



United States Department of Agriculture  
Natural Resources Conservation Service

## Water Quality Enhancement Activity– WQL10 – Plant a cover crop that will scavenge residual nitrogen



### Enhancement Description

Plant a cover crop that will scavenge nitrogen left in the soil after the harvest of a previous crop.

Suitable cover crops include those with at least a “Very Good” rating for scavenging nitrogen as documented in “*Managing Cover Crops Profitably, 3<sup>rd</sup> Edition*” (Sarrantonio, 1998), Chart 2

Performance & Roles, pg 67. Examples include cereal rye, barley, forage radish and sorghum sudan.

### Land Use Applicability

This enhancement is applicable on cropland.

### Benefits

Planting an annual cover crop to scavenge residual nutrients from cropland after the harvest of a previous crop effectively utilizes residual nutrient resources to supply following crops with nutrients required to efficiently produce food, forage, fiber, and cover while minimizing environmental degradation.

### Criteria for Planting a Cover Crop That Will Scavenge Residual Nitrogen:

Implementation of this enhancement requires:

- 1) The cover crop selected shall have the growth rate and rooting depth required to scavenge excess nitrogen from the root zone of the previous crop. Suitable cover crops include those with at least a “Very Good” rating for scavenging nitrogen as documented in *Managing Cover Crops Profitably, 3<sup>rd</sup> Edition, Chart 2 Performance & Roles, pg 67*. Examples include cereal rye, barley, forage radish and sorghum sudan.
- 2) Timing of planting and seeding rates for cover crops shall follow the recommendations in the respective NRCS Field Office Technical Guide (FOTG).
- 3) The producer must have a current soil test (no more than 3 years old).
- 4) Nitrogen application rates for the crop following the cover crop must be reduced by at least 15% from the “Land Grant University (LGU) recommendations to account for the recycling of N by the cover crop.
- 5) The producer shall not increase soil surface disturbance over existing benchmark conditions.



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### **Documentation Requirements**

Documentation for each Treatment area (field) and year of this enhancement describing these items:

- a. Cover crop species planted
  - b. Cover crop planting date
  - c. Cover crop seeding rate (bu/ac)
  - d. Annual crop planted
  - e. Nitrogen application rates/amounts for the annual crop
  - f. Treatment acres
- 2) A map showing where the activities are applied.

**WATER QUALITY ENHANCEMENT ACTIVITY**

**WQL10-OR            Planting an Annual Grass-Type Cover Crop to  
Scavenge Residual Nitrogen**

**General**

The following information is taken from Oregon State University Extension Publication EM8728 *Nitrogen Scavenging: Using Cover Crops to Reduce Nitrate Leaching in Western Oregon* and OSU Extension Publication EM8739 *Cover Crop Dry Matter and N Accumulation in Western Oregon*. The full texts are available at: <http://extension.oregonstate.edu/catalog/html/em/em8728/> and <http://extension.oregonstate.edu/catalog/html/em/em8739/>.

Properly managed cover crops can reduce the amount of nitrate leached from the soil to the aquifer below. Grass, cereal, and brassica (oilseed) cover crops that grow rapidly in the fall and early winter extract nitrate from the soil and incorporate it into plant biomass before winter weather leaches it below the root zone. Nitrogen scavenging, then, is the capture of nitrate from the soil that would otherwise be lost to leaching. Cover crops that scavenge nitrogen not only reduce nitrate leaching but also provide organic matter additions, control erosion, improve soil tilth, and provide weed suppression.

The amount of nitrogen scavenged depends in part on the cover crop type, growth, soil type, and weather. In a typical western Oregon fertilized vegetable rotations, a cereal cover crop may scavenge 20-70 lbs N per acre per year. However, much higher rates have been observed. Annual ryegrass planted into 16 inch tall silage corn on a heavily manured field scavenged more than 260 lbs N per acre by the following spring. Irrigated Micah barley planted in the fall of 1993 took up 92 lbs N per acre after just 6 weeks of growth. Nitrogen is stored in the cover crop until it is killed. As residues decompose, residue-N is converted to plant available N forms, tied up with microorganisms, or stabilized into soil organic matter.

It is important to note that while cover crop residues provide many benefits, excessive dry matter production can cause problems. It can negatively affect field operations (e.g., tillage), the carbon/nitrogen (C:N) ratios, and pest interactions. The ideal amount of dry matter depends, in part, on the type of residue, the tillage system used, planting schedules, and needs or limitations of the following crop. In many western Oregon vegetable rotations, 2 to 3 tons dry matter/acre provides the benefits of cover cropping but does not interfere unduly with other aspects of crop production. Non-legume cover crops such as annual rye, rapeseed, and many cereal grains can accumulate much more than 3 tons dry matter/acre under favorable growing conditions. One way to limit dry matter production is to kill the cover crop mechanically. More commonly, given the typical wet soil conditions of early spring in western Oregon, herbicides are used.

Year-to-year variability of N accumulation is high. During years with good growing conditions, many cover crops perform adequately, and non-legumes probably need to be killed before April 15 to avoid excessive dry matter accumulation. Some cover crops tolerate high rainfall, early frosts, or cold winter weather better than others.

Generally, cover crop vigor increases with earlier planting dates. There are some exceptions. For example, spring cereals planted in early September may be less winter-hardy than those planted later. In general, it is best to plant cover crops by October 1 in western Oregon. When N scavenging is a primary goal, plant as early as possible and irrigate, or plant as early as rains allow.

Prior to selection of this enhancement, you should determine if a cover crop is appropriate for your area. Several areas in Oregon do not receive enough precipitation to make cover cropping feasible. Read over the individual Fact Sheets (attached/linked here) for precipitation requirements or contact the NRCS State Agronomist for more information.

**Oregon Criteria**

The following species are acceptable as grass-type cover crops in Oregon:

**East Side**

- Annual ryegrass([EM8691](#))
- Barley, Oats, Triticale, Wheat([EM8692](#))
- Cereal rye([EM8694](#))
- Mountain brome ([BRMA4](#))
- Rapeseed (canola, summer turnip) ([EM8700](#))
- Slender wheatgrass ([ELTR7](#))

**West Side**

- Annual ryegrass ([EM8691](#))
- Barley, Oats, Triticale, Wheat ([EM8692](#))
- Buckwheat ([EM8693](#))
- Cereal rye ([EM8694](#))
- Rapeseed ([EM8700](#))
- Sudangrass/Sorghum Hybrids([EM8703](#))

**These publications may be found at:**

<http://extension.oregonstate.edu/catalog/details.php?sortnum=0124&name=Cover+Crops>

**or in each NRCS Field Office.**

Other grass-type cover crop species may be practical and feasible for your location. Contact the NRCS State Agronomist for further information.

**Documenting the Enhancement**

- 1. Aerial photo or map showing where the cover crop(s) was/were planted**
- 2. Treatment Acres**

Field(s)	Acres

3. Annual Crop: \_\_\_\_\_ Harvest Date: \_\_\_\_\_
4. Cover Crop(s) Planted: \_\_\_\_\_
5. Percent Pure Live Seed: \_\_\_\_\_ (from seed label)
6. Seeding Rate/Acre: \_\_\_\_\_ Date Planted: \_\_\_\_\_
7. Date Cover Crop Terminated: \_\_\_\_\_
8. Method of Termination: \_\_\_\_\_ Tillage \_\_\_\_\_ Chemical
9. Nitrogen Application Records for each cover crop treatment area (if applicable)

Fertilizer Applications						
Date	Field	Total Applied (lbs./acre)	Formulation (%N-P <sub>2</sub> O <sub>5</sub> -K <sub>2</sub> O)	Net Applied (lbs./acre) N		

10. Amount of Nitrogen (lbs/ac) assumed to be scavenged/recycled by the cover crop: \_\_\_\_\_  
 (this information can be found in the individual cover crop fact sheets referenced on the first page of this document. It is located on the first page of cover crop fact sheets under “Quick Facts” in the lower right hand corner)
11. Amount of Nitrogen credit (lbs/ac) for the following crop: \_\_\_\_\_  
 (this information can be found in the individual cover crop fact sheets referenced on the first page of this document. It is located on the first page of the cover crop fact sheet under “Quick Facts” in the lower right hand corner)