NRCS

Natural Resources Conservation Service

WASHINGTON

SQL05 – Use of deep rooted crops to break up soil compaction

CSP Enhancement Washington State Supplement

Land Use Applicability: Cropland

January 2014

Client/Operating Unit:		Tract Number:	
Farm/Ranch Location:		Farm Number:	
Specifications Date:		Field Number(s):	
Planned Installation Date:		Proposed Treatment Acres:	

Enhancement Description:

Table of Contents

This enhancement is for the use of deep rooted crops to break up compacted soils and improve soil quality. Deep rooted crops can be perennial plants like alfalfa or annual plants like forage radish.

Benefits

Soils can have naturally occurring compacted layers (hard pans) or those that have been created through tillage or other farming activities. Deep rooted crops with large taproots can alleviate the effects of soil compaction by penetrating the compacted layer, creating pore space that allows air, water and crop roots to penetrate deeper in the soil profile. Eliminating soil compaction through the use of deep rooted crops increases infiltration, reduces surface runoff, improves soil tilth and overall soil quality. It also eliminates the need for sub-soiling with a plow, thus saving fuel, reducing erosion and enhancing water quality.

Conditions Where Enhancement Applies

This enhancement applies to all crop land use acres.

Criteria for the use of deep rooted crops to break up soil compaction

1. The selected crop must be one that has been identified as having the capability of alleviating soil compaction. State specific lists are available at your local NRCS Field Office.

2. If perennial plants are used and once established, they must be maintained annually by proper fertilization and mowing/harvesting.

3. Annual crops should be seeded early enough in the fall to allow for adequate growth to occur prior to winter. Follow specifications provide by your local NRCS Field Office.

4. No deep tillage is allowed to remove compacted layer.

Layout Sketch & Drawing (Provide sketch, drawings, maps, and/or aerial photographs.)

- Geo-referenced field map with all delineated treatment areas where CSP Enhancement SQL05 is to be applied.

Adoption Requirements

This enhancement is considered adopted when the selected deep rooted cover crop has been grown in a given rotation on the land use acre.

Documentation Requirements

1. Written documentation for each year describing the following items:
   a. Deep rooted crop(s) used and dated planted.
   b. Cash crop planted and method used.
2. A map showing fields where the enhancement is applied.
3. Photographs of a representative number of fields showing deep rooted crops.

References*:

A. Clark (ed.). 2007. Managing cover crops profitably. 3rd ed. Sustainable Agriculture Network Handbook Series; bk 9.

Magdoff, F. and H. van Es. Cover Crops. 2000. In Building soils for better crops. 2nd ed. Sustainable Agriculture Network Handbook Series. National Agriculture Library. Beltsville, MD. pp 87-96.

Sainju, U.M., W.F. Whitehead and B.P. Singh. 2005. Biculture Legume–Cereal Cover Crops for Enhanced Biomass Yield and Carbon and Nitrogen. Agron. J. 97:1403–1412.

Field Office Technical Guide:
eFOTG, http://www.nrcs.usda.gov/technical/efotg/

Washington Irrigation Guide, Chapter 3 Table 3-4,
ftp://ftp-fc.sc.egov.usda.gov/WA/Tech/WA_Irr_Guide_030207.pdf

USDA-NRCS: National Agronomy Manual
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17894.wba

*** Some online documents may take several minutes to download.**

State Supplemental Information

States need to develop list of approved deep rooted crops.

Include crops with a minimum rooting depth of 3 ft. and aggressive taproot characteristics. Many crops have deep rooting habits, yet only a few have the ability to breakup compacted soil layers.

Examples of Crops in Washington with these root characteristics include:

Alfalfa and Clovers
All Tree, Vine and bush type berry crops.
Canola
Forage radish
Many vegetable crops with Tap root characteristics (Turnips and beets).
Rapeseed, winter
Safflower
Sorghum-sudangrass hybrid
Sunflower
Yellow mustard

Caution, Some of the above are not winter hardy.

Utilize Plant Materials Technical Note 1 – Seeding Guide (*To make the best use of the Seeding Guide load it onto your desktop, see directions in box below*).

Loading and Using the Seeding Guide

The Seeding Guide is a Microsoft Access database and can be found in Washington State's **efotg** in the ***Section I/Reference Lists/Technical Notes by discipline/Plant Materials*** **folder.**

To load the Seeding Guide on your desktop:

1. Go to Section I/Reference Lists/Technical Notes by Discipline/Plant Materials folder in efotg.

2. Double click on the Seeding Guide, and then click OPEN

3. Select the Seeding Guide and then click EXTRACT. Extract the Seeding Guide to your desktop folder.

4. Go to your desktop and double click to open the Seeding Guide (PM_TN1_Seeding_Guide_113010.accdb)

5. The first time you use the Seeding Guide you will need to do the following:

   A. Click on the Microsoft Office button in the upper left hand corner.
   B. Click on "Access Options".
   C. Click on "Trust Center", select (click on) "Trust Center Settings".
   D. Click on Macro Settings and select "Enable all Macros"
   E. Close, then reopen the Seeding Guide.

With a click of the mouse you will have access to seed mixtures and plant data.

Documentation Form

Producer:		**Date:**	
Tracts:		**County:**	

1. Written documentation for each year describing, in detail, the following items:

a. Deep-rooted crop species used and dated planted,

b. Date and amount of fertilizer applied,

c. Crop planted after deep-rooted crop and method used.

Field Number(s):					
Acres:					
Deep-rooted Crop Planted:					
Deep-rooted Crop Planting Date:					
Fertilizer Application Rates for Deep-rooted Crop (if used):					
N:					
P_2O_5:					
K_2O:					
Application Date(s):					
Cash Crop:					
Cash Crop Planting Method:					

2. Attach map showing where activities are applied

3. Attach photographs of a representative number of fields showing deep-rooted crop.

WSU Analytical Laboratories Database:

http://www.puyallup.wsu.edu/analyticallabs/

Commercial and Agricultural Resources:

http://extension.wsu.edu/wsprs/Pages/AgResources.aspx

Client's Acknowledgement (To be signed before the Enhancement is applied.)

By signing below, I acknowledge that I:

- **have reviewed and understand the site specific design, installation specifications and operation/maintenance requirements in this State Supplemental Sheet and have an understanding of the purpose(s) of this Enhancement;**
- **will install, operate, and maintain this Enhancement in accordance with the National Sheet, the Washington State Supplemental Sheet and the site specific specifications.**
- **will make no changes to the planned design and installation without prior written approval of the Natural Resources Conservation Service.**
- **will obtain all necessary permits and/or rights, and comply with all ordinances and laws pertaining to the installation, operation, and maintenance of this Enhancement, prior to the start of installation; and**
- **will assume responsibility for notifying all Utilities affected by the installation, operation and maintenance of this Enhancement.**

Signature	**Date**

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