

# Cover Crops to Improve Soil in Prevented Planting Fields

Natural Resources Conservation Service (NRCS)  
Des Moines, Iowa

Iowa Fact Sheet  
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Prolonged rain and flooding can result in unplanted crop fields. Farmers in this situation need to weigh not only their program and insurance options (“prevented planting”) but should also assess agronomic considerations to ensure long-term productivity from this difficult situation.

Soil left with no vegetation is subject to erosion, loss of organic matter and nutrients, and most critically, loss of living soil biota. Organisms living in the soil (i.e. fungi, bacteria, earthworms) are injured or killed by prolonged saturation or lack of living roots. These organisms are critical for plant growth.

**Cover crops** have the potential to capture applied nutrients, fix nitrogen, build organic matter, control weeds, reduce erosion, and facilitate recovery of the soil biology during the remainder of the season. Using cover crops properly will improve soil health and can provide opportunities to increase forage availability for livestock, and build considerable yield potential for following crops.

**Producers are advised to check with their crop insurance agents on prevented planting requirements and harvest restrictions for cover crops.**

## Building vs. Losing Topsoil

As excessive rainfall runoff or floodwaters cut across unprotected fields, the topsoil may be lost from erosion and scouring. With the productive topsoil lost, so too are the nutrients, organic matter, and soil biology. Tillage applied to these water-damaged fields to control weeds or smooth them will accelerate loss of carbon, nitrogen and biomass. Above-ground biomass from cover crops helps protect the soil from further sun, wind and water damage.



*A key soil health concept is to ensure there is vegetation green and growing during all times of the year.*

Selecting high biomass cover crop mixes will rebuild topsoil. Cover crops, especially if no-tilling, will add organic biomass both above and below ground to rebuild topsoil quicker than if left to grow weeds, or especially if left with no cover.

Removing biomass from a field by harvesting forage or grain will reduce the organic matter benefits. Grazing cover crops is a better way to utilize the forage value of the cover crop. Grazing invigorates soil biology, depositing most of the nutrients back to the field. *Follow Crop Insurance guidelines for harvest or grazing.*

## Soil Biology, Structure and Compaction

Fields saturated for long periods lose soil organisms that create soil macro-pores and cycle nutrients, such as mycorrhizal fungi and rhizobia bacteria. Without these organisms to build structure and till, the soils are subject to compaction, crusting, and high bulk density problems.

Compaction on these soils is a concern that needs remediation. Use of cover crops is essential to rebuild a healthy soil structure. Cover crop roots penetrate compacted zones, hold soil aggregates together, and sustain healthy organisms to restore soil structure. Growing roots is essential to reestablishing the mycorrhizae in the soil and creating pathways for air and water to move through the soil profile. These are key components to restoring the soil's functional properties and will keep the pathways open for a quicker fix of the compacted layers.

### Building vs. Losing Nitrogen

Cover crops can build organic nitrogen, and/or scavenge residual nitrogen in the soil.

A legume or legume mix planted in early summer can easily provide 60-100% of the needed nitrogen for a following corn crop.

A good cover crop mix can scavenge more than 40 pounds of residual N from the soil, and even more in situations where manure or pre-plant nutrients have been recently applied. Additionally, this results in a more rapid gain in total soil biomass and a higher total nutrient availability for subsequent crops.

### Herbicide Concerns

If spring residual herbicides were applied, refer to the label to determine appropriate cover crop species. A bioassay test can also be used to determine if herbicide carryover is present.

### Cover Crop Management

Cover crops seeded early to mid summer have the potential to develop seed. To reduce the potential for seed production, mow the cover crop prior to seed head formation.

### Cover Crop Species Guidance

Focus cover crop selection and management on maximizing both above and below ground biomass to encourage nutrient cycling as deep in the soil profile as possible. Choose a mix of a grass with a fibrous root system and a legume or brassica with a tap root to provide the widest range of benefits.

Planting wildlife-friendly cover crops, such as buckwheat or brassicas, and leaving the growth and/or the grain can be a very valuable winter food source for a wide variety of wildlife and pollinators.



Legumes, in combination with grasses, can provide quicker restoration of soil biology and N fixation. The amount of nitrogen fixed is directly related to growth and development of the legume. An early summer planted legume, such as cow peas, will grow rapidly and fix a substantial amount of N prior to a killing frost. For later plantings, an overwintering legume, such as red clover, should be considered. All legume seed should be inoculated.

Brassicas, such as turnips and radishes, provide excellent weed control and nitrogen scavenging potential. The tap roots are excellent at penetrating tillage pans and dense soil layers. A grass should always be used in combination with a brassica to provide ground cover and a more robust root system.

### Seeding and Establishment

Timeliness of rainfall for mid to late summer seeding is critical for germination. It is best if the seed is drilled to improve seed-to-soil contact.

### Additional References

Midwest Cover Crop Council: [www.mccc.msu.edu](http://www.mccc.msu.edu)

Sustainable Agriculture Research and Education (SARE): *Managing Cover Crops Profitably*  
[www.sare.org/Learning-Center/Books](http://www.sare.org/Learning-Center/Books)

Natural Resources Conservation Service - Field Office  
Technical Guide (eFOTG):  
<https://efotg.sc.egov.usda.gov/#/>

## CoverCrops to Improve Soil in Prevented Planting Fields

**Table 1**

### Cool Season Cover Crop Seeding Rates (*minimum rates*<sup>1</sup>)

Species Common Name	Winter Hardy?	Drilled or Incorporated (Bulk lbs/acre <sup>5</sup> )	Broadcast on Surface (Bulk lbs/acre <sup>5</sup> )
Rye, Winter Cereal	Yes - all cultivars	45	45
Triticale, Winter	Yes - most cultivars	45	45
Wheat, Winter	Yes - many cultivars	45	45
Barley, Winter <sup>2</sup>	No	60	60
Oats	No	60	60
Ryegrass, Annual <sup>3</sup>	No/Sometimes	12	14
Mustard, Oriental	No	3	4
Radish, Oilseed	No	5	6
Rapeseed	No	3	4
Turnip, Forage type	No	3	4
Vetch, Hairy <sup>4</sup>	Usually/Slow Growth	12	14

### Cool Season Cover Crop Recommended Planting Dates

Zone (See Map)	Winter Hardy Cover Crops	Non-Winter Hardy Cover Crops
Zone 1	October 21	September 9
Zone 2	October 28	September 16
Zone 3	November 5	September 23

<sup>1</sup>Minimum rates are for optimum planting time windows and conditions. Seeding rates can be increased if conditions are warrant. When using cover crops for weed control or grazing, consider increasing the rate by 1.5 to 2.0 times the minimum rate.

<sup>2</sup>Winter barley is rarely winter hardy in Iowa.

<sup>3</sup>Some cultivars of annual ryegrass are winter hardy in Iowa.

<sup>4</sup>Hairy Vetch is somewhat winter hardy if enough fall growth occurs, but it grows slowly in both fall and spring. It benefits from an earlier fall planting. Soil incorporation is preferable.

<sup>5</sup>Bulk seed must be a minimum of 85% PLS (Pure Live Seed). For seed lots testing below the minimum, the see rate must be based on PLS and not the bulk seed rate. PLS = Purity \* % total Germination (germination + hard seed) / 100.

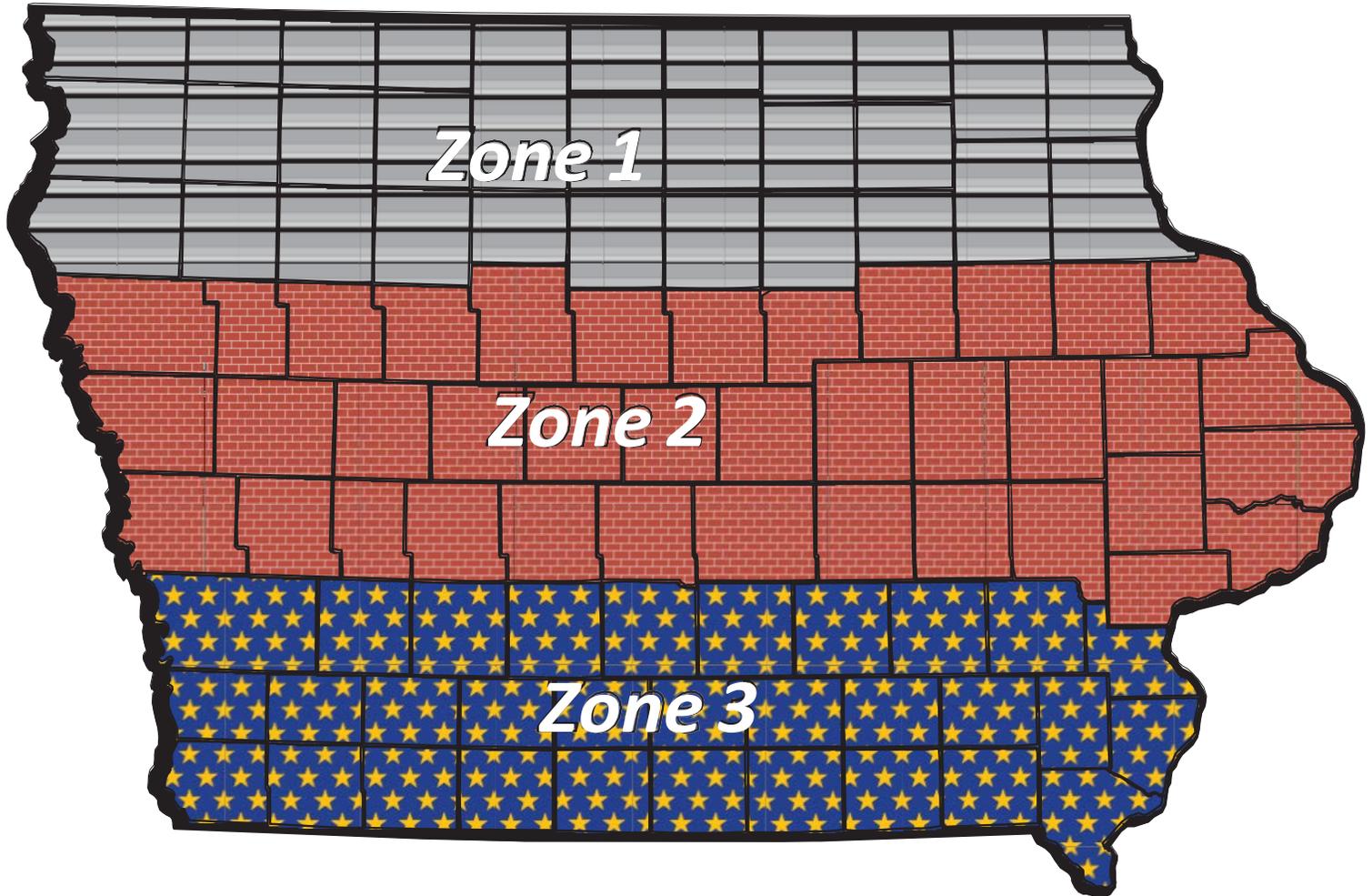
This is not an all-inclusive list of species. See Midwest Cover Crop Council – Cover Crop Decision Tool – Cover Crop Selector for Iowa Counties.

Up to 20% of the seed mix can be other species not listed in the MCCC’s-Cover Crop Decision Tool if approved by the ARC (Area Resource Conservationist). The ARC will determine the lbs. of the species needed to meet the % of seed mix up to the 20% limit.

It is recommended that you plant diverse cover crop mixes. The rates listed are for pure stand seedings. When developing a cover crop mix, take the percent desired by the pure stand rate to determine seeding rate by species.

(Example: 60% cereal rye + 40% radish would have a seeding rate of .6 X 45 = 27 lbs. cereal rye and .4 X 5 = 2 lbs. radish)

## Iowa Cover Crop Planting Zones



-  **Zone 1** - Oct. 21 for winter hardy cover crops; Sept. 9 for cool season non-winter hardy cover crops
-  **Zone 2** - Oct. 28 for winter hardy cover crops; Sept. 16 for cool season non-winter hardy cover crops
-  **Zone 3** - Nov. 5 for winter hardy cover crops; Sept. 23 for cool season non-winter hardy cover crops