NRCS

Natural Resources Conservation Service

WASHINGTON

WQL11 – Precision application technology to apply nutrients

CSP Enhancement Washington State Supplement

Land Use Applicability: Cropland, Pastureland

May 2013

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

The use of precision agriculture technologies to apply nutrients to fit variations in site-specific conditions found within fields.

Benefits

Precision agriculture methods are used to collect information needed to more precisely evaluate production input factors, accurately record crop yields, and precisely apply variable rates of nutrients. The primary benefit of precision agriculture techniques is the use of detailed information about within field variability to maximize nutrient use efficiency. Done properly this helps to protect surface and ground water resources.

Conditions Where Enhancement Applies

This enhancement applies to crop or pasture land use acres where:

- Crop or forage yields can be monitored and correlated to positions in the field in order to produce a geographically accurate yield map.
- Nutrients can be applied according to geographically ***defined management zone*** (s) (DMZ).

Criteria for the precision application technology to apply nutrients

Implementation of this enhancement requires the use of precision agriculture technologies for nutrient management. This enhancement requires the following activities:

1. Variable rate technologies (VRT) for nutrient application. This means computer-controlled equipment that adjusts fertilizer applications based on DMZ.

2. The use of yield monitoring systems. Measure yields in the field using combine-mounted sensors, volume meters or other suitable technologies. Use a GPS receiver with the equipment to correlate field location with yield to create a yield map.

3. Sample soils for nutrient analysis shall be based on DMZs.

4. As a minimum, use yield monitoring data and soils data to create DMZs maps. Apply all nutrients according to the requirements of the DMZ based on yield expectations from yield monitoring.

5. Soil tests for P and K must be no more than 3 years old. If soil or plant tissue tests are used for variable rate nitrogen application, the tests shall be current.

6. All nutrient application rates must not exceed the “Land Grant University (LGU) recommendations for the target yield expectation.

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

- Geo-referenced field map with all delineated treatment areas where CSP Enhancement WQL11 is to be applied.

Adoption Requirements

This enhancement is considered adopted when the system as described in the criteria above have been implemented on the land use acreage. This includes the development of DMZs and the application of nutrients according to the requirements of the DMZ.

Documentation Requirements

Documentation for each field where this enhancement is applied:

1. A map showing the fields where the enhancement is applied,
2. Crops grown in each field and maps with yield monitoring results,
3. Soil sampling protocol,
4. Soil test results,
5. Map(s) showing management zones for each field,
6. Calibration of fertilizer application equipment, and
7. Nutrient application rates/amounts and application dates for each DMZ.

Note: In lieu of documenting each individual item listed in the Documentation Requirements, a Certified Crop Advisor plan that contains each of the items may be substituted.

References*:

International Plant Nutrition Institute (IPNI). 2012. 4R Plant Nutrition – A Manual for Improving the Management of Plant Nutrition (North American Version). IPNI, Norcross, GA.

Randall, G., J.A. Delgado and J.S Schepers. 2008. Nitrogen management to protect water resources. In Schepers and Raun (eds) Nitrogen in Agricultural Systems. SSSA Monograph. 49. Madison, WI. pp 911-945.

USDA-NRCS. 2010. Precision Nutrient Management Planning. Agronomy Technical Note. (TN) 190-AGR-3. Washington, DC.

Field Office Technical Guide:

eFOTG, http://www.nrcs.usda.gov/technical/efotg/

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

State Supplemental Information

None.

In addition to items 1-5 listed on the activity description pages, the following definitions will also apply:

1) A field under irrigation will be defined as being no larger than the acres under one watering system. Example, 120 acre of irrigated land under one circle is a field. The adjoining 120 acres under another circle will be considered a separate field. Example, a rill field is defined by the field boundaries.

2) A field farmed without irrigation (dryland), will be no larger than 500 acres. Example, 2 quarter sections (160 ac. + 160 ac. = 320) both in the fallow portion of cropping, located close to each other with very similar soils and slopes could be considered as 1 field. However if the scenario stated above consisted of 2 half sections (320ac. + 320ac. = 640 ac.), they would be considered 2 separate fields. Example, a full section (640 acres) would need to be broken into 2 separate fields. For further assistance with field delineation contact the state agronomist.

3) Each field will be broken into a minimum of 3 separately mapped sub fields (management zones). The sub fields can be based on a soils map, vegetative indexes, yield maps, electro conductivity map, etc.

4) A composite soil sample will be taken from each of the sub fields. These soil sample results will be the basis for a separate nutrient program on each sub field. Soil sample depth will be a minimum of 12".

This does not change the intent, purpose or original requirements. It only clarifies some parts of the enhancement sheet.

Documentation Form

Producer: _____ **Date:** _____

Tracts: _____ **County:** _____

Documentation for each field where this enhancement is applied:

1. **A map showing the fields where the enhancement is applied,**
2. **Crops grown in each field and maps with yield monitoring results,**
3. **Soil sampling protocol,**
4. **Soil test results,**
5. **Map(s) showing management zones for each field,**
6. **Calibration of fertilizer application equipment, and**
7. **Nutrient application rates/amounts and application dates for each DMZ.**

Note: In lieu of documenting each individual item listed in the Documentation Requirements, a Certified Crop Advisor plan that contains each of the items may be substituted.

Field Number (s)	Crop	Acres	Yield Goal	Measured Yield	Calibration of Fertilizer Application Equipment

The following information is to be provided in a color map format:

1. **Soil Sampling Area Map that includes the sampling dates, number of samples and the size of the grid or zone area sampled.**
2. **Soil Test Results for all Nutrients**
3. **As-applied map that includes the nutrient(s) application rates, amounts and date of application. When using Normalized Difference Vegetation Index (NDVI), provide a digital as-applied map.**

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**