



### **SCOPE:**

This work will consist of establishing close growing grasses, legumes, and forbs for seasonal cover and other conservation purposes to:

- Reduce erosion from wind and water.
- Increase soil organic matter content.
- Capture and recycle or redistribute nutrients in the soil profile.
- Promote biological nitrogen fixation and reduce energy use.
- Increase biodiversity.
- Suppress weeds.
- Manage soil moisture.
- Minimize and reduce soil compaction.

### **GENERAL SPECIFICATIONS APPLICABLE TO ALL PURPOSES:**

Plans and specifications for the establishment of cover crops or green manure crops shall be prepared for each site or management unit according to the Criteria and Considerations and Operations and Maintenance procedures described in this standard, and shall be recorded on specification sheets, job sheets, in narrative statements in the conservation plan, or other acceptable documentation, in coordination with any other existing or required conservation systems.

### **SELECTING COVER CROPS:**

Select single species or species mix from the **Tables 1a-1c** that will meet the objectives of the site specific conservation plan. Ensure that cover crop species selected have the proper growth and biomass production characteristics that will complement the time period(s) needing resource protection or enhancement. Species outlined assume typical cropland soil conditions with adequate natural or artificial drainage.

Ensure that crops are compatible with the cropping system and soils. Detailed descriptions of cover crops can be found in [Managing Cover Crops Profitably](#) publication or the [Cornell Cover Crop Guide](#).

### **MATERIALS:**

Where cover crop is applied to certified organic cropland, all materials will meet the [National Organic Program](#) (and [Vermont Organic Farmers](#)) standards approved and meet minimum requirements outlined below.

#### *(a) Seed:*

All purchased seed shall conform to the current rules and regulations of Vermont Agency of Agriculture, Food & Markets and shall meet or exceed the standards for purity and germination of pure live seed (80% germination). No seed will be used with a date of test more than 9 months old. All purchased seed shall be fully tagged or certified by a commercial supplier. Seed that has become wet, moldy or otherwise damaged in transit or storage shall not be used. Farm produced seed shall be germination tested (also to meet 80% germination), as to ensure accurate pure live seeding rates to meet the criteria in this document.

#### *(b) Inoculants:*

The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species.

#### *(c) Lime:*

Lime shall consist of Standard Ground Agricultural Limestone, or approved equivalent. Standard Ground Agricultural Limestone is defined as ground limestone meeting current requirements of the Vermont Agency of Agriculture, Food & Markets. Where lime is specified, an evaluation of potential adverse effects of pH dependent herbicide carry over will be conducted.

#### *(d) Fertilizer:*

Fertilizer, where required, shall be a commercial grade fertilizer and meet the standard for grade and quality specified by Vermont State Law or can be manure/compost. Where fertilizer is furnished from bulk storage, the supplier shall furnish certification of analysis and weight.

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### ESTABLISHING COVER CROPS:

Cover crops may be established using a variety of methods, including broadcasting, interseeding, drilling, frost/dormant seeding, manure slurry seeding, and aerial seeding.

#### *(a) Application of Soil Amendments:*

Apply lime, fertilizer, manure and other organic by products using rates, form, timing and method based on current soil test results and [University of Vermont Extensions Nutrient Recommendations for Field Crops in Vermont](#). Applications of soil amendments must meet the Vermont Nutrient Management (590) standard where applicable.

#### *(b) Timing of Seeding:*

The latest seeding dates for the primary season requiring cover crops are provided in **Tables 1b** and **1c**. The dates in these tables serve as 'base' latest seeding dates for Vermont. For fall and winter cover crops only, refer to the USDA Plant Hardiness Zone Maps (Figure 1) for latest seeding date adjustments based on specific location where cover crop will be planted. Locations within Hardiness Zones 3b-5a require the use of the base latest seeding dates listed in the **Tables 1b** and **1c**. Latest fall and winter seeding dates may be adjusted up to 5 days later from the latest base seeding dates relative to dates in **Tables 1b** and **1c** for the areas located in USDA Plant Hardiness Zone 5b. See attached map.

#### *(c) Seedbed Preparation:*

The seedbed shall be adequate to ensure seed/soil contact and weed control for successful cover crop establishment. Prepare a seedbed by harrowing, cultivating, disking or no-till drilling where practical and effective. If necessary, broadcast planting can occur after seedbed preparation. Seedbed preparation shall be discontinued when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed or when equipment use will compact the soil. Broadcast and aerial seeding without tilling shall be only when seeding can be timed to coincide with optimum soil surface conditions that will result in seed-soil contact. Such conditions include:

- Seeding on moist, loose, friable, weed free soil immediately prior to crop leaf drop, residue additions from harvest, or other additions of surface organic matter including manure;
- Seeding on a loose, friable, weed free soil surface seeding when adequate soil moisture is present or precipitation imminent;
- Seeding during surface freeze thaw cycles with appropriate species and seed type.

On non-cropland sites where equipment cannot operate, the seedbed shall be prepared by hand or other means such that the surface is scarified and roughened so that seed will stay in place.

#### *(d) Seed Inoculation:*

Inoculate legumes with the proper fresh culture no more than 8 hours prior to sowing unless pre-inoculated coated seed is used. If hydro-seeding is used, inoculate immediately prior to hydro-seeding. Use four times the recommended inoculant when hydro-seeding. The inoculant shall be used no later than the date indicated on the container or as otherwise specified. Inoculant shall be used no later than the date indicated on the container or as otherwise specified. Inoculant will be stored according to manufacturer's recommendations until ready for use. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. When used with hydraulic seeding equipment with fertilizer in the mix, the inoculant shall be added last and it shall not remain in the seeder longer than 4 hours.

#### *(e) Inter-seeding:*

Where the cover crop is to be inter-seeded with growing crop, seed cover crop after; or simultaneously with cultivation or side dress incorporation of nitrogen so as to improve seed/soil contact and maintain recommended seeding depth. Soil disturbance should be between all rows. Herbicides used for the primary crop must be compatible with the inter-seeded cover crop. Guidance can be found in Penn State Extension "[Herbicide Carryover Table](#)". Broadcast inter-seeding without tilling will follow broadcast

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requirements in (c) *Seedbed Preparation* above. Inter-seeded cover crops must be timed so as not to adversely affect main crop growth and development. Inter-seeding is best done just before the crop fills the canopy. The cover crop will begin to establish a shallow root system, but will not be overly competitive due to shading by the major crop. The cover crop can reduce damage from harvest traffic, and can help speed the recovery of the soil after harvest. Inter-seeding into a vegetable crop allows the cover crop to establish better in the fall than does a grain sown well after vegetable harvest.

The key to successful seeding is to get the seed in contact with moisture. Under dry conditions, drilling is essential. If the soil surface is moist, broadcasting without covering can be effective. Good seedling growth requires continued moisture. Often seeding can be combined with a final cultivation.

### (f) *Seeding Depth:*

Follow seeding depths specified in **Tables 1b** and **1c** for species and/or species mix selected or follow specification for un-tilled broadcast seeding (c) *Seedbed Preparation* above.

### FROST AND DORMANT SEEDING:

Frost seeding involves broadcasting appropriate species just after snowmelt in late winter/early spring. The freeze-thaw action of the soil works the seed into the soil. Frost seeding should be done early in morning when frost is still in the soil. Seed early enough allow for several freeze-thaw cycles.

Dormant seeding involves broadcasting appropriate species in the early winter just after the field has frozen and the air temperature is low enough to prevent germination. Ideally this is just prior to snowfall. Seeds remain dormant under the snow through the winter and emerge in the spring.

Both frost and dormant seeding are not completely reliable, but should be tried when a fall cover cannot be established. Do not plow, cultivate, or operate heavy equipment on wet/thawed soils. Broadcasting on top of a lot of snow cover is not

recommended because the seed will tend to wash away.

### SEEDING MIXTURES:

Guidance for seed mixtures is provided in **Table 1c**.

Legumes will be scarified if necessary and inoculated with the proper viable rhizobia before planting. For best results, consider selecting pre-inoculated, coated seed when available.

Common mixes for VT include a small grain like winter rye or oats with hairy vetch, red clover or peas. Other common mixes include annual ryegrass and clovers, timothy and alfalfa, and sorghum sudangrass or millets with soybean or cowpea. Trial unfamiliar combinations on a small-scale to determine if they will work.

If soil health is an objective, three to five species of grasses and legumes are generally used to provide maximum diversity.

### GREEN MANURE CROPS:

Whereas winter cover crops are planted primarily to prevent soil erosion and capture excess nutrients, green manure crops are grown during the mid-season primarily to increase soil organic matter, suppress weeds, and to improve soil structure and tilth.

Green manure crops shall be plowed, disked under, or killed as late as feasible to maximize plant biomass production, allowing time needed to prepare the field for planting of the next crop, unless no-tilled. Caution: Winter cereal grains may produce a large volume of carbonaceous material that may tie up nitrogen for the following crop.

### LIVING MULCHES:

Vegetables crop producers should consider using living mulches to prevent erosion, improve soil structure and microbial population, improve water relations, and provide beneficial insect habitat. Legume living mulches provide supplemental N if they are mown and blown to adjacent cash crop rows. Living mulches can be established before or after the cash crop is planted, and can be used

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alone or in combination with plastic mulch. Using a biodegradable black plastic mulch and seed the alley with a living mulch is a management practice that is becoming popular. Typically living mulches should be low growing and tolerate mowing.

### GRAZING:

A number of cover crops can be grazed prior to termination to improve the overall value of the cover crop. Check each cover crop to ensure that the crops pose no danger to livestock. A few examples are: (i) sorghum-sudangrass may cause prussic acid and nitrate poisoning if the young growth is grazed or if the crop is grazed after frost, (ii) alsike clover may cause photo-sensitivity in horses and other livestock (especially white-skinned animals), (iii) turnips may cause copper toxicity in sheep, (iv) red clover contains phytoestrogens that may complicate sheep breeding, and (v) many of the legumes may cause bloat and should not be grazed when wet.

### TERMINATING COVER CROPS:

Cover crops will be terminated by frost, harvest or grazing for forage, roller crimping, tillage, and/or with proper herbicide selection. Timely termination of in season cover crops is required to reduce soil moisture depletion, nitrogen immobilization, allelopathy and to prevent unwanted re-seeding. Timing of cover crop termination must meet the purpose of the cover crop as specified in the conservation plan. Manage cover crop surface residue and biomass production to meet objectives specified in the conservation plan. In vineyards and small fruit operations, grow cover crop in aisles, mow as necessary for mulch cover and maintain as short stubble. Adjust nitrogen application rates for the subsequent crop based on nitrogen credits for specific cover crop species from University of Vermont nutrient guidelines.

Cover crops can be terminated as much as 5 days after the main crop is planted, but must be terminated prior to crop emergence, [NRCS Cover Crop Termination Guidelines – Non-irrigated Cropland](#).

In general, terminate cover crops at least 1-2 weeks prior to planting the cash crop. Small grain cover crops should be at least 12-18 inches high. For organic, no-till systems cover crops can be terminated on the same day as planting. Note that winter cereal grains, such as rye, may produce a large volume of carbonaceous material that may tie up nitrogen for the following crop.

Monitor crop maturity carefully to time termination. When terminating cover crops by mowing or crimping, plants must often be in full flower or fully mature in order to completely kill. Avoid future weed problems by ensuring that cover crops are terminated prior to seed set (unless a reseeding of cover is the goal).

#### (a) *Herbicide Termination:*

Herbicide selection for termination must be made by a Vermont State Certified Pesticide Applicator, Certified Crop Advisor or qualified Extension Specialist following pesticide labeling and must be compatible with the following main crop to be grown.

#### (b) *Winter Kill Termination:*

Ensure that planned cover and biomass production levels can be achieved for the specific cover crop purpose from the conservation plan when using cover crop species that terminate by frost or winter kill. When the objective of the conservation plan is to allow fall manure applications to high Nitrogen Leaching Index (NLI) soils, winter kill termination is not an option and winter hardy cover crops must be used.

#### (c) *Grazing/Haying Termination:*

Cover crops grazed or harvested for forage as a termination method will have a specified amount of target residual biomass left in the field to meet the cover crop objective(s) outlined in the conservation plan. Employ additional termination methods as needed once grazing/haying has concluded and target biomass is achieved and documented. When cover crops are grazed, potential adverse reactions from cover crop consumption by grazing animals must be monitored at all times.

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### (d) Tillage Termination:

Use inversion type tillage implements that will adequately bury and kill the cover crop.

### (e) Roller-Crimper/Mowing Termination:

Rolling/crimping or mowing will take place at the proper cover crop growth stage to limit regrowth potential. For small grains this stage is at the anthesis (full flower formation and pollen shedding), for annual legumes the flowering stage (and pod development for vetch). Direction of rolling/crimping will coincide with planting direction when no-till planting the subsequent crop.

## COMMON COVER CROPS, SEEDING RATES AND LATEST SEEDING DATE TABLES FOR VERMONT:

- (a) The correct table used for species selection must correspond to the purpose outlined in a site specific conservation plan.
- (b) Cover crops will be seeded no later than the dates shown on the appropriate table and adjusted as allowed based on item (b) *Timing of Seeding* (p. 2). Planting at latest seeding date will result in a minimal cover crop performance level for the purpose given. For optimal cover crop establishment and growth, seed earlier than the latest seeding dates indicated.
- (c) Seeding will be at rates no less than the seeding rate specified from the appropriate table. Seeding rates in the tables are for the seeding depths specified.

## COOL-SEASON ANNUAL GRAINS

**Winter Rye** (*Secale cereal*) is the most reliable cool season cover crop. Rye establishes easily, produces a lot of biomass, and suppresses weeds. It can be planted the latest in fall and is the hardiest. Rye may tie up N if not grown with a legume or if incorporated when too mature, though it may mow kill if mowed after it heads out. It is generally incorporated when it is 12-18" tall, about 2 weeks before planting. Rye may be allelopathic if vegetables seeds are planted immediately after rye

termination. Rye is commonly mixed with hairy vetch or red clover.

**Wheat, Triticale, and Spelt** (*Triticum spp.*) are hardy cover crops that can suppress weeds and produce a moderate to high amount of biomass. Triticale is a cross between wheat and rye, and spelt is an ancient subspecies of wheat. Hessian fly can be a problem with wheat and spelt harvested for grain, but is generally not a problem if used solely as a cover crop. Wheat is a good nutrient catch crop and prefers well-drained, fertile soils. Spelt may perform better on poor soils. [Wheat, Triticale and Spelt](#) can also be sown in the early spring and will produce significant biomass in late spring and early summer. These three grains are commonly mixed with peas, vetch, and clover.

**Barley** (*Hordeum vulgare*) is one of the more difficult cereal grains to grow. Although when grown on lighter textured soils it can become deeply rooted and reduce erosion and weed biomass. It does poorly in wet, heavy soils, and is more drought tolerant than other small grains. It is less winter hardy than rye or wheat, and may winterkill in many regions of VT. Check for newer winter barley varieties for improved hardiness. Barley can be killed by mowing or rolling at milk stage. Barley is commonly mixed with peas, oats, and crimson or red clover.

**Oats** (*Avena sativa*) are commonly used in VT as a spring and fall cover. Oats establish rapidly and are easily killed. They provide good erosion control, and tend to leave a clean seedbed. Oats will winterkill in VT and are often used by vegetable growers prior to early spring crops. Commonly used as a nurse crop and mixed with alfalfa, hairy vetch and field peas. Fall oats must be planted earlier than other small grains, and when planted with hairy vetch the cover can provide sufficient soil N for sweet corn growth.

## WARM-SEASON ANNUAL GRAINS

**Buckwheat** (*Fagopyrum esculentum*) is one of the quickest growing summer annuals, and is commonly used as the smother crop, nurse crop and insectary. Buckwheat tolerates poor soils and can extract nutrients from the soil. Plants mature in

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6-8 weeks, and residue degrades rapidly. If mown prior to flowering, the crop should regrow. Buckwheat should be mown or incorporated into the soil before seed set so that it does not become a weed problem.

**Sudangrass, Sorghum, Sorghum-Sudangrass** (*Sorghum bicolor* x *S. bicolor* var *Sudanese*), also known as [Sudax](#), is a vigorous warm season grass that produces large amounts of biomass, increases organic matter, reduces compaction, suppresses weeds and some diseases, and can provide excellent forage and insect habitat. Sudangrass reduces nematodes. Sudax can be mowed 2-3 times when it reaches a height of 3-5 feet (leave at least 6" or 2 nodes for regrowth). This grass is very responsive to nitrogen fertility. These grasses are generally planted through the mid-summer for adequate growth. Sudax will frost kill. These grasses can be mixed with other warm season annuals such as buckwheat, forage [soybeans and cowpeas](#).

**Japanese Millet** (*Echinochloa esculenta*), **Pearl Millet** (*Pennisetum glaucum*), and **Foxtail Millet** (*Setaria italica*) are drought and heat tolerant summer annuals that produce a lot of biomass quickly. These crops withstand cooler and wetter soil conditions than the Sudax and are more appropriate for cooler zones of VT. Plant Japanese and Foxtail millet early in the June to mid-July because later plantings may be weak due to day length response. Pearl millet is very tall and produces the most biomass. Foxtail millet should mow kill, but Japanese and Pearl millet will regrow. These millets are commonly mixed with forage soybeans and cowpeas.

**Teff** (*Eragrostis tef*) is a fine-leaved African grain that shows a lot of potential as a living mulch. It is very drought tolerant, can be surface broadcast, does not need much mowing, and will not go to seed. Ensure a firm seedbed prior to planting. Teff is also a quality forage that can be grazed/hayed during dry summers.

### **LEGUMES**

**Red Clover** (*Trifolium pretense*) is a cool season biennial that is often used as an annual. Red clover

is deep-rooted, produces a lot of N, and provides beneficial insect/pollinator habitat. It tolerates poorly drained and acidic soils. It can be interseeded with many crops, such as small grains after planting, silage corn at last cultivation, or into vegetables before harvest. Red clover does very well when frost-seeded and mixed with small grains or annual ryegrass.

**White Clover** (*Trifolium repens*) is a low growing perennial that produces moderate levels of N, and tolerates traffic and close mowing/grazing. Common [white clover](#) is the lowest growing type that tolerates the most traffic and compaction. Dutch and New Zealand are intermediate, widely available types that are commonly used as living mulches. Ladino clover is the tallest white clover and produces the most nitrogen. White clover does well interseeded or frost seeded, and is often mixed with annual ryegrass, small grains, or red clover.

**Alsike Clover** (*Trifolium hybridum*) is an upright hybrid of red and white clover that produces more N than intermediate types and does the best in poorly drained soil. Alsike can be toxic to horses.

**Yellow Sweetclover** (*Melilotus officinalis*) is a highly productive biennial legume and **White Sweetclover** (*Melilotus alba*) is an annual. Sweetclover produces a lot of N and biomass, has a deep root that breaks up hardpan, and provides beneficial insect habitat. Sweetclover is better suited for well drained and droughty sites. Yellow sweetclover will mow kill after flowering in the second year. Use yellow sweetclover only if it will be grown through the second year, otherwise use annual or 'Hubam'. Sweetclover prefers spring seeding. Hard seed may remain viable in soil for years. Sweetclover can be toxic to livestock.

**Crimson Clover** (*Trifolium incarnatum*) is an annual legume that will winter kill like oats. It establishes easily, produces a moderate to high amount of N and biomass, suppresses weeds, and has beautiful flowers that attract a lot of beneficial insects and pollinators. Select regionally-adapted varieties for improved cold hardiness.

[Crimson clover](#) is easily crimped with a lasting residue. It has potential to be frost seeded,

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crimped, and used as mulch for late planted no-till pumpkin transplants. This clover is often mixed with annual ryegrass, small grains, and brassicas. Caution: may support nematodes that impact tomatoes.

**Subterranean Clover** (*Trifolium subterraneum*) is a low growing, self-seeding annual hardy to 0-15 degree F. It produces a moderate amount of N, provides beneficial insect habitat and is best used as a [living mulch](#). It is a shade tolerant crop that tolerates wet soils, acidic soils, mowing and grazing. Subterranean clover and teff may make a great living mulch. Subterranean clover will reseed and should be mowed or killed prior to seeding if growing leafy greens or other crops where it could be a problem.

**Berseem Clover** (*Trifolium alexandrinum*) is a summer annual with traits similar to subterranean clover. It is a quick growing, heavy N producer that tends to be used as a living mulch. It establishes well with an oat nurse crop, and tolerates most soils except sands. Mix with teff, ryegrass or small grains.

**Hairy Vetch** (*Vicia villosa*) is the most commonly used cool season legume. It is very winter hardy, an excellent N producer, increases nutrient availability, and provides beneficial insect habitat. It is slow to establish and often needs to be grown late into the spring/early summer to produce maximum N. It can provide sufficient N for many vegetable and late planted crops and partially replace N for corn. Smothers spring weeds. Hairy Vetch is commonly planted with winter cereals. This vetch can be killed by mowing if in full flower.

**Field Pea** (*Pisum sativum*) is also known as Canadian Field Pea or Austrian Winter Pea. It is a large seeded, cool-season annual that produces a large amount of nitrogen. Peas generally require support from another cover crop, and should be grown with another small grain like oats. Peas make for a good companion crop as long as the seed is planted deep enough. Though they are cold-tolerant, peas may winterkill in VT.

**Soybean** (*Glycine max*) and **Cowpea** (*Vigna unguiculata*) are summer legumes that produce a

lot of N and are best grown with sorghum-sudangrass or millets. Soybean is more cold tolerant than cowpea and tends to produce more biomass and N, though it is more susceptible to pests and drought. Use regionally adapted forage varieties for maximum benefit. Cowpea requires warmer conditions than soybean, but is more tolerant of poor soils, drought, heat, and pests. Cowpea grows quickly, suppresses weeds, and provides beneficial insect habitat.

**Alfalfa** (*Medicago sativa*) is a perennial cool-season legume that is a superior N fixer, reduces soil compaction, and provides habitat for beneficial insects. It prefers well-drained, fertile soils near pH 7, and is best grown with a small grain nurse crop or perennial grass. Choose varieties with a fall dormancy class of 1-4. More hardy varieties (closer to class 1) tend to yield higher in the spring, but mature later.

**Sunn Hemp** (*Crotalaria juncea*) is a warm season legume that produces significant amounts of nitrogen in 60 days depending on conditions. Its fast growth, tolerance of dry conditions, dense foliage and tall growth habit can add significant amounts of biomass in a short 6-8 week growth window, ideal for most break crop rotations. Mow, till, crimp, or use herbicide application at first flower to terminate.

### **BRASSICAS**

Brassicas can be especially useful for planting after early vegetable crops. Brassica cover crops are well-suited for scavenging residual nitrogen in the fall because they grow rapidly during periods of cool weather. Some Brassicas are used to reduce the level of soil pathogens through [biofumigation](#); however, Brassica cover crops should not be used before or after other Brassica vegetables. Mix with annual ryegrass and clovers. Note: brassica cover crops can cause and harbor many of the same diseases as vegetable crop brassicas such as club root.

**Forage Radish** (*Raphanus sativus*) and **Forage Turnip** (*Brassica rapa*) are deep-rooted cover crops that can reduce surface and subsoil compaction, scavenge N, and suppress weeds. Plant early

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enough to ensure that roots mature and grow deep. Will winterkill and leave a clean seedbed for early vegetable crops. *Do not let it go to seed.*

**Mustard** and **Canola** (*Brassica* spp.) grows rapidly in the spring and fall and can produce abundant biomass. These species are effective at scavenging nutrients, preventing erosion, and decreasing soil-borne pathogens. *Do not let them go to seed.*

### GRASSES

**Annual** and **Perennial Ryegrass** (*Lolium* spp.) are cool season grasses with a high utility value because they establish easily when surface broadcast and can be interseeded, frost-seeded, and dormant seeded. Ryegrass produces a tremendous amount of biomass, reduces surface compaction, scavenges nutrients, and is a strong erosion fighter. Annual varieties tend to be cheaper than perennial, are used as cool and warm-season cover, and are used as living mulches. Southern varieties will winterkill, whereas regionally adapted annual varieties may overwinter in warmer areas of VT. Perennial rye may be short-lived.

**Orchardgrass** (*Dactylis glomerata*) and **Timothy** (*Phleum pratense*) are perennial grasses that are commonly used forages in the VT. They are highly productive and should be planted with clovers. Like alfalfa and sweetclover, these grasses are best used as a cover crop if grown for a full season and terminated in the second year.

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Table 1a - VT 340	Purpose										Other Roles & Characteristics											
Cover Crop	Reduce Erosion	Increase SOM	Recycle Nutrients	Fix Nitrogen Save Energy	Improve Biodiversity	Suppress Weeds	Remove Excess Soil Moisture	Loosen Topsoil	Reduce Subsoil Compaction		Grazing Potential	Living Mulch	Broadcast Interseed	Companion Crop	Nurse Crop	Reduce Soil Diseases	Rapid Growth	Drought Tolerant	Flooding Tolerant	Shade Tolerant	Reseeds (Potential Weed!)	
<b>Cool-Season Grains</b>																						
Winter Rye	✓+	✓+	✓+			✓+	✓+	✓			✓-		✓		✓	✓	✓	✓	✓-	✓	✓	
Triticale and Spelt	✓	✓+	✓			✓	✓+	✓	✓-		✓				✓+		✓	✓-				
Wheat	✓	✓+	✓			✓	✓+	✓	✓-		✓				✓+		✓	✓-		✓-	✓-	
Barley	✓+	✓+	✓		✓-	✓	✓	✓	✓-		✓				✓+	✓-	✓	✓		✓-	✓	
Oats	✓-	✓	✓-			✓+	✓	✓			✓-	✓-	✓-	✓+	✓+	✓-	✓+		✓-			
<b>Warm-Season Grains</b>																						
Buckwheat		✓-	✓+		✓+	✓+		✓						✓+	✓		✓+					✓+
Sorghum/Sudangrass	✓+	✓+	✓+		✓-	✓+	✓-	✓-	✓+		✓					✓	✓+	✓+	✓-	✓-	✓-	✓-
Japanese/Foxtail Millet	✓	✓+	✓			✓+		✓			✓+				✓		✓	✓+				✓-
Pearl Millet	✓	✓+	✓			✓+		✓			✓-						✓	✓+				✓-
Teff	✓+	✓	✓-			✓-		✓			✓+	✓+	✓-	✓-	✓			✓+				
<b>Legumes</b>																						
Red Clover	✓-	✓	✓	✓	✓+	✓-	✓	✓-	✓		✓+		✓+	✓+					✓-	✓		
White or Alsike Clover	✓	✓		✓	✓	✓	✓	✓			✓+	✓	✓	✓				✓-	✓	✓	✓	✓+
Berseem Clover	✓	✓+	✓+	✓+	✓-		✓+	✓			✓+	✓+	✓	✓	✓		✓+	✓-	✓-	✓		
Sweetclover	✓	✓+	✓+	✓+	✓+	✓	✓	✓	✓+		✓						✓-	✓+				✓-
Crimson Clover	✓	✓		✓	✓+		✓-	✓-			✓+		✓+	✓+			✓-			✓		✓+
Subterranean Clover	✓	✓		✓	✓	✓+	✓+	✓-			✓	✓+	✓+	✓+			✓-	✓	✓-	✓	✓	✓+
Alfalfa	✓	✓+		✓+	✓		✓		✓+		✓+											
Hairy Vetch	✓-	✓+	✓-	✓+	✓	✓	✓	✓	✓-		✓-	✓-	✓	✓		✓-		✓-		✓-	✓-	✓-
Field Pea/Winter Pea	✓	✓		✓+	✓		✓	✓			✓			✓+	✓	✓	✓	✓-				

## SPECIFICATION GUIDE SHEET- COVER CROP (340)

United States Department of Agriculture  
Natural Resources Conservation Service

Table 1a - VT 340 (Continued)	Purpose									Other Roles & Characteristics										
Cover Crop	Reduce Erosion	Increase SOM	Recycle Nutrients	Fix Nitrogen Save Energy	Improve Biodiversity	Suppress Weeds	Remove Excess Soil Moisture	Loosen Topsoil	Reduce Subsoil Compaction	Grazing Potential	Living Mulch	Broadcast Interseed	Companion Crop	Nurse Crop	Reduce Soil Diseases	Rapid Growth	Drought Tolerant	Flooding Tolerant	Shade Tolerant	Reseeds (Potential Weed!)
Soybean	✓-	✓		✓+				✓		✓			✓+				✓			
Sunn Hemp	✓-	✓		✓+				✓		✓			✓+				✓			
Cowpea	✓+	✓	✓-	✓+	✓	✓+		✓	✓-	✓-			✓			✓	✓		✓-	
<b>Brassicas</b>																				
Radish or Turnip	✓	✓	✓+			✓+		✓-	✓+	✓-		✓	✓-			✓			✓-	✓-
Mustard or Canola	✓	✓	✓		✓-	✓-		✓		✓-		✓	✓-	✓-	✓+	✓	✓		✓-	✓+
<b>Grasses</b>																				
Annual Ryegrass	✓+	✓+	✓+			✓+	✓+	✓+		✓+	✓	✓+	✓+	✓+	✓-	✓		✓	✓	✓+
Perennial Ryegrass	✓+	✓+	✓+			✓	✓+	✓+		✓+	✓	✓+	✓	✓	✓-	✓		✓	✓	✓
Orchardgrass	✓+	✓+	✓-			✓	✓+	✓		✓+		✓				✓		✓	✓-	✓
Timothy	✓+	✓+	✓-			✓	✓+	✓		✓		✓-						✓-		✓
<b>Rating: Above Average (✓+); Average (✓); Below Average/Unknown (✓-). Blank = Not Recommended</b>																				

Refer to text in accompanying Planting Specification Guide for more information about selecting and managing each cover crop.

## SPECIFICATION GUIDE SHEET- COVER CROP (340)

United States Department of Agriculture  
Natural Resources Conservation Service

Table 1b - VT 340	Min. Seeding Rate (lbs/acre)		Seeding Depth	Latest Seeding Dates* (USDA Hardiness Zones 3b – 5a)				Primary Purpose**			Termination Method				
	Broadcast (Includes aerial apply)	Drilled or Planted	Inches	Fall Cover	Winter Cover	Spring Cover	Summer Cover	Erosion	Nitrogen Fixation	Nutrient Scavenge	Mow	Till	Crimp	Winter	Chemical
<b>Cool-Season Grains</b>															
Winter Rye	112	75	1-2	Aug. 15	Oct. 1	NA	NA	x		x	x	x	x		x
Winter Triticale/Wheat/Spelt	112	75	1-2	Aug. 15	Oct. 1	NA	NA	x		x	x	x	x		x
Spring Wheat, Triticale, Barley	100	75	1-2	Aug. 15	Sept 15	April 15	June 1	x		x	x	x	x	x	x
Oats***	112	75	1-2	Aug. 15	Sept 15	April 15	June 1	x		x	x	x	x	x	x
<b>Warm-Season Grains</b>															
Buckwheat	70	60	½-1½	Sept 15	April 15	June 1	June 1	x		x	x	x		x	x
Sorghum/Sudangrass	50	35	½-1½	Aug. 15	Aug. 15	NA	July 1	x		x	x	x		x	x
Japanese/Foxtail Millet	40	25	½-1½	Aug. 1	Aug. 1	June 1	July 1	x		x	x	x		x	x
Pearl Millet	30	20	¼-½	Aug. 1	Aug. 1	June 1	July 1	x		x	x	x		x	x
Teff	8	5	0-¼	Aug. 1	Aug. 1	June 1	July 1	x		x	x	x		x	x
<b>Legumes</b>															
Red Clover	12	10	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x			x
White or Alsike Clover	10	8	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x			x
Berseem Clover	18	10	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x		x	x
Sweetclover	15	8	¼-½	Aug. 15	Aug. 15	April 15	May 15		x		x	x			x
Crimson Clover	25	20	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x	x	x	x
Subterranean Clover	25	15	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x			x
Alfalfa	20	15	¼-½	Aug. 15	Aug. 15	April 15	May 15		x			x			x
Hairy Vetch	35	20	½-1½	Aug. 15	Sept 15	April 15	April 15		x		x	x	x		x
Field Pea/Winter Pea***	100	65	½-1½	Aug. 15	Sept 1	April 15	April 15		x		x	x		x	x
Soybean	120	90	1-2	Aug. 1	NA	NA	June 15		x		x	x		x	x

## SPECIFICATION GUIDE SHEET- COVER CROP (340)

United States Department of Agriculture  
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Table 1b – VT 340 (Continued)	Min. Seeding Rate (lbs/acre)		Seeding Depth	Latest Seeding Dates* (USDA Hardiness Zones 3b – 5a)				Primary Purpose**			Termination Method				
	Broadcast (Includes aerial apply)	Drilled or Planted	Inches	Fall Cover	Winter Cover	Spring Cover	Summer Cover	Erosion	Nitrogen Fixation	Nutrient Scavenge	Mow	Till	Crimp	Winter	Chemical
Sunn Hemp	50	30	½-1	July 15	NA	NA	June 15				x	x	x	x	x
Cowpea	100	60	¾-1½	July 1	NA	NA	June 15		x		x	x		x	x
<b>Brassicas</b>															
Forage Brassica (Radish, Turnip, Spring Canola)	15	10	¼-½	Aug. 15	Sept 1	April 15	May 15	x		x		x		x	x
Mustard	10	6	¼-½	Aug. 15	Aug. 15	April 15	May 15	x		x		x		x	x
Winter Canola	10	6	¼-½	Aug. 15	Sept 15	April 15	May 15	x		x		x			
<b>Grasses</b>															
Annual Ryegrass	30	20	0-½	Aug. 15	Sept 1	April 15	May 15	x		x		x		x	x
Perennial Ryegrass	35	25	0-½	Aug. 15	Sept 1	April 15	May 15	x		x		x			x
Orchardgrass	20	15	0-½	Aug. 15	Sept 1	April 15	May 15	x		x		x			
Timothy	15	10	0-½	Aug. 15	Sept 1	April 15	May 15	x		x		x			
<p><i>*Locations in USDA Hardiness Zone 5b may plant up to 5 days later for the Fall and Winter Cover dates.</i></p> <p><i>**Other purposes may also be accomplished, but this is meant to help you select cover crops to address the primary resource concern in the conservation plan.</i></p> <p><i>***If using as a nurse/companion crop, seed at half the rate.</i></p>															

## SPECIFICATION GUIDE SHEET- COVER CROP (340)

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Table 1c - VT 340	Min. Seeding Rate (lbs/acre)		Seeding Depth	Latest Seeding Dates* (USDA Hardiness Zones 3b – 5a)				Primary Purpose**		
	Broad - cast (includes aerial apply)	Drilled or Planted	Inches	Fall Cover	Winter Cover	Spring Cover	Summer Cover	Erosion	Nitrogen Fixation	Nutrient Scaveng
<b>1-1</b>										
Ryegrass-annual or perennial	20	15	¼-½	Aug. 15	Sept 1	April 15	May 15	x		x
Radish/Canola/Turnip/Rapeseed	4	3								
<b>1-2</b>										
Winter Small Grain	85	60	½	Aug. 15	Sept 15	NA	NA	x		x
Radish/Canola/Turnip/Rapeseed	4	3								
<b>1-3</b>										
Spring Small Grain	85	60	½	Aug. 15	Sept 1	April 15	May 15	x		x
Radish/Canola/Turnip/Rapeseed	4	3								
<b>1-4</b>										
Spring Small Grain	85	60	¾	Aug. 15	Aug. 15	April 15	May 15	x		x
Mustard	4	3								
<b>1-5</b>										
Winter Small Grain	60	40	½	Aug. 15	Sept 1	NA	NA	x	x	x
Red Clover	6	5								
Radish/Canola/Turnip/Rapeseed	4	2								
<b>1-6</b>										
Ryegrass-annual or perennial	15	12	¼-½	Aug. 15	Sept 1	April 15	May 1	x	x	
Red Clover	8	6								
<b>1-7</b>										
Winter Small Grain	70	56	1-1½	Aug. 15	Sept 1	April 15	May 1	x	x	
Hairy Vetch	20	15								
<b>1-8</b>										
Winter Small Grain	85	60	½	Aug. 15	Sept 1	April 1 Frost seeding	April 1 Frost seeding	x	x	
Clover- Red, Ladino, Berseem, Crimson, Yellow, Sweet	8	6								
<b>1-9</b>										
Winter Small Grain	70	56	1	Aug. 15	Sept 1	NA	NA	x	x	
Austrian Winter Pea	60	40								

\*Locations in USDA Hardiness Zone 5b may plant up to 5 days later for the Fall and Winter Cover dates.

\*\*Other purposes may also be accomplished, but this is meant to help you select cover crops to address the primary resource concern.

**SPECIFICATION GUIDE SHEET- COVER CROP (340)**

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**Figure 1**

