NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION

COVER CROP (ACRE)

CODE 340

PURPOSE: Cover Crops are grown to protect and improve the soil. Cover crops reduce erosion from wind and water, maintain or increase soil health and organic matter and reduce water quality degradation by utilizing excessive soil nutrients. Cover crops can suppress excessive weed pressures and break pest cycles, improve soil moisture use efficiency and minimize soil compaction. There are many ways to use cover crops including: to reduce wind and water erosion, enhance soil health and increase organic matter, remove excess nutrients, suppress weeds and break pest cycles and minimize soil compaction.

CONSERVATION MANAGEMENT SYSTEMS

Cover crops must be correctly selected and managed for the planned purpose. There are many possible cover crops, each differing in potential benefits and adaptability to particular climates and rotations. The most commonly used cover crops are ***annual*** grasses and legumes but perennial crops should also be considered. Consider soil moisture, cover crop and weed species maturity and subsequent crops in the rotation when terminating cover crops. Terminate cover crops early to conserve soil moisture for the subsequent crop and to ensure cover crop species and weeds do not set seed.

CONDITIONS WHERE PRACTICE APPLIES

All lands requiring seasonal vegetative cover for natural resource protection or improvement.

GENERAL CRITERIA APPLICABLE TO ALL PRACTICE PURPOSES

Seedbed preparation, plant species, seeding rates, seeding dates, seeding depths, fertility requirements and planting methods shall follow NRCS and Montana State University guidelines and recommendations and be adapted to specific on-site conditions.

All seed and planting materials shall be labeled and will comply with current Federal and Montana standards. See FOTG, Section I, State/Tribal/Local Laws for the Montana Agricultural Seed Act and Administrative Rules, State of Montana Department of Agriculture.

Use certified seed and recommended species and cultivars whenever available. When certified seed is not available, common seed may be used that is adapted to local soil and climatic conditions. Seed should not be used if the origin or cultivar is unknown. Consult state agronomist prior to planting species not on cover crop lists.

All seed must be tested and tagged in accordance with all Federal and Montana Agricultural Seed Act and Administrative Rules and **must be performed and dated within one year prior to the date of planting**. See FOTG, Section I, State/Tribal/Local Laws, Ordinances, and Regulations.

The germination and purity of each species in a mixture must be listed on the seed tag, as well as the percentage of each species in the mixture, to verify adequate amounts of Pure Live Seed (PLS). The percentage of weeds and other crop seeds must be on the label.

Select species compatible with the rotation and management that will not become weeds in the crop rotation. Many cover crop species such as buckwheat, cereal rye, hairy vetch and sweet clover have a high percent of hard seed (10-20 percent) which can germinate in the following year's crop and can become weed problems if proper management is not followed. Management techniques such as using certified seed, intensive weed control, choosing pesticides that provide more effective control of weed species and modifying or extending rotations so cover crop species or other volunteer plants aren't a

problem in subsequent cash crops. Management techniques for control of cover crop species in succeeding years should be included in the MT-JS-340.

Buckwheat (*Fagopyrum esculentum*) has a high percent of hard seed and volunteers easily in no-till systems and can become weedy in subsequent crops. Low levels of buckwheat has been found in wheat shipments from the United States to Japan. Japanese have a higher level of sensitivity to buckwheat allergies, causing issues analogous to peanut allergies in the United States. Japan has zero tolerance for buckwheat in wheat and requires listing of the presence of buckwheat as an allergen on food products. Buckwheat contamination in wheat shipments to Japan could have significant economic impacts to Montana and other wheat-producing states.

In addition to human toxicity, buckwheat is considered to be a primary photosensitizer to livestock. Ingesting a portion or entire plants, dried or fresh, has caused photosensitization in animals with exposed or light-colored skin including cattle, goats, sheep, swine, and turkeys. Symptoms in cattle include recumbency, thirstiness, skin peeling and weakness. Symptoms in sheep include recumbency, blistering, skin peeling and paralysis.

NRCS Montana will not recommend buckwheat in conservation plantings in areas in rotation with or adjacent to wheat production within two growing seasons after planting buckwheat because of the potential for buckwheat seed to contaminate the wheat crop, and the potential health risks. "Adjacent" is designated as within 30 feet of a wheat field. NRCS Montana will also not recommend buckwheat in conservation plantings that will be grazed.

Common vetch (*Vicia Sativa L.*) has been found in lentil fields in Montana and North Dakota and if allowed to go to seed, reduces the value of the lentils when sold. This is a serious concern that can affect producers who have pulse crops in their rotation.

Hairy vetch (*Vicia villosa* Roth) also causes poisoning and death in cattle, horses, and poultry. Mortality occurs in cattle and poultry with one symptom being an acute illness followed by death after ingesting raw seeds of hairy vetch. The poisoning is most prevalent in mid- to late spring as the hairy vetch reaches maturity. Older reports of common vetch poisoning livestock have been reported but none recently.

NRCS Montana will not recommend hairy, common, or other vetches as single crop, a component in any pollinator or cover crop mix in areas in rotation with or adjacent to lentil production within two growing seasons after planting lentils or other pulse crops because of the potential to contaminate the lentil crop. NRCS Montana will also not recommend vetch in conservation plantings that will be grazed.

Forage peas grown commercially as a crop or in cover crops can be a contaminant in yellow and green peas grown for food and can result in a price reduction or rejection of peas for human consumption. **Ensure that producers are aware of the potential for forage peas to become a contaminant in subsequent pea crops grown for the human consumption market. Producers should implement management techniques to prevent contamination when growing forage peas as crop or as a component in a cover crop mix.**

Cereal Rye (*Secal Cereale* L.) is an annual grass that can and has become weedy in many regions of the west including Montana, Oregon and Washington. It is a problem especially in cereal grain rotations because its life cycle and growth habit is very similar to small grains. **Cereal Rye is not approved as a cover crop in Montana.** Suggested alternatives are winter or spring small grain varieties.

Check herbicides being applied in the rotation to ensure they are compatible with cover and cash crops in the rotation. Some crops such as corn, soybeans, sugar beets and canola have been developed with resistance to the herbicide glyphosate and are marketed as "Roundup Ready®" crops. If these crops are used in a mix, care should be taken to ensure control of volunteer or "escape" plants, especially if glyphosate is used to control weeds in the rotation.

Consider type of cover crop species (warm season or cool season) when selecting individual species or "cocktail mixes". To increase diversity in a rotation chose species that are different from the current rotation but that will not affect marketing of other crops in the rotation. Mixtures should have enough

diversity to ensure a variety of species/crop types with different above-ground growth, rooting depths and types, flowering and maturity ranges and residue types. Plant cool season species in early spring and warm season species when soil and air temperatures are warmer. Planting cool and warm season species in mixes together is generally not recommended unless a mid-season planting is used. For example, buckwheat and teff are sensitive to frost and are killed by light frosts and should only be planted after danger of frost is past. Brassica species and spring grains are more frost tolerant and can grow under cooler temperatures. Warm season species can be planted in late spring to late summer, if adequate moisture and growing season is available before killing frost. This will allow enough time to grow and take up nutrients, ensure biomass production, but not enough time to set seed.

Do not burn cover crop residue or harvest cover crops for seed.

Inoculate legumes with the appropriate rhizobium bacteria species.

If the cover crop is to be grazed or hayed, follow pesticide label restrictions. Small grains, brassica spp., sorghum, sudangrass, sunflower with immature seeds and other species can accumulate nitrate that can be toxic to livestock. Stress, high soil nitrogen levels, regrowth after cutting or hail can increase nitrate levels. Nitrate levels generally decrease as plants mature. Management techniques such as not turning cattle that have been grazing on mature pasture or range into green lush growth, having cattle graze cover crops after they have grazed non-nitrate species in the morning, use electric fences to limit access to cover crops, provide stubble or other forage sources that are low in nitrates so cattle can buffer themselves, leave taller stubble heights since nitrates are often concentrated in the lower one-third or 6” of the plant, provide another energy source such as grain or molasses to provide carbon backbones to increase microbial protein. Sorghum, sudangrass and sorghum x sudangrass crosses can have high levels of HCN which can also be toxic to livestock.

A nitrate and forage quality analysis from a certified lab is required prior to grazing or haying cover crops and pollinator mixtures.

Grazing is allowed but cannot exceed 50 percent of the current year’s growth and a minimum of 6-inch stubble height must be maintained.

CRITERIA APPLICABLE TO SPECIFIC PRACTICE PURPOSES

Reduce Erosion from Wind and Water

Select species that have physical above and or below ground characteristics to provide adequate erosion protection from wind and/or water. Time the planting of cover crop to protect the soil during the critical erosion period. Use current wind (WEPS) and water (RUSLE2) erosion prediction technology to determine surface and/or canopy cover needed throughout the year and amount of surface soil disturbance allowed to reduce erosion to the desired level.

Maintain or Increase Soil Health and Organic Matter Content

Select cover crop species that produce larger amounts of biomass and root mass to maintain or increase soil organic matter. Soil Conditioning Index (SCI) as determined by WEPS or RUSLE2 must be zero or higher for the entire rotation. Either RUSLE2 or WEPS can be used to determine SCI, but to get accurate SCI values the soil erosion value from WEPS must be entered in RUSLE2 and the soil erosion value from RUSLE2 must be entered into WEPS. When using RUSLE2, the soil conditioning index folder must be opened and the WEPS average ‘annual gross soil loss’ must be entered into the ‘wind & water induced ero’ input cell. When using WEPS, the RUSLE2 ‘soil loss for cons. plan t/ac/yr’ value must be entered into WEPS ‘water erosion’ input cell.

Cover crops should be planted as early as possible and terminated based on biomass production, soil moisture depletion, cover crop maturity and crop insurance criteria. When managing for soil nutrient additions, the best time to terminate leguminous cover crops is the period just before or at full bloom. This ensures decomposition and nutrient release over a longer period of time (versus termination prior to bloom).

Specification MT340-4

Reduce Water Quality Degradation by Utilizing Excessive Soil Nutrients

Select cover crop species that will effectively utilize nutrients. Use annual soil tests to determine if nutrients, especially nitrogen are in excess in the soil profile. Deep sampling of the soil profile will help to determine if nitrate is leaching through the system. If the cover will be grazed or hayed choose species that are suitable for livestock and capable of removing excess nutrients.

Suppress Excessive Weed Pressures and Break Pest Cycles

Select cover crop species that can help suppress or compete with weeds, break pest life cycles or suppress plant pests and pathogens, provide food or habitat for pest predators and release compounds that suppress soil borne pathogens or pests. Select cover crop species that do not harbor pests or diseases of subsequent crops in the rotation. Weeds are suppressed with cover crops during germination and establishment, while the cover is growing, and following desiccation and termination. Cover crops that germinate and emerge quickly before weeds grow will be the most effective. Choose single species or mixtures of crops based on lifecycle of weeds present and cover crop growth characteristics. To eliminate potential insect or disease infestations associated with growing green tissue (the green bridge) cover crops should be terminated at least two to three weeks prior to planting the next crop.

Improve Soil Moisture Use Efficiency

Terminate cover crop species early to conserve soil moisture for the following crop and leave residue on the surface. In areas of excess soil moisture such as saline seep recharge areas, include deep-rooted crops and allow cover crop to grow as long as possible to maximize soil moisture removal.

Minimize Soil Compaction

Select cover crop species such as radish and safflower with deep roots that can penetrate compacted layers and increase infiltration. Plants must have quick germination and a rooting depth sufficient to reach nutrients. Planning must provide for adequate time for crops to develop a root system that is able to penetrate compaction layers.

References

Canadian Poisonous Plants Information System. Munro, D. Canadian Biodiversity Information Facility, Government of Canada. http://www.cbif.gc.ca/eng/species-bank/canadian-poisonous-plants-information-system/?id=1370403265036

Guide to Poisonous Plants. Knight, A. P., Colorado State University. http://www.vth.colostate.edu/poisonous_plants/index.cfm

Legume Seed Inoculation. NRCS Plant Materials Tech Note Texas TX-PM-15-01. February 17, 2015.

Nitrate Toxicity of Montana Forages, Glunk, E., Olson-Rutz, K., King, M., Wichman, D., Jones, C. Montana State University Extension MontGuide MT200205AF. Revised March 2015.

Cover Crop Species for Species Purposes

Tables 1-6 have listings of cover crops for erosion control, soil health, deep-rooted species, pollinator species and full production seeding rates. Consult the NRCS State Agronomist prior to planting other species.

TABLE 1. COVER CROP FOR EROSION CONTROL [1/]

Cool Season Broadleaves	Warm Season Broadleaves	Cool Season Grasses	Warm Season Grasses
camelina	buckwheat [3/]	barley, spring	corn
canola, spring	safflower [4/]	oats, spring	millet
clover, spp.	soybean	wheat, spring	sorghum
flax	sunflower	wheat, winter	sudangrass
radishes, deep-rooted (forage or daikon)		triticale, spring	sorghum/sudangrass crosses
sweetclover		triticale, winter	teff
turnips			
vetch, spp. [2/]			

[1/] Cover crop species can have a wide range of seeding dates ranging from spring to fall depending on specific use and climatic conditions. Generally soil moisture must be within the top 2 inches of soil to ensure planting success. Consult the NRCS State Agronomist to plant species not listed.

[2/] Cannot be grown as a single crop, as a component in any pollinator or cover crop mix that will be grazed or in any rotation where lentils or other pulse crops are included in the rotation.

[3/] Cannot be grown in conservation plantings that will be grazed or in areas in rotation with or adjacent to commodity wheat production that will be planted to wheat within the next two calendar years after planting buckwheat. “Adjacent” is designated as within 30 feet of a wheat field.

[4/] Safflower should be planted as early as small grains but needs a full growing season for optimum seed production.

TABLE 2. COVER CROPS FOR SOIL HEALTH [1/]

Cool Season Broadleaves	Warm Season Broadleaves	Cool Season Grasses	Warm Season Grasses
alfalfa	beans, field	barley, spring	corn
beet	buckwheat [3/]	oats, spring	millet
brassica, spp.	chickpea	triticale, spring	sorghum
camelina	cowpea	triticale, winter	sudangrass
canola, spring	mung bean	wheat, spring	sorghum/sudangrass crosses
clover, spp.	safflower [4/]	wheat, winter	teff
flax	soybean		
lentils, spring	sunflower		
peas, field			
radishes, deep-rooted (forage or daikon)			
sweetclover			
turnips			
vetch, spp. [2/]			

[1/] Cover crop species have a wide range of seeding dates depending on specific use and climatic conditions. Generally moisture must be apparent within the top 2 inches of soil to ensure planting success. Consult the NRCS State Agronomist prior to planting other species.

[2/] Cannot be grown as a single crop, as a component in any pollinator or cover crop mix that will be grazed or in any rotation where lentils or other pulse crops will be grown within the next two years.

[3/] Cannot be grown in conservation plantings that will be grazed or in areas in rotation with or adjacent to commodity wheat production that will be planted to wheat within the next two calendar years after planting buckwheat. “Adjacent” is designated as within 30 feet of a wheat field.

[4/] Safflower should be planted as early as small grains but needs a full growing season for optimum seed production.

TABLE 3. DEEP-ROOTED COVER CROPS TO BREAK UP COMPACTED SOILS [1/]

Species	Crop Type	Crop Growth Cycle
Alfalfa	Cool season broadleaf	Perennial
Mustard, brown, yellow, oriental	Cool season broadleaf	Annual
Radish, deep-rooted (forage or daikon) [2/]	Cool season broadleaf	Annual
Safflower [3/]	Warm season broadleaf	Annual
Sunflower	Warm season broadleaf	Annual
Turnip	Cool season broadleaf	Biennial

[1/] Cover crop species have a wide range of seeding dates depending on specific use and climatic conditions. Generally moisture must be apparent within the top 2 inches of soil to ensure planting success. Consult the NRCS State Agronomist prior to planting other species.

[2/] Radish can “bolt” and produce seed (rather than deep roots) based on cool temperatures after emergence and radish type. Oilseed type radishes have shown a greater tendency to “bolt” than daikon or forage types that have been selected for root growth.

[3/] Safflower should be planted as early as small grains but needs a full growing season for optimum seed production.

TABLE 4. BLOOM AND PLANTING INFORMATION FOR ANNUAL CROPS THAT ATTRACT AND BENEFIT HONEY BEES AND OTHER POLLINATORS IN MONTANA

Common Name	Scientific Name	Pollinator Comments	Crop Type	Planting Time	Bloom Period
Buckwheat [1/]	*Fagopyrum esculentum*	Very attractive to honey bees and to a lesser degree other pollinators	Annual	Late Spring	Late Summer
Camelina	*Camelina sativa (l.) Crantz*	Attractive to honey bees and other pollinators when more desirable plants are missing	Annual	Early Spring	Early Summer
Canola, Rapeseed	*Brassica napus*	Attractive to honey bees and other pollinators	Annual	Early Spring	Early Summer
Phacelia	*Phacelia tanacetifolia Benth.*	Attractive to honey bees, bumble bees and other pollinators	Annual	Early Spring	Summer
Safflower	*Carthamus tinctorius L*.	Very attractive to honey bees, bumble bees and other pollinators, excellent source of nectar and pollen.	Annual	Early Spring	Early Summer
Sunflower	*Helianthus annuus L.*	Attractive to honey bees, bumble bees, wild bees, and other pollinators	Annual	Late Spring	Late Summer
Mustard, Yellow, Brown and Oriental	*Brassica, spp.*	Attractive to honey bees, bumble bees and other pollinators	Annual	Early Spring	Early Summer
Clovers, spp.	*Trifolium, spp.*	Many species are good sources of nectar and pollen for bees.	Biennial / Perennial	Spring	Summer
Sweet Clover	*Melilotus, spp.*	Attractive to honey bees and pollinators, excellent source of nectar and pollen. When hayed during flowering has prolific flowering	Annual / Biennial	Early Spring	Summer - Fall
Vetch, spp.[2/]	*Vicia, spp.*	Attractive to bumble bees and other pollinators	Annual / Biennial	Early Spring	Summer - Fall

[1/] Cannot be grown in conservation plantings that will be grazed or in areas in rotation with or adjacent to commodity wheat production that will be planted to wheat within the next two calendar years after planting buckwheat. “Adjacent” is designated as within 30 feet of a wheat field.

[2/] Cannot be grown as a single crop, as a component in any pollinator or cover crop mix in areas in rotation with or adjacent to (within 30 feet) lentil production within two growing seasons after planting lentils or other pulse crops. Vetch, spp. cannot be grown in conservation plantings that will be grazed.

TABLE 5. BLOOM AND PLANTING INFORMATION FOR PERENNIAL SPECIES THAT ATTRACT AND BENEFIT HONEY BEES AND OTHER POLLINATORS IN MONTANA.

Common Name	Scientific Name	Pollinator Comments	Crop Type	Planting Time	Bloom Period
Alfalfa	*Medicago sativa* L.	Attractive to honey bees and other pollinators, excellent source of nectar and pollen but honey bees are not good alfalfa pollinators.	Perennial	Spring	Summer - Fall
Alsike Clover	*Trifolium hybridum*	Attractive to honey bees, bumble bees and to a lesser degree other pollinators	Perennial	Spring	Summer - Fall
Birdsfoot Trefoil	*Lotus corniculatus*	Attractive to honey bees and bumble bees	Perennial	Spring	Summer - Fall
Cicer Milkvetch	*Astragalus cicer*	Attractive to honey bees, bumble bees and other pollinators	Perennial	Spring	Summer - Fall
Red Clover	*Trifolium pretense* L.	Attractive to honey bees and bumble bees	Perennial	Spring	Summer - Fall
Sainfoin	*Onobrychis viciafolia*	Very attractive to honey and bumble bees	Perennial	Spring	Summer - Fall
White Clover	*Trifolium repens*	Attractive to honey bees, bumble bees and other pollinators, excellent source of nectar and pollen.	Perennial	Spring	Summer - Fall

TABLE 6. SEEDING RATES FOR COVER CROPS BASED ON MAXIMUM CROP PRODUCTION [1/] [2/] [3/]

SPECIES	DRILLED SEEDING RATES (lb./ac. PLS)	
	Dryland	Irrigated
alfalfa	5	6
barley, spring	45-60	60-75
beet, sugar	Not recommended	45,000 (# seeds/ac)
Brassica Carinata[4/]	15-17 seeds/ft^2	15-17 seeds/ft^2
buckwheat	40-50	40-50
camelina	3-5	5-7
canola spring	5-8	5-8
chickpea (desi)	80-100	80-100
chickpea (kabuli)	125-150	125-150
clover berseem	8	9
clover, spp.	3-6	3-6
corn	10-15,000 (# seeds/ac)	32-40,000 (# seeds/ac)
cowpea	25-30	30-40
faba bean	4 seeds/ft^2	5 seeds / ft^2
flax	20-30	3-40
lentils, spring (IndianHead 22,000 seeds/lb)	40-70	40-70
millet, foxtail	4-12	4-12
millet, pearl	10-20	10-20
millet, proso	15-30	15-30
mung bean	10-15	15-20
mustard, yellow	8-14	8-14
mustard, brown, oriental	5-8	5-8
oats	50-60	60-70
peas field	70-150	70-150
Phacelia tanacetifolia Benth.	2-3	3-4
rape, *brassica napus*	2-3	2-3
radishes, deep-rooted (forage or daikon)	5-6	6-7
safflower	15-30	15-30
sorghum	5-8	8-10
sorghum / sudangrass crosses	5-8	8-10
soybean	25-40	35-45
sudangrass	25-30	25-30
sunflower	14-21,000 (# seeds/ac)	20-25,000 (# seeds/ac)
sweetclover	4	3-6
teff	4-5	5-6
triticale spring	50-60	60-70
triticale winter	45-55	55-65
turnips	1-2	1–2
vetch, common	60	60
vetch, hairy	25-30	25-30
wheat spring	50-60	60-80
wheat winter	40-60	50-70

[1/] Cover crop species can have a wide range of seeding dates depending on specific use and climatic conditions. Generally soil moisture must be apparent within the top 2 inches of soil to ensure planting success. Consult the NRCS State Agronomist before planting other species.

[2/] Seeding rates are for a single species planted for maximum crop production; adjust rates for mixtures based on desired percent composition of species.

[3/] Seed size can vary widely especially with some species; If possible, calculate seeding rates based on the weight of 1,000 seeds. Consider planting by number of seeds per ft^2 or acre to ensure adequate stands.

Recommended seeding rates for corn, sugar beet and sunflower are based on seeds per acre; *brassica carinata* and faba bean seeding rates are in # seeds/ft^2 with 12-inch row spacing.

4/ *Brassica Carinata*, also called Carinata, Abyssinian mustard, Ethiopian mustard, Abyssinian cabbage (former USSR), Tamu-Texsel (Texas), Ethiopian rapeseed (Europe, trade mark name).

PLANTING METHODS: Each field should be evaluated for weed populations to ensure good stands. Seeding on fields with significant weed or volunteer plant populations will be delayed until weeds are controlled by mechanical tillage, organic methods or chemically with labeled herbicides prior to planting. Check residual effect of previously applied herbicides prior to planting cover crops. Any potential carryover problems must be addressed by delaying seeding, or changing species to prevent planting failures. Ensure adequate moisture is available and good seed to soil contact for germination and seedling growth. Base fertilizer recommendations on current soil test analysis which at the minimum shall include 0-6" analysis for Nitrate (NO_3), Phosphorus-Olsen method (P), Potassium (K), Organic Matter (OM), pH, and Electro Conductivity (EC) and a 6-24" sample for NO_3. Plant at recommended seeding rates and depths, when planting cocktail mixes with different species adjust rates based on desired species percent composition. When small seeded species such turnip and radish are in the mix plant approximately .5 to 1 inch deep. Deeper planting depths may reduce germination of these species. Use a current seed analysis with germination, purity and noxious seed percent and calculate seeding rates based on a Pure Live Seed (PLS) basis.

Establish stand of vegetation according to recommended seeding rates (see Table 6). Control pests according to the Field Office Technical Guide (FOTG), Section IV, Practice Standard for Integrated Pest Management (Code 595). If nutrients are applied, guidelines will follow the FOTG, Section IV, Practice Standard for Nutrient Management (Code 590).

OPERATION AND MAINTENANCE: Perform all seedbed preparation and planting operations in a manner that will minimize erosion until cover establishment. Control weeds in the cover crop by herbicide application or terminate cover crop before seed set of weeds and cover crop species. Annually terminate cover crop as late as possible in summer or fall to maximize plant growth while retaining adequate soil moisture for the subsequent crop. To avoid potential insect or disease infestations associated with green tissue, terminate cover crop at least two to three weeks prior to planting the next crop. If the cover crop is to be grazed, a site-specific inventory of cover crop production and guidance for the estimated number of AUMS of grazing should be provided for each field. Fields should be monitored to ensure adequate residue levels and soil quality objectives are met. Test for nitrate levels in small grains, brassica and other nitrate acclimating species and Prussic acid if sorghum, sudangrass or sorghum sudangrass hybrids are present in the mix prior to haying or grazing. Be careful if livestock are moved from dry pasture or range onto lush green cover crops. Monitor animals to ensure animals are healthy.