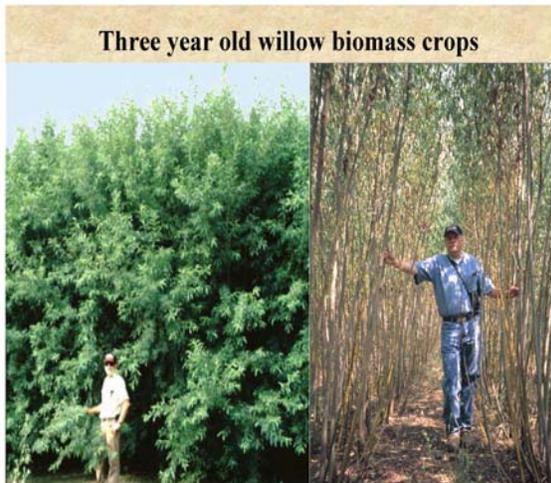


ESTABLISHMENT GUIDE FOR WILLOW BIOMASS

USDA - Natural Resources Conservation Service – Practice Code 612
 USDA – Farm Service Agency BCAP Practice BC3B



INSTRUCTIONS: THIS IS A FILLABLE FORM

This guide should be completed with the landowner. Pages 1,2 and 3 are information for planning and are completed by placing the appropriate information in the box next to the practice and/or cover. Check only those sections that are applicable. It is recommended that this guide accompany the conservation plan and contract support document.

Producer's Name(s)		
Street Address		
City, State, Zip		
Telephone		
Tract Number	_____, _____, _____, _____	
NRCS Conservation Practice Standards and Specifications to be followed:	Practice #	Practice Name

ESTABLISHMENT GUIDE FOR WILLOW BIOMASS

Certification Signatures

The conservation practices, plant varieties and cover types, and the management activities indicated for use are suitable and required for successful establishment, operation and maintenance under the provisions of the BCAP Program.

I agree to follow the conservation plan and the supporting practice implementation, establishment and maintenance information to properly manage my Conservation Reserve Program contract.

Selection and Characteristics Guide

To assist in selecting willow clones and/or species best suited for planting for the predominant soil drainage conditions. Refer to: the Willow Biomass Producer’s Handbook. Large fields should be planted with 4 – 6 different varieties representing at least three different diversity groups. Updated information on availability of different types of planting material can be found in the willow biomass producer’s handbook, on the SUNY-ESF web site (www.esf.edu/willow) or the Double A Willow website (www.doubleawillow.com).

Field #	Soil Map Unit(s)	Predominant Soil Drainage (EWD → VPD)	Present Cover (List species)
		EWD	

Table 1 - Recommended Establishment Schedule for Willow Biomass (Year 0 through September Year 2)

Preparation of Site Prior to Willow Planting (Year 0 – Establishment)	<input type="checkbox"/> July or August: Mow vegetation, if hayfield or old field.	Date mowed	
	<input type="checkbox"/> July or August: take soil samples and submit for analysis if soil has not been sampled in past three years.	Date soil sampled	Recommended Nutrients lbs/ac N P K
	<input type="checkbox"/> August: Contact Herbicide	Date Herbicide Applied	Herbicide Product Applied
	<input type="checkbox"/> Apply lime if needed.	Date Lime Applied	Lime rate Applied tons/ac
	<input type="checkbox"/> August/September: Plow, Fit, Remove rocks protruding 2 inches or more above soil level and Plant Cover Crop (Winter Rye, e.g. Aroostook Rye, Perennial Ryegrass (forage type) if prior to September 5th).	Date cover crop planted	Cover crop species Cover Crop seeding rate Cover crop seeding method

Planting Willow (Year 1 – Establishment)	<input type="checkbox"/> April/May: Kill cover crop with herbicide	Date Herbicide Applied	Herbicide Product Applied
	<input type="checkbox"/> mid-April – early June: Plant Willow, see notes on spacing below	Actual Planting rate	
	<input type="checkbox"/> April – June: Apply pre-emergent herbicide to suppress weeds within 2-5 days of planting	Date Herbicide Applied	Herbicide Product Applied
	<input type="checkbox"/> August – September: Mechanical weed control, chemical weed control if necessary. See notes on weed control below.	Date Herbicide or mechanical control Applied	Herbicide Product Applied
	<input type="checkbox"/> November – March: Coppice willow.	Date Coppiced	
Planting Willow (Year 2 – Establishment)	<input type="checkbox"/> May: Mechanical weed control if necessary	Date Herbicide or mechanical control Applied	Herbicide Product Applied
	<input type="checkbox"/> Chemical weed control – pre-emergence herbicide – if necessary		
	<input type="checkbox"/> Apply Nutrients recommended by soil test results and Willow Biomass Producer's Handbook.	Date Nutrients applied	Amount of fertilizer Applied lbs/ac Analysis N P K-

Spacing: Willow will be planted in double rows that are 2.5 feet apart. The inter-row distance between rows will be 6.0 feet. Willow cuttings will be planted 21 inches apart for the within row spacing. They will be planted at the rate of 5,800 cuttings per acre. Forty to fifty feet vegetated areas will be left at the row ends for movement of equipment. Guidance for seeding mixtures for these areas is provided below in Table – 4 Seeding Mixtures for Willow Biomass Inter-row Permanent Cover

Rock Removal: An important consideration is the removal of large rocks that protrude 2 inches or more above the soil surface. Harvesting equipment cuts the willow stems at a height of two to four inches and rocks can cause equipment damage.

Weed Control: Weed control is a critical factor in establishing a productive willow crop. Proper site preparation and control of any weeds (by mechanical or chemical means) just before planting and proper application of pre-emergence herbicides within a day or two of planting is important to successfully establish the crop. Mid to late summer mechanical or chemical control of weeds is only necessary if weed pressure is beginning to adversely affect willow crop establishment. All chemical recommendations must be made by a qualified Extension Specialist or consultant with Certified Pesticide Applicator License.

Application shall be in accordance with the manufacturer's label. A WIN-PST run will be need for all pesticides to be used.

Establishment of Permanent Grasses and Legumes

Permanent vegetative cover will reduce soil erosion on the travel lanes and field ends and improve trafficability. Inter-rows between the paired rows of willows may need permanent vegetative cover to reduce erosion and satisfy the cover requirements to meet tolerable soil loss levels per RUSLE2. It also reduces the establishment and growth of undesirable

weed species. The mixtures listed below are used to establish the vegetative cover, control erosion, and ensure the success of the willow planting. This cover will be established one growing season prior to planting the willow shrubs if existing cover is removed or is not adequate to control erosion.

If the area is not established to acceptable vegetative cover or existing cover is removed in preparation of willow planting, establish the seeding(s) where required according to the mixtures below.

If erosion rates exceed allowable rates permanent grasses and legumes for inter-rows will be required, These covers may be terminated if needed after satisfying the cover requirements for length of planting as per RUSLE2.

Table 2 – Seeding Mixtures for BCAP Willow Biomass Inter-row Permanent Cover

**** increase seeding rate by 35% if broadcasting**

Seed Mixture	Rate (lbs/acre)	Predominant Soil Drainage
1) Hard fescue or timothy Orchardgrass Perennial Ryegrass	5 5 2	Well to moderately well drained soils. For somewhat poorly drained soils timothy should be used.
AND		
Birdsfoot Trefoil (erect Viking type w/inoculant) OR White Clover (Dutch or Ladino w/ inoculants)	3	
2) Chewing fescue Hard fescue Sheep fescue or tall fescue (turf type) Perennial Ryegrass (turf type)	5 5 5 2	Sheep, chewing and hard fescue for well to excessively well drained soils. Tall fescue for the well to somewhat poorly drained soils. For somewhat poorly drained soils increase tall fescue to 10 lbs/ac and drop the sheep and hard fescue.
AND		
Birdsfoot Trefoil (erect Viking type w/inoculant) OR White or Alsike Clover (w/ inoculant),	2	
3) Canada Wildrye, Hard fescue Perennial Ryegrass (turf type)	10 5 2	Well drained
AND		
Birdsfoot Trefoil (erect Viking type w/inoculant) OR White Clover (w/inoculant),	2	
4) Virginia Wildrye, Chewing fescue Perennial ryegrass (turf type)	10 5 2	Well drained through somewhat poorly drained soils.
AND		
Birdsfoot Trefoil (erect Viking type w/inoculant) OR White or Alsike Clover w/ inoculant),	2	
5) Creeping Red fescue Tall fescue (turf type) Red top	15 15 2	Well drained to somewhat poorly drained soils.
AND		
Birdsfoot trefoil (upright Viking type w/inoculants) White or Alsike Clover	4	

1 For areas not subjected to traffic where wildlife is a consideration or use a mix from TN-36

2,3,4 For inter-row areas where a relatively non-competitive cover is desired seeding can be applied to whole field the prior year than strip sprayed or tilled out of the planting area.

5 For turning areas where intensive traffic is anticipated or laneways.

REFERENCE:

Abrahamson, L.P., T.A. Volk, L.B. Smart and K. Cameron. 2010. Shrub willow biomass producers' handbook. SUNY-ESF, Syracuse, NY 27 pp.

NRCS Cover Crop Conservation Practice Standard and Job Sheet (340)

NRCS Tree/Shrub Establishment Conservation Practice Standard and Job Sheet (612)

NRCS Conservation Cover Conservation Practice Standard and Job Sheet (327)

NRCS Critical Area Planting Conservation Practice Standard and Job Sheet (342)

NRCS Forestry Site Preparation Conservation Practice and Job Sheet (490)

Farm Service Agency BCAP Manual