

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

CRITICAL AREA PLANTING
(acre)
CODE 342

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 NRCS Hawaii Jobsheet for this practice shall be used to document the site-specific specifications for installing, operating, and maintaining the practice on a specific field or treatment unit. Other documents (worksheets, maps, drawings, and narrative statements in the conservation plan) may be used in addition to the Jobsheet to document site specifications or to plan or design the practice.

SPECIES SELECTION

Refer to Table 1 for information about adapted plants, seeding or planting rates and rainfall and elevation requirements. The Table and pictures of most of the plants are also included in the Hawaii Vegetative Guide available online at:

<ftp://ftp-fc.sc.egov.usda.gov/HI/pub/technotes/vegetative/>

ESTABLISHMENT

By Seeding

Seedbed Preparation. Seedbed preparation shall consist of plowing or ripping, followed by disking where soil conditions permit. Prepare a firm seedbed. Use no-till seeding methods and equipment, where practicable. If planting large areas of sloping land and no-till is not possible, establish new plantings in increments or in strips alternating with undisturbed areas to minimize erosion. Soil disturbance should be kept to a minimum.

Seeding Method and Planting Requirements. Seeding may be accomplished by either broadcasting, drilling, or hydroseeding.

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

Depth of seeding depends on seed size, soil moisture and soil texture. A general recommendation is to plant 1/4-1/2 inch deep on medium - to fine textured soils and 1/2 -1 inch deep on coarse - textured soils. Plant seeds deeper when soil moisture is low and shallow when moisture is abundant. Large seeds are generally planted deeper than small seeds.

Hydroseeded plantings must not be allowed to dry out. Germination and seedling emergence may be low if the mulch/seed mixture is not kept moist. Provide irrigation, as needed, until the plants are well established.

By Vegetative Method (Stolons, Sprigs, Rhizomes, or Seedlings)

Land Preparation and Planting Requirements. Where terrain permits the use of heavy equipment, land preparation will be the same as for seedbed preparation described above. 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 and a maximum spacing of 3 feet apart. Vegetative material is then placed in the furrows at a maximum spacing of 3 feet between sprigs. 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 less weeds. Unless planting material is limited, make the furrows about 3 feet apart or less and place the stolons, sprigs or rhizomes as close as practicable in the furrows.

A mechanical sprig planter may be used, soil conditions and terrain permitting.

Where terrain restricts the use of heavy equipment, the minimum site preparation shall consist of providing 6-inch deep holes at the maximum spacing of 3 feet by 3 feet. Fertilize according to soil test recommendations. Place the recommended amount of fertilizer in each hole and cover with approximately 1 inch of soil. Sprigs should be inserted at least 5 inches in the hole. The sprigs should have a minimum of two nodes. The hole should then be filled with soil and compacted to ensure good plant-soil contact. Leave at least a 1-inch depression in the hole to trap rainwater and other moisture.

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.

Woody Plant Seedlings. Dibble tube or potted stock is preferred to bare-root stock. Plant seedlings as deep as they grew in the nursery with roots naturally positioned in an adequately sized planting hole. If the survival rate at the end of a year is less than 80 percent, the dead plants will be replaced as soon as possible.

FERTILIZATION

The Nutrient Management (590) standard and 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.

MANAGEMENT

Unsuccessful Plantings. In the event of failures, follow-up seeding, sprigging or planting of seedlings will be done as soon as practicable.

Protection. The critical area planting will be protected from traffic, fire and grazing. Refer to practice standard Use Exclusion (472).

Mulching. Materials such as hay, straw or wood chips will be used where appropriate. Apply the mulch by hand, blower or other suitable equipment. If hay or straw is applied with a blower, at least 50% of the stems should be more than 6 inches in length. Apply hay or straw mulch at the rate of 4,000 pounds per acre. Refer to the Mulching (484) standard and specification.

WEED CONTROL

Mechanical mow with a rotary or flail mower or use approved chemicals to control weeds.

When using chemicals, the **Pest Management** (595) 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 the manufacturer's recommendations, treating individual weeds or patches of weeds carefully, avoiding the desired species.

Wick Applications. Use appropriate chemicals according to the manufacturer's recommendations on weeds that are at least 6 inches taller than the desired species.

IRRIGATION

If the natural precipitation is not adequate for the establishment of the selected species, supplemental watering shall be applied.

Table 1. Suitable Species (Page 1 of 4)

| Common Name / Cultivar | Scientific Name | Elevation (ft.) | Rainfall (in.) ^{1/} | Seeding Rate (lbs/PLS/ac) ^{2/} |
|--|--------------------------------|-----------------|------------------------------|---|
| Grasses / Non-legumes | | | | |
| 'aki'aki ^{4/ 8/} | <i>Sporobolus virginicus</i> | 0 - 1,000 | 20+ | <u>3/</u> |
| Australian saltbush ^{8/} 'Corto' | <i>Atriplex semibaccata</i> | 0 - 6,000 | 20+ | 20 |
| bahiagrass ^{9/ 10/} 'Pensacola' 'Wilmington' | <i>Paspalum notatum</i> | 0 - 4,500 | 40+ | 40 ^{3/} |
| barley ^{5/ 8/} | <i>Hordeum vulgare</i> | 0 - 4,000 | 40+ | 70 |
| Bermudagrass ^{7/ 8/} common 'NK-37'(giant) | <i>Cynodon dactylon</i> | 0 - 3,000 | 20 - 50 | 35 ^{3/} |
| buckwheat ^{5/} | <i>Fagopyrum esculentum</i> | 0 - 4,000 | 40+ | 100 |
| carpetgrass ^{9/ 10/} (broadleaf) | <i>Axonopus compressus</i> | 0 - 5,000 | 50+ | <u>3/</u> |
| carpetgrass ^{9/} (narrowleaf) | <i>Axonopus affinis</i> | 0 - 5,000 | 50+ | 40 ^{3/} |
| centipedegrass ^{10/} | <i>Eremochloa ophiuroides</i> | 0 - 2,500 | 40+ | 20 ^{3/} |
| digitgrass ^{7/ 9/} 'Mealani' 'Pangola' 'Transvala' | <i>Digitaria eriantha</i> | 0 - 3,500 | 50+ | <u>3/</u> |
| 'emoloa, kawelu ^{4/} | <i>Eragrostis variabilis</i> | 0 - 3,500 | 15 - 45 | 10 |
| green panicgrass ^{7/} 'Petrie' | <i>Urochloa maxima</i> | 0 - 2,500 | 25 - 70 | 20 |
| hairy chess | <i>Bromus catharticus</i> | 3,000 - 7,000 | 40 - 100 | 20 |
| kikuyugrass ^{10/} 'Whittet' | <i>Pennisetum clandestinum</i> | 0 - 6,000 | 40+ | 10 ^{3/} |
| Napiergrass 'Mott' | <i>Pennisetum purpureum</i> | 0 - 3,000 | 40+ | <u>3/</u> |
| oats ^{5/} | <i>Avena sativa</i> | 0 - 7,000 | 40+ | 70 |
| orchardgrass | <i>Dactylis glomerata</i> | 3,000 - 7,000 | 40 - 100 | 20 |
| paspalum 'Tropic Lalo' | <i>Paspalum hieronymii</i> | 0 - 3,000 | 45+ | <u>3/</u> |
| piligrass ^{4/} | <i>Heteropogon contortus</i> | 0 - 2,000 | 15 - 45 | 10 |
| Rhodesgrass ^{8/} 'Bell' 'Katambora' 'Nemkat' ^{7/} | <i>Chloris gayana</i> | 0 - 3,000 | 20 - 40 | 20 |
| ryegrass, annual ^{5/ 10/} | <i>Lolium multiflorum</i> | 0 - 7,000 | 40+ | 40 |
| ryegrass, perennial | <i>Lolium perenne</i> | 1,500 - 7,000 | 40+ | 40 |

Table 1. Suitable Species (Page 2 of 4)

| Common Name / Cultivar | Scientific Name | Elevation (ft.) | Rainfall (in.) ^{1/} | Seeding Rate (lbs/PLS/ac) ^{2/} |
|---|-----------------------------------|-----------------|------------------------------|---|
| Grasses / Non-legumes (Continued) | | | | |
| seashore paspalum ^{8/ 10/} 'Tropic Shore' | <i>Paspalum vaginatum</i> | 0 - 1,000 | 40+ | 3/ |
| stargrass, Puerto Rican ^{8/} 'Florico' | <i>Cynodon nlemfuensis</i> | 0 - 3,000 | 20 - 80 | 3/ |
| stargrass, 'South Point' ^{8/} | <i>Cynodon plectostachyus</i> | 0 - 3,000 | 20 - 80 | 3/ |
| St. Augustinegrass ^{8/ 10/} | <i>Stenotaphrum secundatum</i> | 0 - 3,000 | 40+ | 3/ |
| wheat ^{5/ 8/} | <i>Triticum aestivum</i> | 0 - 4,000 | 40+ | 70 |
| Legumes | | | | |
| big trefoil 'Grasslands Maku' | <i>Lotus pedunculatus</i> | 1,500 - 6,000 | 50+ | 25 |
| desmodium, intortum 'Greenleaf' 'Kuiaha' | <i>Desmodium intortum</i> | 0 - 3,000 | 60+ | 20 |
| dolichos, lablab 'Rongai' | <i>Lablab purpureus</i> | 0 - 4,000 | 20 - 60 | 60 |
| forage peanut ^{7/} | <i>Arachis glabrata</i> | 0 - 3,000 | 50+ | 3/ |
| forage peanut 'Amarillo' 'Forrajero' | <i>Arachis pintoi</i> | 0 - 3,000 | 50+ | 20 ^{3/} |
| hetero ^{9/} | <i>Desmodium heterophyllum</i> | 0 - 2,500 | 60+ | 20 ^{3/} |
| kaimi clover ^{9/} | <i>Desmodium incanum</i> | 0 - 3,000 | 60+ | 20 |
| nanea ^{4/} | <i>Vigna marina</i> | 0 - 1,000 | 20+ | 20 ^{3/} |
| siratro ^{7/ 10/} | <i>Macroptilium atropurpureum</i> | 0 - 2,500 | 20 - 70 | 20 |
| stylo ^{9/ 10/} 'Cook' 'Endeavor' 'Oxley' 'Schofield' | <i>Stylosanthes erecta</i> | 0 - 3,000 | 50+ | 25 |
| three-flowered ^{9/} beggarweed | <i>Desmodium triflorum</i> | 0 - 2,500 | 60+ | 3/ |
| white clover 'Grasslands Huia' (New Zealand) 'Haifa' | <i>Trifolium repens</i> | 1,500 - 7,000 | 35 - 80 | 25 |

Table 1. Suitable Species (Page 3 of 4)

| Common Name / Cultivar | Scientific Name | Elevation (ft.) | Rainfall (in.) ^{1/} | Seeding Rate (lbs/PLS/ac) ^{2/} |
|---|------------------------------------|-----------------|------------------------------|---|
| Ornamental Ground Covers | | | | |
| 'akia ^{4/} | <i>Wikstroemia uva-ursi</i> | 0 - 1,000 | 20+ | <u>3/</u> |
| cape marigold | <i>Dimorphotheca sinuata</i> | 0 - 3,000 | 20+ | <u>3/</u> |
| carpet bugle | <i>Ajuga reptans</i> | 0 - 3,000 | 30+ | <u>3/</u> |
| Chinese jasmine | <i>Jasminum polyanthum</i> | 0 - 4,000 | 35+ | <u>3/</u> |
| day lily | <i>Hemerocallis aurantiaca</i> | 0 - 4,000 | 30+ | <u>3/</u> |
| dichondra | <i>Dichondra repens</i> | 0 - 4,000 | 30+ | <u>3/</u> |
| 'ilima & 'ilima papa ^{4/} (flat ilima) | <i>Sida fallax</i> | 0 - 6,000 | 15 – 45 | <u>3/</u> |
| joyweed | <i>Alternanthera tenella</i> | 0 - 3,000 | 40+ | <u>3/</u> |
| lippia ^{8/} | <i>Lippia nodiflora</i> | 0 - 2,500 | 40+ | <u>3/</u> |
| 'ohai ^{8/} | <i>Sesbania tomentosa</i> | 0 - 1,000 | 20 – 40 | <u>3/</u> |
| 'ohelo papa ^{4/} (wild strawberry) | <i>Fragaria chiloensis</i> | 0 - 6,000 | 40+ | <u>3/</u> |
| oyster plant | <i>Tradescantia spathacea</i> | 0 - 1,000 | 30+ | <u>3/</u> |
| pa'uohi'iaka ^{4/ 8/} | <i>Jacquemontia ovalifolia</i> | 0 - 1,000 | 20 – 45 | <u>3/</u> |
| pohinahina ^{4/ 8/} (beach vitex) | <i>Vitex rotundifolia</i> | 0 - 1,000 | 20 – 45 | <u>3/</u> |
| pohuehue ^{4/ 8/} (beach morning glory) | <i>Ipomoea pes-caprae</i> | 0 - 1,000 | 20+ | <u>3/</u> |
| portulaca ^{8/} (moss rose) | <i>Portulaca grandiflora</i> | 0 - 4,000 | 20+ | <u>3/</u> |
| trailing African daisy | <i>Osteospermum fruiticosum</i> | 0 - 4,000 | 40+ | <u>3/</u> |
| trailing gazania | <i>Gazania uniflora leucoleana</i> | 0 - 4,000 | 30+ | <u>3/</u> |
| 'uhaloa ^{4/} | <i>Waltheria Indica</i> | 0 - 3,000 | 15 – 45 | <u>3/</u> |
| Waipahu fig | <i>Ficus tikoua</i> | 0 - 2,000 | 40+ | <u>3/</u> |
| Common Name / Cultivar | Scientific Name | Elevation (ft.) | Rainfall (in.) ^{1/} | Spacing (ft.) |
| Woody Plants | | | | |
| 'a'ali'i ^{4/} | <i>Dodonaea viscosa</i> | 0 - 7,000 | 20+ | 10 x 10 |
| alaha'e ^{4/} | <i>Canthium odoratum</i> | 0 - 3,000 | 40+ | 10 x 10 |
| athel tamarisk ^{8/ 10/} | <i>Tamarix aphylla</i> | 0 – 1,000 | 25+ | 10 x 10 |
| 'aweoweo ^{4/} | <i>Chenopodium oahuense</i> | 0 - 6,000 | 20+ | 6 x 6 |
| bamboo, clumping | <i>Bambusa sp.</i> | 0 - 3,000 | 60+ | 6 x 6 |
| Bermuda juniper | <i>Juniperus bermudiana</i> | 0 - 3,500 | 40+ | 10 x 10 |
| Bougainvillea ^{8/} | <i>Bougainvillea spectabilis</i> | 0 - 2,500 | 25+ | 10 x 10 |
| Cook pine ^{8/} | <i>Araucaria columnaris</i> | 0 - 3,000 | 40+ | 15 x 15 |
| dracaena | <i>Dracaena fragrans</i> | 0 - 2,000 | 50+ | 6 x 6 |
| dracaena | <i>Dracaena dermensis</i> | 0 - 2,000 | 50+ | 6 x 6 |
| eucalyptus | <i>Eucalyptus spp.</i> | 0 - 6,000 | 30+ | 10 x 10 |
| hala ^{4/ 8/} | <i>Pandanus tectorius</i> | 0 - 2,000 | 40+ | 15 x 15 |
| hibiscus, Chinese | <i>Hibiscus rosa-sinensis</i> | 0 – 3,000 | 30+ | 6 x 6 |
| hibiscus, native ^{4/} | <i>Hibiscus spp.</i> | 0 - 3,000 | 30+ | 6 x 6 |

Table 1. Suitable Species (Page 4 of 4)

| Common Name / Cultivar | Scientific Name | Elevation (ft.) | Rainfall (in.) ^{1/} | Spacing (ft.) |
|--|---|-----------------|------------------------------|---------------|
| Woody Plants (Continued) | | | | |
| kamani ^{4/ 8/} | <i>Calophyllum inophyllum</i> | 0 – 2,000 | 50+ | 15 x 15 |
| koa ^{4/ 6/} | <i>Acacia koa</i> | 1,500 – 7,000 | 50+ | 15 x 15 |
| koai'a ^{4/ 6/} | <i>Acacia koaia</i> | 1,000 – 6,000 | 30+ | 10 x 10 |
| kou ^{4/ 8/} | <i>Cordia subcordata</i> | 0 – 500 | 30+ | 10 x 10 |
| kukui ^{4/} (candlenut tree) | <i>Aleurites moluccana</i> | 0 – 2,000 | 50+ | 10 x 10 |
| 'kulu'i ^{4/} | <i>Nototrichium sandwicense</i> | 0 – 6,000 | 20+ | 6 x 6 |
| mamane ^{4/ 6/} | <i>Sophora chrysophylla</i> | 1,500 – 8,000 | 30+ | 10 x 10 |
| maneie ^{4/} | <i>Sapindus saponaria</i> | 0 – 4,000 | 50+ | 15 x 15 |
| mangium ^{6/} | <i>Acacia mangium</i> | 0 – 2,000 | 40+ | 10 x 10 |
| ma'o ^{4/} (Hawaiian cotton) | <i>Gossypium tomentosum</i> | 0 – 1,000 | 20+ | 4 x 4 |
| milo ^{4/ 8/} | <i>Thespesia populnea</i> | 0 – 2,000 | 30+ | 10 x 10 |
| naio ^{4/ 8/} | <i>Myoporum sandwicense</i> | 0 – 7,500 | 30+ | 10 x 10 |
| naupaka kahakai ^{4/ 8/} | <i>Scaevola sericea</i> | 0 – 1,000 | 30+ | 6 x 6 |
| noni ^{4/ 8/} | <i>Morinda citrifolia</i> | 0 – 1,500 | 30+ | 10 x 10 |
| Norfolk Island pine ^{8/} | <i>Araucaria heterophylla</i> | 1,500 – 3,000 | 40+ | 15 x 15 |
| 'ohai ^{4/ 6/ 8/} | <i>Sesbania tomentosa</i> f. <i>arborea</i> | 0 – 1,000 | 20 - 40 | 6 x 6 |
| 'ohi'a lehua ^{4/} | <i>Metrosideros polymorpha</i> | 0 – 8,000 | 60+ | 10 x 10 |
| small cone ironwood ^{6/ 10/} | <i>Casuarina cunninghamiana</i> | 0 – 3,000 | 40+ | 10 x 10 |
| tall erythrina 'Tropic Coral' ^{6/} | <i>Erythrina variegata</i> | 0 – 1,000 | 50+ | 6 x 6 |
| ti ^{4/} | <i>Cordyline fruticosa</i> | 0 – 6,000 | 30+ | 4 x 4 |
| 'ulei ^{4/ 8/} | <i>Osteomeles anthyllidifolia</i> | 0 – 6,000 | 50+ | 4 x 4 |
| vitex ^{8/} | <i>Vitex trifolia variegata</i> | 0 – 4,000 | 30+ | 4 x 4 |
| wiliwili ^{4/ 6/} | <i>Erythrina sandwicensis</i> | 0 – 1,000 | 25+ | 10 x 10 |

Note: This list is not all – inclusive. Other species may be prescribed by qualified NRCS technical specialists.

^{1/} Unless irrigated.

^{2/} Pure Live Seed (PLS): The amount of PLS is equal to the percent purity, multiplied by the percent germination.

Double the seeding rates indicated in the table when hydroseeding.

^{3/} Species are established with vegetative material. If the material is spread and disked in, use a minimum of 80 bushels of stolons or sprigs per acre. One bushel equals 1.25 cu. ft. or about 15 pounds. For planting sprigs in holes or if using rooted cuttings or seedlings, spacing shall be a maximum of 36 inches apart.

^{4/} Native to Hawaii or early Polynesian introduction.

^{5/} Use these annuals for rapid cover as a companion plant at one half the indicated per acre rate with a perennial. For rapid temporary cover after land clearing or other disturbance, seed at full rate indicated in table.

^{6/} Nitrogen fixing tree.

^{7/} Resistant to root-knot nematodes.

^{8/} Highly tolerant of soil salinity and wind-borne salt.

^{9/} Tolerates acid/low fertility soils.

^{10/} May have potential to become invasive.