mapped at 1:20,000.</p> <p>Warning: Soil Map may not be valid at this scale.</p> <p>Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.</p> <p>Please rely on the bar scale on each map sheet for accurate map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov Coordinate System: UTM Zone 10N NAD83</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Multnomah County Area, Oregon Survey Area Data: Version 10, Aug 20, 2012</p> <p>Date(s) aerial images were photographed: 7/23/2006</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>	

Map Unit Legend

Multnomah County Area, Oregon (OR051)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5B	Bull Run silt loam, 3 to 8 percent slopes	12.7	66.8%
5E	Bull Run silt loam, 30 to 60 percent slopes	5.7	30.2%
27D	Mershon silt loam, 15 to 30 percent slopes	0.6	3.0%
Totals for Area of Interest		19.0	100.0%

Multnomah County Area, Oregon

5B—Bull Run silt loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 500 to 1,500 feet
Mean annual precipitation: 60 to 100 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 100 to 180 days

Map Unit Composition

Bull run and similar soils: 85 percent

Description of Bull Run

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty material mixed with volcanic ash

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very high (about 15.0 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance
Land capability classification (irrigated): 3e
Land capability (nonirrigated): 3e
Hydrologic Soil Group: B

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 12 inches: Silt loam
12 to 62 inches: Silt loam

Data Source Information

Soil Survey Area: Multnomah County Area, Oregon
Survey Area Data: Version 10, Aug 20, 2012



View Soil Information By Use: All Uses

Search	
Suitabilities and Limitations Ratings	
<input type="button" value="Open All"/> <input type="button" value="Close All"/> ?	
Building Site Development	? ⌵
Construction Materials	? ⌵
Disaster Recovery Planning	? ⌵
Land Classifications	? ⌵
Land Management	? ⌵
Military Operations	? ⌵
Recreational Development	? ⌵
Sanitary Facilities	? ⌵
Vegetative Productivity	? ⌵
Waste Management	? ⌵
Water Management	? ⌵

Map — Land Application of Municipal B

Legend

The map displays a satellite-style image of a landscape with various colored overlays. The map includes a toolbar with icons for zooming, panning, and other map functions. A legend is visible on the left side of the map area.

Waste Management  
Disposal of Wastewater by Rapid Infiltration
Land Application of Municipal Biosolids, spring (OR)
Land Application of Municipal Biosolids, summer (OR)
Land Application of Municipal Biosolids, winter, (OR)
Manure and Food-Processing Waste
Overland Flow Treatment of Wastewater
Slow Rate Treatment of Wastewater

Tables – Land Application of Municipal Biosolids, summer (OR) – Summary By Map Unit**Summary by Map Unit – Multnomah County Area, Oregon (OR051)**

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)
5B	Bull Run silt loam, 3 to 8 percent slopes	Not limited	Bull Run (85%)	
5E	Bull Run silt loam, 30 to 60 percent slopes	Very limited	Bull Run (85%)	Slope (1.00)
27D	Mershon silt loam, 15 to 30 percent slopes	Very limited	Mershon (90%)	Slope (1.00)



Soil Physical Properties	
Available Water Capacity	
Available Water Supply, 0 to 100 cm	
Available Water Supply, 0 to 150 cm	
Available Water Supply, 0 to 25 cm	
Available Water Supply, 0 to 50 cm	
Bulk Density, 15 Bar	
Bulk Density, One-Tenth Bar	
Bulk Density, One-Third Bar	
Linear Extensibility	
Liquid Limit	
Organic Matter	
Percent Clay	
Percent Sand	
Percent Silt	
Plasticity Index	
Saturated Hydraulic Conductivity (Ksat)	
Saturated Hydraulic Conductivity (Ksat), Standard Classes	
Surface Texture	
Water Content, 15 Bar	
Water Content, One-Third Bar	

Tables – Saturated Hydraulic Conductivity (Ksat) – Summary By Map Unit**Summary by Map Unit – Multnomah County Area, Oregon (OR051)**

Map unit symbol	Map unit name	Rating (micrometers per second)
5B	Bull Run silt loam, 3 to 8 percent slopes	160.6667
5E	Bull Run silt loam, 30 to 60 percent slopes	160.6667
27D	Mershon silt loam, 15 to 30 percent slopes	9.0000

Soil Map—Multnomah County Area, Oregon



Map Scale: 1:2,380 if printed on A size (8.5" x 11") sheet

0 20 40 80 120 Meters

0 50 100 200 300 Feet

Summary of Tools for Site Selection

- NRCS Web Soil Survey
- Google Earth
- Hand Auger
- Clinometer
- Tape for measuring setbacks
- Personal Contact with Neighbors

Questions?