

## Appendix to Practice Guide for Cover Crop (340)

PA 340-1

NRCs Pennsylvania					PA 340				
PLANT SPECIES	PRACTICE PURPOSES						OTHER CONSIDERATIONS		
Cool-Season Growth*	Reduce erosion	Increase soil health and organic matter	Utilize (scavenge) excess nutrients	Suppress weeds/pests	Minimize compaction		N fixation	Host for Arbuscular Mycorrhizal Fungi	Beneficial/ Pollinator
					Subsoil	Surface soil			
Winter Rye*	5	5	5	5	3	5	N	Y	N
Winter Barley*	5	4	4	4	3	5	N	Y	N
Winter Wheat*	4	4	4	4	3	5	N	Y	N
Winter Triticale*	5	5	5	5	3	5	N	Y	N
Oats*	4	4	4	5	1	5	N	Y	N
Annual Ryegrass	4	4	4	4	3	5	N	Y	N
<b>Warm-Season Growth*</b>									
Sorghum Sudangrass*	5	5	5	5	5	3	N	Y	N
Pearl Millet*	5	5	3	5	1	5	N	Y	N
Japanese Millet*	5	5	5	5	1	3	N	Y	N
Teff*	5	5	5	5	1	3	N	Y	N
Buckwheat*	3	3	3	5	1	5	N	Y	Y
Sunflower*	3	3	5	3	3	1	N	Y	Y
<b>Legumes</b>									
Cowpea	5	4	2	5	3	2	Y	Y	Y
Sunn Hemp	3	5	3	5	5	3	Y	Y	Y
Berseem Clover	4	4	4	4	0	5	Y	Y	Y
Red Clover	3	4	4	4	5	3	Y	Y	Y
Sweetclover	4	5	2	4	5	5	Y	Y	Y
Subterranean Clover	4	4	2	5	0	3	Y	Y	Y
Crimson Clover	4	4	3	4	0	3	Y	Y	Y
Field/Austrian Winter Pea	4	3	2	4	1	5	Y	Y	Y
Hairy Vetch	3	4	2	3	3	5	Y	Y	Y
<b>Brassicas (Cruciferae)</b>									
Forage Radish	4	4	5	5	5	3	N	N	N
Rapeseed/Canola	5	3	4	4	3	3	N	N	Y
Mustards	4	3	4	4	1	5	N	N	Y
Turnip	1	4	3	4	5	5	N	N	N
*When managing these plants as cover crops, harvesting for grain or seed is not allowed under the conservation practice standard 340 to remain eligible for crop insurance. If species are suitable for livestock feed, cover crops may be harvested as forage for hay or grazing.									
1=Poor; 2=Fair; 3=Good; 4=Very Good; 5=Excellent; 0 = no information									

Table 2: Cover Crop Characteristics for determining compatibility with cropping system						NRCS Pennsylvania						PA 340		
Plant Species	Life cycle <sup>1</sup>	Seeding Rate <sup>2</sup> lbs./ac	Hardy thru (PHZ) zone <sup>1</sup>	Shade Tolerance for Inter-seeding	Seeding Depth Inches	Optimum Season Seeding Reliability <sup>3</sup>						Latest seeding dates (fall) For Winter Erosion Control		
						Spring	Early Summer	Summer	Early Fall	Fal I	Late Fall	Zone 1	Zone 2	Zone 3
Cool-Season Growth														
Winter Rye ( <i>Secale cereale</i> )	WA	112	3	Y	¾ - 2				✓	✓+	✓	10/10	10/15	10/25
Winter Barley ( <i>Hordeum vulgare</i> )	WA	120	6	Y	¾ - 2	✓+			✓			NA	9/25	10/1
Winter Wheat ( <i>Triticum aestivum</i> )	WA	120	3	Y	½ - 1 ½	✓+			✓+	✓+		10/1	10/5	10/15
Winter Triticale (× <i>Triticosecale</i> )	WA	110	3	N	½ - 1 ½				✓	✓+		10/5	10/10	10/20
Oats ( <i>Avena sativa</i> )	SA	100	8	N	½ - 1 ½	✓+			✓+	✓		9/1	9/10	9/15
Annual Ryegrass ( <i>Lolium multiflorum</i> )	WA	20	6	Y	1/8 – ½	✓+	✓	✓-	✓+			8/15	9/1	9/15
Warm-Season Growth														
Sorghum-Sudangrass Hybrids ( <i>Sorghum bicolor</i> x <i>S. 2udanese</i> )	SA	35	NFT	Y	½ - 1 ½		✓+	✓+				NA	NA	NA
Pearl Millet ( <i>Pennisetum Glaucum</i> )	SA	15	NFT	N	½ - ¾		✓	✓				NA	NA	NA
Japanese Millet ( <i>Enchinochloa frumentacea</i> )	SA	20	NFT	N	½ - 1		✓	✓				NA	NA	NA
Teff ( <i>Eragrostis tef</i> )	SA	8	NFT	N	1/8 – ¼		✓	✓				NA	NA	NA
Buckwheat ( <i>Fagopyrum esculentum</i> )	SA	50	NFT	N	½ - 1 ½		✓+	✓+				NA	NA	NA
Sunflower ( <i>Helianthus annuus</i> )	SA	5	NFT	N	1/8 – ¼		✓+	✓+				NA	NA	NA
Legumes														
Cowpea ( <i>Vigna unguiculata</i> )	SA	40	NFT	N	1 -1 ½		✓	✓+				NA	NA	NA
Sunn Hemp ( <i>Crotalaria juncea</i> )	SA	10	NFT	N	½ - 1 ½		✓	✓+				NA	NA	NA
Berseem Clover ( <i>Trifolium alexandrinum</i> )	SA	15	NFT	N	¼ - ½	✓+	✓+	✓	✓-			NA	NA	NA
Red Clover ( <i>Trifolium pretense</i> )	SLP	10	4	N	¼ - ½	✓+		✓	✓-			NA	NA	NA
Yellow Sweet Clover ( <i>Melilotus officinalis</i> )	B	10	4	N	¼ - 1	✓			✓			NA	NA	NA
Subterranean Clover ( <i>Trifolium subterraneum</i> )	SA	12	8	N	¼ - ½	✓	✓	✓				NA	NA	NA
Crimson Clover ( <i>Trifolium incarnatum</i> )	WA/SA	15	6	Y	¼ - ½	✓+	✓+	✓	✓+			NA	9/1	9/15
Austrian Winter Pea ( <i>Pisum sativum</i> )	SA/WA	50	7	N	1 ½ - 2	✓+	✓		✓+			NA	8/25	8/30
Hairy Vetch ( <i>Vicia villosa</i> )	WA	20	4	Y	½ - 1 ½				✓+	✓		8/15	9/1	9/15
Brassicas (Cruciferae)														
Forage Radish ( <i>Raphanus sativus</i> )	SA	10	8	Y	¼ - ½	✓+	✓		✓+			9/1	9/7	9/15
Rapeseed/Canola ( <i>Brassica napus</i> )	WA/SA	10	8	Y	¼ - ¾	✓+	✓		✓+			9/1	9/7	9/15
Mustards ( <i>Brassica juncea</i> )	SA	10	8	N	¼ - ¾	✓+	✓		✓+			9/1	9/7	9/15
Turnip ( <i>Brassica rapa</i> )	SA	10	8	N	¼ - ¾	✓+	✓		✓+			9/1	9/7	9/15
1. A = annual; WA = winter annual; SA = summer annual; B = biennial; SLP = short-lived perennial; NFT = no frost tolerance														
2. Drilled seeding rate; for broadcast seeding or for seeding past optimum date, increase 25 to 50 percent.														
3. Optimum Season Seeding Reliability: Above Average (✓+); Average (✓); Below Average/Unknown (✓-); Blank = Not Recommended														

## Cover Crop Zones

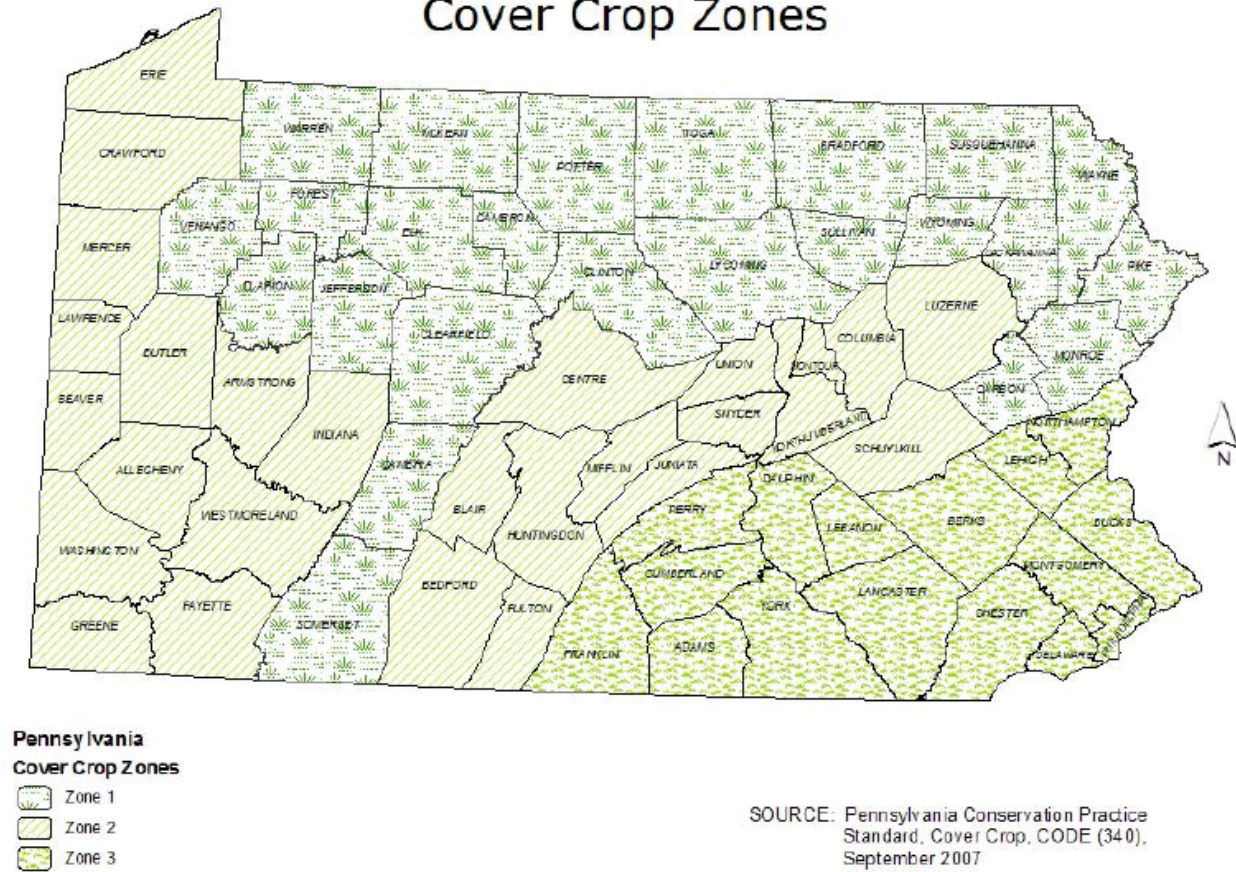


Figure 1 shows Pennsylvania Cover Crop Zones.

Table 3 Optimum Season Seeding Reliability Date Range by Cover Crop Zone						
Cover crop zone	Spring	Early Summer	Summer	Early Fall	Fall	Late Fall
1	March 15 – June 1	June 1 – July 1	July 1 – August 1	August 1 – September 1	September 1 – October 15	October 15 – November 1
2	March 7 – May 21	May 21 – June 21	June 21 – August 7	August 7 – September 7	September 7 – October 21	October 21 – November 7
3	March 1 – May 15	May 15 – June 15	June 15 – August 15	August 15 – September 15	September 15 – October 30	October 30 – November 15

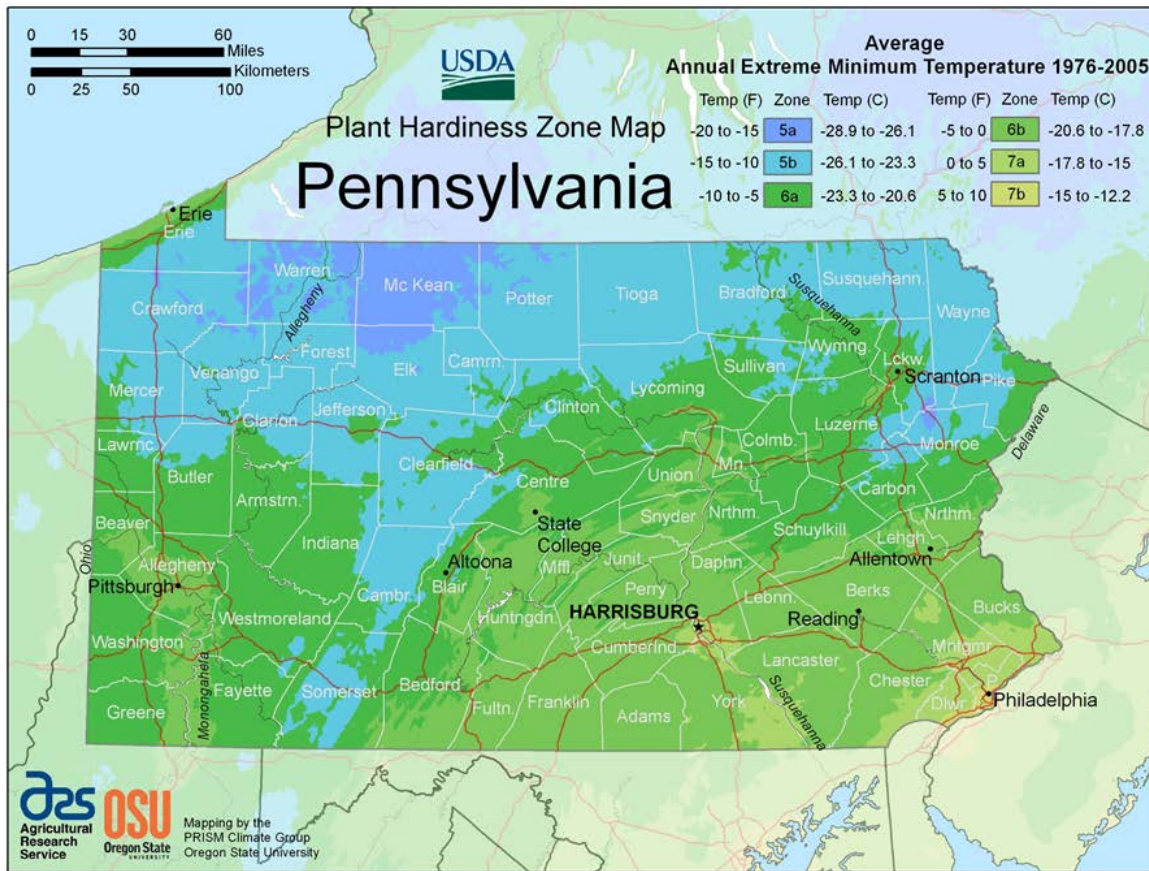


Figure 2 is the USDA Plant Hardiness Zone (PHZ) Map for Pennsylvania

**Table 4. A sample of published Cover Crop Mixtures**

1. Rye/Red Clover – 83#/acre (85# Rye, 8# Red Clover)
2. Rye/Hairy Vetch – 80#/acre (50# Rye, 30# Hairy Vetch)
3. Rye/Radish – 45#/acre (42# Rye, 3# radish)
4. Oats/Radish – 45#/acre (42# Oats, 3# Radish)
5. Ryegrass/Radish – 17#/acre (15# Ryegrass, 2# Radish)
6. Sorghum-Sudangrass/Sunn hemp – 40#/acre (10# sorghum-sudangrass, 30# sunn hemp)
7. Oat/Vetch 52#/acre (20# Hairy Vetch 32# Oats)
8. Pea/Rye/Clover 70#/acre (organic) (6# Clover, 25# Rye, 39# Pea)
9. Rye/Oats/Radish 116#/acre (organic) (8# Radish, 62# Rye, 46# Oat)
10. Rye/Oats/Clover 116#/acre (organic) (8# Clover, 62# Rye, 46# Oat)

**Table 5: NUMBER OF SEEDS PER POUND FOR SOME COMMONLY USED COVER CROPS<sup>1</sup>**

NUMBER OF SEEDS PER POUND FOR SOME COMMONLY USED COVER CROPS.			
Species	# of seeds per lb *	Species	# of seeds per lb *
<b>GRASSES/GRAINS</b>		<b>LEGUMES</b>	
annual ryegrass	162,577	arrowleaf clover	503,989
AROOSTOOK cereal rye	18,000	AU EARLY COVER hairy vetch	18,900
oats	15,000	Austrian winter pea	4,124
perennial ryegrass	210,972	balansa clover	647,986
triticale	15,000	berseem clover	161,996
wheat	16,000	CAHABA white vetch	9,257
<b>WARM SEASON GRASSES</b>		cowpea	3,780
<i>brown-top millet</i>	<i>133,409</i>	DIXIE crimson clover	181,436
<i>dwarf BMR millet</i>	<i>259,194</i>	Ladino white clover	503,989
German foxtail millet	216,511	LANA hairy vetch	11,020
<i>japanese millet</i>	<i>120,957</i>	Persian clover	566,988
pearl millet	53,364	red clover	250,602
<i>PIPER sudangrass</i>	<i>32,399</i>	REGEN alfalfa	258,908
PIPER sudangrass	42,392	sweet blue lupin	3,024
<i>proso millet</i>	<i>96,509</i>	WINDHAM winter pea	2,846
<i>QUICK COVER s x s (AS5201)</i>	<i>22,680</i>	yellow blossom sweet clover	237,482
<i>RED MILO dwarf sorghum</i>	<i>20,618</i>	<b>BRASSICAS &amp; RADISHES</b>	
<i>sorghum x sudangrass (AS6402)</i>	<i>14,632</i>	BARKANT turnip	133,409
Teff	1,814,360	BARSICA (rapeseed)	120,957
<i>TRUDAN-8 sudangrass</i>	<i>26,372</i>	Brassica rapa (turnip)	207,119
		DWARF ESSEX (rapeseed)	133,409
*different varieties and even lots of seed vary in the number of seeds in 1 lb. The above values were obtained from the			
USDA ARS Germplasm Resources Information network (GRIN) or actual counting (italics from actual counts)			

\*Source: Northeast Regional Plant Materials Center staff.

<sup>1</sup> Note: Different varieties and even lots of seed vary in the number of seeds in 1 lb. The above values were obtained from the USDA ARS Germplasm Resources Information network (GRIN), or *actual counting* (values in *italics* from actual counts).