NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATION

COVER CROP

(acre)
CODE 340

SCOPE

This document establishes the technical details, workmanship, and quality and extent of materials required to install the practice in accordance with the Conservation Practice Standard. The information shall be considered when preparing site-specific specifications for the practice.

The site-specific specifications for installing, operating, and maintaining the practice on a specific field or treatment unit shall be documented via the NRCS Hawaii Jobsheet for this practice and given to the client. Other documents such as practice worksheets, maps, drawings, and narrative statements in the conservation plan may be used to plan or design the practice and to prepare the site-specific specifications.

SPECIES SELECTION

Refer to Tables 1 and 2 for adapted cover crop plants, seeding or planting rates, rainfall and elevation requirements and other cultural information.

ESTABLISHMENT

Seeding

Seedbed Preparation

Seedbed preparation shall consist of rototilling, plowing, ripping or disking. Prepare a firm seedbed. Use no-till seeding methods and equipment, where practicable.

Seeding Method

Seeding may be accomplished by either broadcasting or drilling.

Where seed is broadcast, dragging the area with a chain, or light plank will help to ensure good soil-seed contact. Shallow disking or rototilling is also effective.

Depth of seeding depends on seed size, soil moisture and soil texture. Plant deeper when soil moisture is low and shallow when moisture is abundant. Large seeds are generally planted deeper than small seeds. A general recommendation is to plant at a depth equal to four times the diameter of the seed.

To achieve rapid cover when establishing a permanent or perennial cover crop, include rapidly growing annuals such as ryegrass and oats in the seed mixture. Use approximately one-half the seeding rates listed in Table 1 for these annuals when mixing them with the perennials. Seed the perennials at the fully recommended rate.

Vegetative

Land Preparation and Planting Methods

Land preparation will be the same as for seedbed preparation described for seeding. Vegetative material should be evenly distributed on the prepared ground and disked in.

For a more positive placement of the vegetative material, seedbed preparation may be followed by plowing furrows at a maximum depth of 6 inches. Vegetative material is then placed in the furrows. Cover the material with soil by disking, or other suitable means, in the direction of the furrow; then compact lightly to ensure good plant-soil contact.

Dense plantings will produce a quicker stand of grass with fewer weeds. Unless planting material is limited, make the furrows about 3 feet apart and place the stolons, sprigs or rhizomes as close as practicable in the furrows.

Adequate moisture is critical for successful planting. Plant only after the rainy season has begun or provide irrigation until the plants are well established.

Where topography permits, seedbed or site preparation, seeding and vegetative planting shall be cross-sloped or on the contour to minimize erosion hazard.

Fertilization

When a cover crop is used for soil improvement, microorganisms will utilize or tie up about 25 pounds of nitrogen per ton of dry matter in the decomposition process. For non-legumes, nitrogen fertilizer added as the soil improving crop is incorporated into the soil will speed decomposition and prevent a temporary shortage for the subsequent crop. This application should be part of the nitrogen that would be applied for the subsequent crop as determined by soil tests.

The **Nutrient Management** (590) standard and the specification must be used when working with the land user on a fertilizer program.

Fertilizer and other amendments should be applied according to soil test results and recommendations.

Nitrogen credits from legume cover crops will be accounted for in the nutrient management plan.

MANAGEMENT

For maximum nutrient addition, incorporate the annual cover crop when immature. For the maximum addition of organic matter, incorporate the cover crop when mature but before it seeds or becomes too fibrous, making it difficult to incorporate into the soil. The subsequent crop should be planted when most or all of the soil improving cover crop is decomposed. The rate of decomposition is affected by various factors such a soil moisture, soil temperature, yield and maturity of the cover crop.

If a cover crop is grazed, it must be part of a grazing management system that permits adequate control of the livestock. Refer to the **Prescribed Grazing** (525) standard.

WEED CONTROL

Mechanical mow with a rotary or flail mower when the weeds overtop a newly planted cover crop. Mow permanent or perennial cover crops as needed to control weeds and maintain a desirable height. Annual cover crops planted for soil improvement will usually do a good job of smothering weeds if planted at the recommended PLS rate.

Chemical weed control may be appropriate in permanent or perennial cover crops. Do not use when a full cover of desirable legumes is present unless the legumes are tolerant to the herbicide used. The Pest Management standard and specification must be used when working with the land user on a weed control program.

Cooperators should be aware of and adhere to the provisions of state and federal laws and regulations concerning the use of agricultural chemicals.

Spot Control of Undesirable Weeds

Use appropriate chemicals according to manufacturer's recommendations, treating individual weeds or patches of weeds carefully, avoiding the desired species.

Wick Applications

Use appropriate chemicals according to manufacturer's recommendations on weeds that are at least 6 inches taller than the desired species. Wick applicators are useful for cover crops in orchards since there is no chemical drift produced that can damage young trees.

SEEDING MIXTURES

Where more than one species is to be seeded, reduce the seeding rate for each species in proportion to the number of species in the mixture.

TABLE 1 - SPECIES FOR SEASONAL COVER CROPS*

Species & Cultivars	Min. Broadcast Seeding Rates Lbs. PLS/Ac.	pH Range	Inoculant Group	Approx. Growing Time in Days	Approx. Dry Matter Yield T/Ac.	Approx. N Content lbs/T Dry Matter	Lbs. Of Actual N/T Dry Matter to Add at Plow Down	Optimum Planting Period & Elevation Range (ft.)
Legumes:								
Alfalfa (*Medicago sativa*) cv. CUF-101 WL- 516 WL- 605 WL-711 WF 1/	20	6.0 – 8.0	Alfalfa	90	1.5	85	0	Year round 0-4000’
Clover, Sweet 5/ (*Melilotus alba*) cv. Hubam	20	6.0-8.0	Clover	90	2.5	63	0	Year round 0-2500’
Cowpea (*Vigna unguiculata*) cv. Mississippi Pinkeye Purple Hull 1/	60	5.5 – 8.3	Cowpea	90	2	59	0	Year round 0-1000’ spring/summer 0-2500’
Lablab 4/ (*lablab purpureus*) cv. Rongai	60	4.5 – 6.5	Lablab specific	60	2.5	50	0	Year round 0-4000’
Pigeonpea (*Cajanus cajan*)	40 – 60 3/	5.0 – 8.3	Cowpea	90	2.5	50	0	Year round 0-3000’
Mung Bean (*Vigna radiata*)	80	5.4 – 8.3	Cowpea	60	1.5	60	0	Year round 0-1000’ spring/summer 0-2500’
Soybean (*Glycine max*)	75	5.5 – 8.3	Soybean	90	1.5	51	0	Year Round 0-2500’
Sunn Hemp 1/ (*Crotalaria juncea*) cv. Tropic Sun	40 – 60 3/	5.0 – 7.0	Cowpea	60	2.5	51	0	Year Round 0-1000’ spring/summer 0-2500’

TABLE 1 - SPECIES FOR SEASONAL COVER CROPS* (continued)

Species & Cultivars	Min. Broadcast Seeding Rates Lbs. PLS/Ac.	pH Range	Inoculant Group	Approx. Growing Time in Days	Approx. Dry Matter Yield T/Ac.	Approx. N Content lbs/T Dry Matter	Lbs. Of Actual N/T Dry Matter to Add at Plow Down	Optimum Planting Period & Elevation Range (ft.)
Vetch, woolypod 4/ 5/ (*Vicia villosa* ssp. *varia*) cv. Lana Namoi	40 – 60 3/	4.5 – 7.0	Pea/vetch	90	1.5	73	0	Year round 1500'-4000' fall/winter 0- 4000'
Vetch, purple 4/ (*Vicia benghalensis*)	50	4.5-6.5	Pea/vetch	90	1.5	73	0	Year round 1500'-4000'
Vetch, common 4/ (*Vicia sativa*)	60	4.5 – 6.5	Pea/vetch	90	1.5	60	0	Year round 1500'-4000'
Non-Legumes:								
Barley 5/ (*Hordeum vulgare)*	70	5.0 – 8.3		90	1	18	20	Year round 0-4000'
Buckwheat 4/ 5/ (*Fagopyrum esculentum*) cv. Japanese, Common	60	4.5 – 6.5		30	1.5	18	20	Year round 0-4000'
Millet, pearlmillet (*Pennisetum americanum*)	50	5.5 – 8.3		60	2	19	20	Year round 0-1000' spring/summer 0-2500'
Oats, black (*Avena strigosa*) cv. IAPAR-61 1/ 5/	70	5.5 - 7.0		60	1.5	16	20	Year round 0-4000'
Oats, common 5/ (*Avena sativa*) cv. Coker 234 2/ Steele Swan Walken	70	5.5 – 7.0		60	1.5	16	20	Year round 0-4000'

TABLE 1 - SPECIES FOR SEASONAL COVER CROPS* (continued)

Species & Cultivars	Min. Broadcast Seeding Rates Lbs. PLS/Ac.	pH Range	Inoculant Group	Approx. Growing Time in Days	Approx. Dry Matter Yield T/Ac.	Approx. N Content lbs/T Dry Matter	Lbs. Of Actual N/T Dry Matter to Add at Plow Down	Optimum Planting Period & Elevation Range (ft.)
Oats, red (*Avena bysantina*)	70	5.5 – 7.0		60	1.5	16	20	Year round 0-4000'
Ryegrass, annual 5/ (*Lolium multiflorum*) cv. Tam 90 (*Lolium rigidum*) cv. Wimera 62	40	5.5 – 7.0		90	1	13	25	Year round 0-4000'
Sorghum x sudangrass (*Sorghum* hybrids) 1/ 5/ Sorghum, forage (*Sorghum bicolor*)	50	5.5 – 8.3		60	3	13	25	Year round 0-1000' spring/summer 0-2500'
Rye grain 5/ (*Secale cereale*) cv. Danko, Elbon	70	5.5 – 7.0		90	1.5	18	20	Year round 0-4000'
Sudangrass (*Sorghum bicolor* var. *sudanese*) 1/	50	5.5 – 8.3		60	3	13	25	Year round 0-1000' spring/summer 0-2500'
Wheat (*Triticum aestivum*)	70	5.5 – 8.3		90	1.5	16	20	Year round 0-4000'

* This list not all-inclusive. Other species may be used based on prescriptions by qualified NRCS technical specialists.
1/ Resistant to root-knot nematodes.
2/ Rust resistant.
3/ Increase seeding rate to 60 lbs/A if incorporating early, to produce finer stemmed material that is easier to till into the soil, or if severe weed competition is expected.
4/ Tolerates acid/low fertility soils.
5/ Suppresses weeds (allelopathic).

TABLE 2 - SPECIES FOR PERMANENT COVER CROPS

Species & Cultivars 1/	Min. Seeding Rate (lbs) PLS/Ac	pH Range	Inoculant Group	Planting Rate 2/ Bu/Ac	Maintenance Required	Shade Tolerance	Drought Tolerance	Rainfall Range (in.) 3/	Rate of Establishment	Elevation Range (ft.)
Legumes:										
Clover, white (*Trifolium repens*) cv. Haifa Grasslands Huia (New Zealand) Common	10	5.5-7.0	Clover		Medium	Fair	Fair	35-80	Medium	1500-7000
Desmodium (*Desmodium aparines*) (syn. *D. intortum*) cv. Kuiaha Greenleaf	20	5.5-7.0	Cowpea		Medium	Fair	Fair	35-50	Medium	0-2500
Hetero 5/ (*Desmodium heterophyllum*)	20	4.0-7.0	Cowpea	40-80	Low	Fair	Fair	50+	Medium	0-2500
Kaimi clover 5/ (*Desmodium canum*)	20	4.5-7.0	Cowpea	40-80	Medium	Fair	Good	35+	Medium	0-3000
Peanut, forage (A*rachis pintoi*) cv. Amarillo Forrajero	20	5.0-7.0	Peanut	40-80	Low	Fair	Fair	50+	Medium	0-3000
Stylo 5/ (*Stylosanthes guianensis*) cv. Cook Endeavour Oxley Schofield	25	4.0-8.3	Stylo specific		Medium	Fair	Fair	50+	Medium	0-3000
Three-flowered beggarweed 5/ (*Desmodium triflorum*)	20	4.5-7.0	Cowpea	40-80	Low	Fair	Fair	35+	Medium	0-2500

TABLE 2 - SPECIES FOR PERMANENT COVER CROPS (continued)

Species & Cultivars 1/	Min. Seeding Rate (lbs) PLS/Ac	pH Range	Inoculant Group	Planting Rate 2/ Bu/Ac	Maintenance Required	Shade Tolerance	Drought Tolerance	Rainfall Range (in.) 3/	Rate of Establishment	Elevation Range (ft.)
Trefoil, big 4/ (*Lotus pedunculatus*) cv. Grasslands Maku	10	5.0-7.0	Lotus specific		Medium	Fair	Fair	50+	Medium	1500-6000
Non-Legumes:										
Bahiagrass 5/ *(Paspalum notatum)* cv. *Pensacola Wilmington*	40	4.0-6.5		40-80	Low	Fair	Fair	40+	Slow	0-4500
Bermudagrass 4/ 6/ (*Cynodon dactylon*) cv. NK-37 common	35	5.0-8.0		40-80	Medium	Poor	Very Good	20-80	Medium	0-3000
Carpetgrass, narrowleaf 5/ (*Axonopus affinis*)	40	4.0-7.0		40-80	Medium	Fair	Poor	50+	Medium	0-2000
Carpetgrass, broadleaf 5/ (*Axonopus compressus*)		4.0-7.5		40-80	Low	Good	Fair	50+	Medium	0-3000
Centipedegrass (*Eremochloa ophiuroides*)	5	5.5-7.5		40-80	Low	Good	Good	35+	Slow	0-2500
Digitgrass 4/ 5/ 6/ (*Digitaria decumbens*) cv. Transvala (dwarf pangola) Pangola (common)		4.2-8.5		40-80	Medium	Fair	Fair	40+	Medium	0-2500
Kikuyugrass 4/ (*Pennisetum clandestinum*) cv. Whittet	5	5.0-8.3		40-80	High	Fair	Good	35+	Rapid	0-6000

TABLE 2 - SPECIES FOR PERMANENT COVER CROPS (continued)

Species & Cultivars 1/	Min. Seeding Rate (lbs) PLS/Ac	pH Range	Inoculant Group	Planting Rate 2/ Bu/Ac	Maintenance Required	Shade Tolerance	Drought Tolerance	Rainfall Range (in.) 3/	Rate of Establishment	Elevation Range (ft.)
Paspalum 4/ 5/ (*Paspalum hieronymii*) cv. Tropic Lalo		4.5-7.0		40-80	Low	Fair	Fair	40+	Rapid	0-4000
Rhodesgrass (*Chloris gayana*) cv. Bell Nemkat 6/	40	5.0-8.3		40-80	Medium	Poor	Very Good	20-40	Rapid	0-3000
Ryegrass, perennial (*Lolium perrene*)	40	5.0-7.0			Medium	Good	Poor	40+	Medium	1500-7000
St. Augustinegrass (*Stenotaphrum secundatum*)		5.0-7.0		40-80	Medium	Very Good	Fair	40+	Slow	0-3000
Stargrass (*Cynodon plectostachyus*) cv. South Point (*Cynodon nlemfuensis*) cv. Florico (P. R.)		5.0-8.0		40-80	Medium	Poor	Very Good	20-80	Rapid	0-3000
Zoysia (*Zoysia japonica*)	10	5.0-8.0		40-80	Low	Good	Good	35+	Slow	0-4000

1/ This list is not all-inclusive. Other species may be used for this practice based on prescriptions by qualified NRCS technical specialists.
2/ Vegetative material such as sprigs or stolons, maximum 3' x 3' spacing.
3/ If irrigated, most species will grow in areas drier than indicated.
4/ In Hawaii Plant Guide series.
5/ Tolerates acid/low fertility soils.
6/ Resistant to root-knot nematodes.