APPENDIX II – SUPPLEMENTARY MATERIAL TO CHAPTER THREE

The literature research conducted to build this appendix was performed after reading *The History of the Countryside* by Oliver Rackham (2000). In this, Rackham describes plants with seeds that were previously thought to have gone extinct in the British Isles but have subsequently been found as dormant seeds in soil in the Fens. Researching these species led me to find that some of these species were able to also undergo dispersal. I then began to build a list of species that thrive in disturbed or managed landscapes that could undergo both long-term dormancy and long-distance dispersal by combing the literature, often finding new species to investigate while researching another.

Species	Family	Description	Habitat type	Dormancy type	Dispersal type
Aethionema	Brassicaceae	Annual	Steppe, stony slopes	IND fruits undergo dormancy	IND fruits undergo long
arabicum				(Lenser <i>et al.,</i> 2016).	distance dispersal (Arshad <i>et</i>
					al., 2019).
Amphicarpum	Poaceae	Perennial	Recently disturbed	High dormancy in aerial	Subterranean dispersal
purshii			sandy areas in coastal	seeds, low dormancy in	(short) and aerial dispersal
(Ppeanut grass)			plains	subterranean seeds (Cheplick,	(long) (Cheplick, 1994).
				1994).	
Anthoxanthum	Роасеае	Perennial	Grassland	After keeping soil samples	Found on machinery
odoratum				from five neglected coppices	(Strykstra, Verweij and
				in East Anglia for two years,	Bakker, 1997).
				seedlings emerged (Brown,	
				1981).	

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Carex panicea	Cyperaceae	Perennial	Wetland and grassland	Long-term persistence. Strict	dispersed around fen by
(Carnation				primary dormancy (minimal	free-roaming horses (Stroh
sedge)				germination under all light	et al., 2012).
				and temperature conditions	
				(Jensen, 2004).	
Carex pilulifera	Cyperaceae	Perennial	Woodland and	After keeping soil samples	Myrmecochorous (Kjellsson,
			grassland	from five neglected coppices	1985).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	
Chenopodium	Amaranthaceae	Annual	Wasteland and arable	After keeping soil samples	Bird dispersal, higher in
album			land	from five neglected coppices	cropped areas (Holmes &
				in East Anglia for two years,	Froud-Williams 2005). Seed
				seedlings emerged (Brown,	dispersal from croplands
				1981)	into forest (Devlaeminck,
					Bossuyt & Hermy, 2005)

Chorispora	Brassicaceae	Annual	Steppe and gravel	Seed bank (Lu <i>et al.,</i> 2017).	Silique (Lu <i>et al.,</i> 2015)
sibirica (Syn.			desert		
Alba)					
Cirsium palustre	Asteraceae	Perennial	Wetland, grassland and	After keeping soil samples	requires light following seed
			woodland	from five neglected coppices	dispersal for germination in
				in East Anglia for two years,	ash coppices (Pons, 1984)
				seedlings emerged Brown,	Wind dispersed (Leeuwen,
				1981).	1981).
Galinsoga	Asteraceae	Annual	Disturbed habitats and	Inner – delayed	Inner - far
parviflora (aallant soldier)			agricultural areas, tropical/mountainous	Outer– quick	Outer– near
() ,				(Venable & Lawlor 1980).	(Venable & Lawlor 1980).
Goldbachia	Brassicaceae	Annual	Desert	Seed bank (Lu <i>et al.,</i> 2017).	Silicles Lu <i>et al.,</i> 2015).
laevigata					

Hypericum	Hypericaceae	Perennial	Damp habitats:	After keeping soil samples	Galloway cattle disperse
tetrapterum			marshes, streamsides,	from five neglected coppices	between isolated habitats
(Hypericum			open ditches, meadow	in East Anglia for two years,	(Couvreur <i>et al.,</i> 2005). Duck
quadrangulum)			and springs.	seedlings emerged (Brown,	dispersal (Soons et al.,
(St Deter's Wort)				1981). Dormancy protection	2008).
				by seed coat (Lorenz <i>et al.,</i>	
				2018).	
Juncus bufonius	Juncaceae	Annual	Wetland and riparian	After keeping soil samples	Contaminant of peat-based
			woodland	from five neglected coppices	compost, dispersed by
				in East Anglia for two years,	human activity (Schmidt,
				seedlings emerged (Brown,	1989).
				1981).	
Juncus effusus	Juncaceae	Perennial	Wetland, riparian	After keeping soil samples	Epizoochorous – seed
			woodland and grassland	from five neglected coppices	dispersal from croplands
				in East Anglia for two years,	into forest (Devlaeminck,
				seedlings emerged (Brown,	Bossuyt & Hermy, 2005)
				1981)	

Juncus filiformis	Juncaceae	Perennial	Wetland	Conditional primary	Dispersed by cows and
(Thread Rush)				dormancy (Jensen, 2004).	reindeer in Sweden, could
					have some wind and water
					dispersal also (Richards,
					1943).
Lycopus	Lamiaceae	Perennial	Found on banks of wet	Dormancy broken by higher	Aquatic and animal
europaeus			ditches, ponds and	temperatures (Brändel, 2006).	(Couvreur <i>et al.,</i> 2005).
(Gypsywort)			streams (Thompson,		Animal through
			1969).		heterogenous landscapes
					(Cosyns <i>et al,</i> 2005). Duck
					dispersal (Soons et al.,
					2008).

Lynchnis flos-	Caryophyllaceae	Perennial	Along roads, wet	Persistant seed bank noted	Non specialised. Only short
cuculi (Syn.			meadow, pastures	and dormancy (Milberg,	dispersal (Aavik et al., 2014).
Silene floscuculi)			Declining in number	1994).	Duck dispersal (Soons et al.,
Ragged-robin			because farming		2008).
			techniques no longer		
			common (Aavik <i>et al.,</i>		
			2014).		
Mentha aquatica	Lamiaceae	Perennial	Shallow waters of fens,	Dormancy (Brändel, 2006).	Duck dispersal (Soons et al.,
(Water mint)			streams, ditches and		2008).
			meadows.		
Plantago major	Plantaginaceae	Perennial	Disturbed land and	After keeping soil samples	Human dispersal (Hodkinson
			grassland	from five neglected coppices	&Thompson 1997).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	

Polygonum	Polygonaceae	Annual	Disturbed and arable	After keeping soil samples	Human dispersal (Hodkinson
aviculare			land	from five neglected coppices	&Thompson 1997).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	
Potentilla	Rosaceae	Perennial	Wetlands, ponds, bogs	Strict primary dormancy and	Dispersal in drift material
palustris				long-term persistence	(Skoglund, 1990).
(March				(Jensen, 2004).	
Cinquefoil)					
Prosopis juliflora	Fabaceae	Perennial	Sandy, rocky, saline soils	Dormancy (Zare, Tavili &	Dispersal: Livestock
(mesquite)				Darini, 2011).	dispersal (Mworia et al.,
					2010)
Ranunculus	Ranunculaceae	Perennial	Arable land, wetland	Survived wildwood period	Water dispersed (Vogt,
repens			and grassland	(Rackham, 2000).	2006).
(Buttercup)					

Rapistrum	Brassicaceae	Annual	Wasteland, disturbed	Upper seed (Deep dormancy)	Upper seed (Far dispersal)
rugosum			land and grassland	Lower seed (Quick	Lower seed (Near dispersal)
(Anuual bastard cabbage)				germination) (Venable & Lawlor, 1980).	(Venable & Lawlor, 1980).
Rumex acetosa	Polygonaceae	Perennial	Grassland and arable	Survived wildwood period	Transportation by machinery
(Sorrel)			land	(Rackham, 2000).	(Strykstra, Verweij & Bakker,
					1997).
Rumex	Polygonaceae	Perennial	Arable land, grassland,	After keeping soil samples	Epizoochorus - seed
obtusifolius			waste land, wetland	from five neglected coppices	dispersal from croplands
			and woodland	in East Anglia for two years,	into forest (Devlaeminck,
				seedlings emerged (Brown,	Bossuyt & Hermy, 2005).
				1981).	

Senecio	Asteraceae	Perennial	Fens	Dormancy: thought to be	Dispersal: wind dispersal,
paludosus				extinct but rediscovered in	suggests went extinct
(Fen Ragwort)				England in 1972 - could have	because of this rather than
(been stored in a peat bed and	being dispersed by other
				dug up when ditch was dug in	means (Salisbury, 1976).
				1968 (Walters, 1974).	
Senecio palustris	Asteraceae	Annual	Fens	Dormancy: couldn't confirm,	Dispersal: wind dispersal,
(Marsh				although Walters (1974)	suggests went extinct
Fleawort)				suggests dormancy not	because of this rather than
				uncommon in Senecio genus.	being dispersed by other
					means (Salisbury, 1975).
Solanum nigrum	Solanaceae	Perennial	Woodland and	After keeping soil samples	Dispersed by bustards
			disturbed land	from five neglected coppices	(Bravo <i>et al.,</i> 2014).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	

Sparganium	Sparganiaceae	Perennial	Areas of permanent	Naturally broken by freezing	Fruits float on water for up
erectum			water, banks of large	or decomposition.	to 12 months (Guppy, 1894;
(Branched bur			lakes	Seeds remain viable for 4	Praeger 1913).
reed)				years.	Seeds passive ingested by
					waterfowl and fish (Pollux et
					al., 2006). Duck dispersal
					(Soons <i>et al.,</i> 2008).
Spirorrhynchus	Brassicaceae	Annual	Stationary and semi-	No seed bank (Lu et al.,	Silicles (Lu et al., 2015).
sabulosus			stationary sand dunes	2017).	
				Non-deep physiological	
				dormancy (Lu et al., 2015).	

Stachys palustris	Lamiaceae	Perennial	Lakee shores, marshes,	Dormancy (Brändel, 2006).	Biotype dispersal of
(Marsh			banks of ditches and		rhizomes (Wilcock, 1974).
woundwort)			streams, damp		Persistant tubers make is
woundworty			meadow, arable land		difficult to eradicate from
			and waste places		arable land. Water dispersal
					by buoyant seeds (Taylor &
					Rowland, 2011).
Sterigmostemum	Brassicaceae	Annual	Gravel desert	Seed bank (Lu et al., 2017).	Siliques Lu et al., 2015).
fuhaiense					
Tauscheria	Brassicaceae	Annual	Desert	No seed bank (Lu et al., 2017)	Silicles Lu et al., 2015).
lasiocarpa					
				Non-deep physiological	
				dormancy (Lu et al., 2015).	

Veronica	Plantaginaceae	Perennial	Disturbed land and	After keeping soil samples	Cattle and horse dispersal
chamaedrys			grassland	from five neglected coppices	(Cosyns <i>et al,</i> 2005).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	
Veronica	Plantaginaceae	Perennial	Grassland and	After keeping soil samples	Cattle and horse dispersal
officinalis			woodland	from five neglected coppices	(Cosyns <i>et al,</i> 2005)
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981).	
Veronica	Plantaginaceae	Perennial	Disturbed land,	After keeping soil samples	Cattle and horse dispersal
serpyllifolia			grassland and woodland	from five neglected coppices	(Cosyns <i>et al,</i> 2005).
				in East Anglia for two years,	
				seedlings emerged (Brown,	
				1981)	

Viola palustris	Violaceae	Perennial	Wetlands	Conditional primary	Ejection or myrmecochory
(Marsh Violet)				dormancy, long-term	(Jensen & Meyer, 2001).
				persistence (Jensen, 2004).	
Prunus serotina	Violaceae	Perennial	Wetland, woodland and	Deep dormancy (Esen, 2006).	Vertebrate dispersal along
(Black cherry)			disturbed land		hedgerows (Deckers et al.,
					2005).