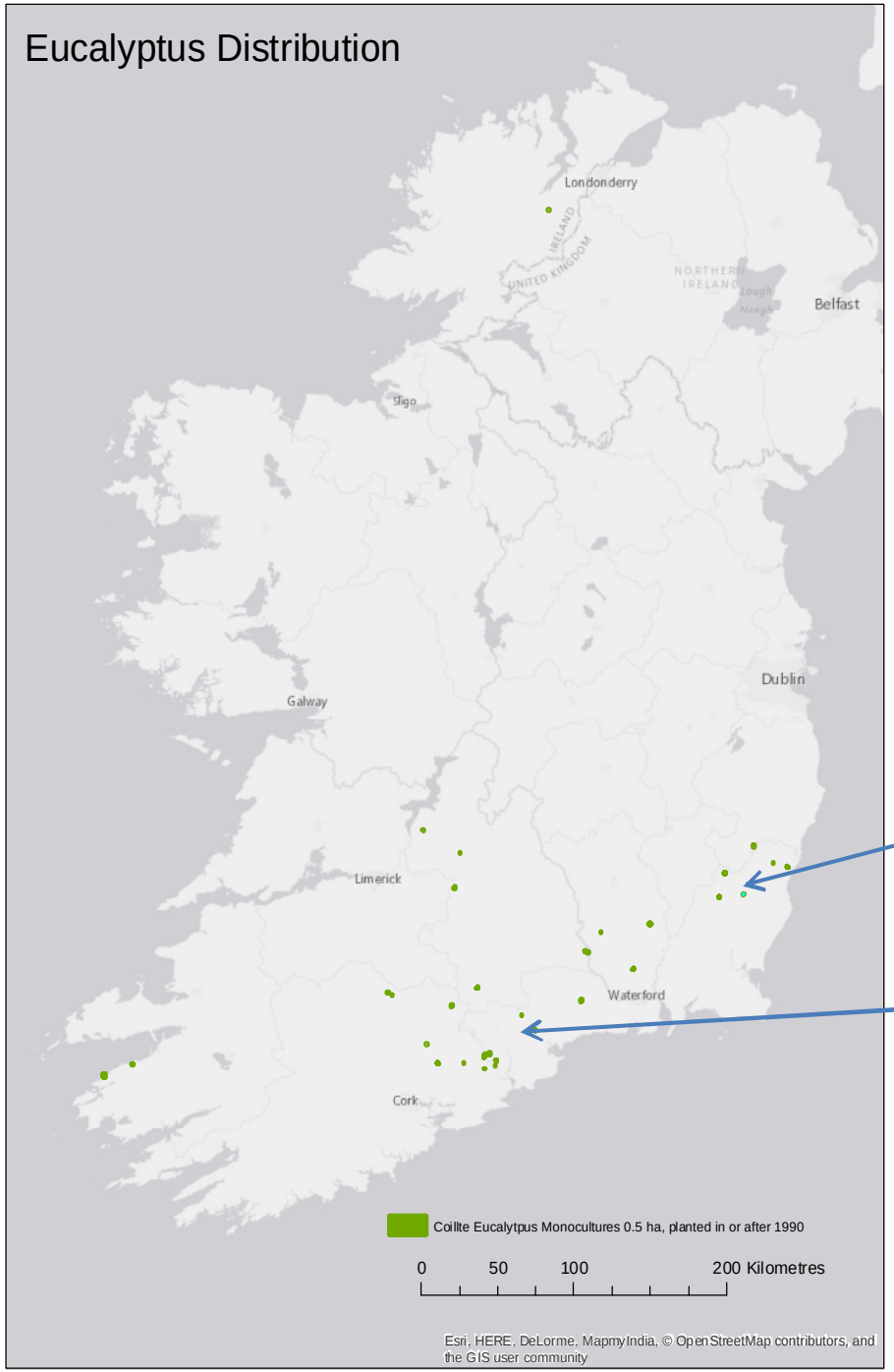
Eucalyptus resource in Ireland



Planted since 2009

	Coillte	Private	Total
No. Sites	53	0	53
Total Area (ha)	333	0	333
Average Area (ha)	6.3	0.0	
Min area (ha)	0.6	0	
Max area (ha)	25.5	0	

Older Plantations

Kilbora, Co. Wexford. Planted 1992.

Glenshelane, Co. Waterford. Planted 1993.

Sampling:

- On 3 site destructive samples taken to characterise the biomass:
  - Both of the older sites planted in 1992-93
  - One of the younger plantations, planted in 2009

All plantations planted in 2009 and 2010 measured:

Site	P year	Euc Species	Soil Type	Soil Nutrient Regime	Soil Moisture Regime	Elevation	Slope	Aspect	Initial Spacing
1	2010	E. Nitens	Brown Gley / Podzolic Gley	Poor - Medium	Fresh - Moist	189	3	SW	2 x 2
2	2009	E. Nitens	Loamy Brown Earth	Medium	Moist	168	3	SE	2 x 2
3	2009	E. Nitens	Loamy Brown Earth	Medium	Moist	173	2	SE	2 x 2
4	2009	E. Nitens	Brown Gley	Poor - Medium	Very Moist	168	4	SE	2 x 2
5	2009	E. Nitens	Loamy Brown Earth	Medium	Moist	169	8	SE	2 x 2
6	2009	E. Nitens	Loamy Brown Earth / Brown Gley	Medium	Moist	172	4	E	2 x 2
7	2009	E. Nitens	Loamy Brown Earth	Medium	Moist	174	6	SE	2 x 2
8	2009	E. Nitens	Gravelly Iron Pan Soils	Poor	Sl. Dry	184	6	S	2 x 2
9	2009	E. Nitens	Gravelly Brown Earth/ Podzol	Poor	Sl. Dry	151	3	SE	2 x 2
10	2009	E. Nitens	Gravlly, Sandy Brown Earth	Poor - Medium	Sl. Dry	171	6	N	2 x 2
11	2010	E. Nitens	Podzolic Gley	Poor	Moist	153	1	S	2 x 2

Fieldwork

- Stratifying
- Assessing the canopy cover (DENSIOMETER)
- Setting out plots for an assessment of survival, stocking and dbh distribution
- Height measurements
- On a number of sample trees, upper stem measurements were taken to develop a local volume equation for each strata (CRITERION)
- Crown projection measurements (DENSIOMETER)
- Identification of soil type and soil nutrient regime (Soil pit + indicator species)

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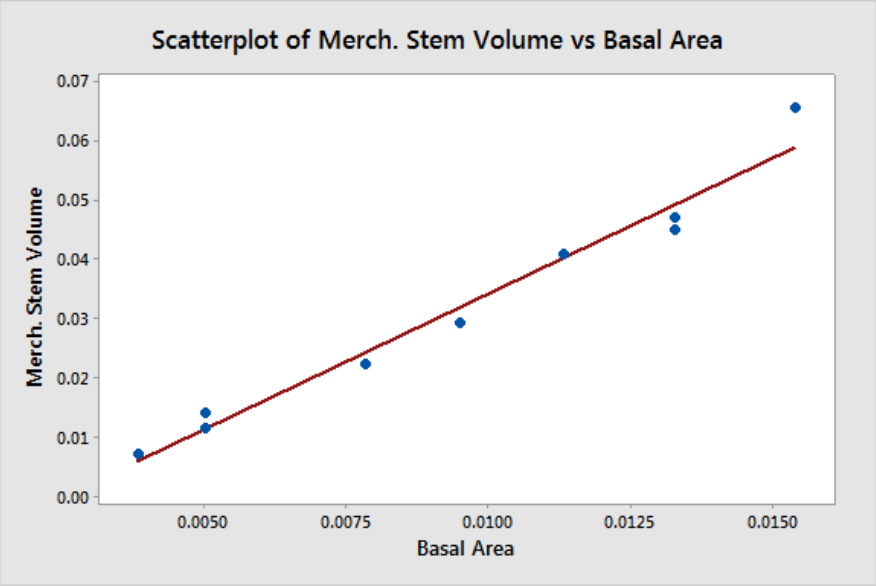
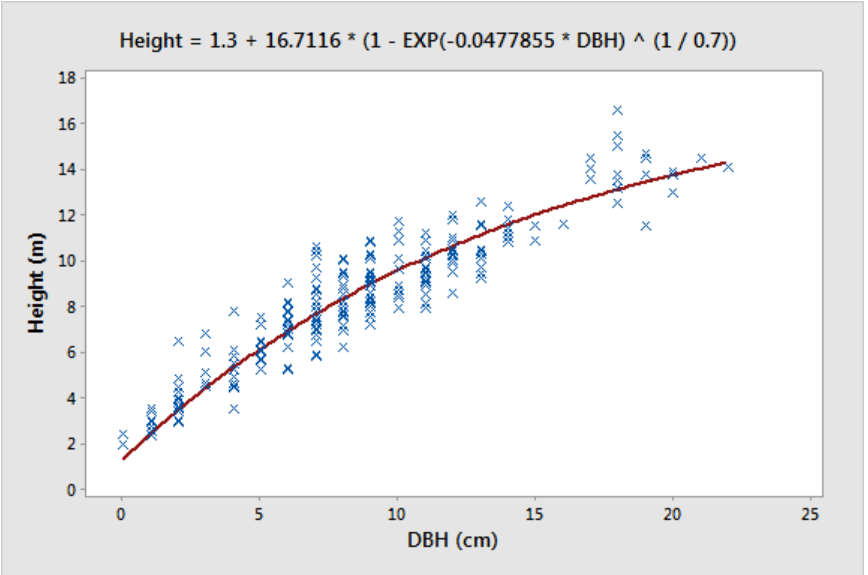
Destructive sampling on 3 sites

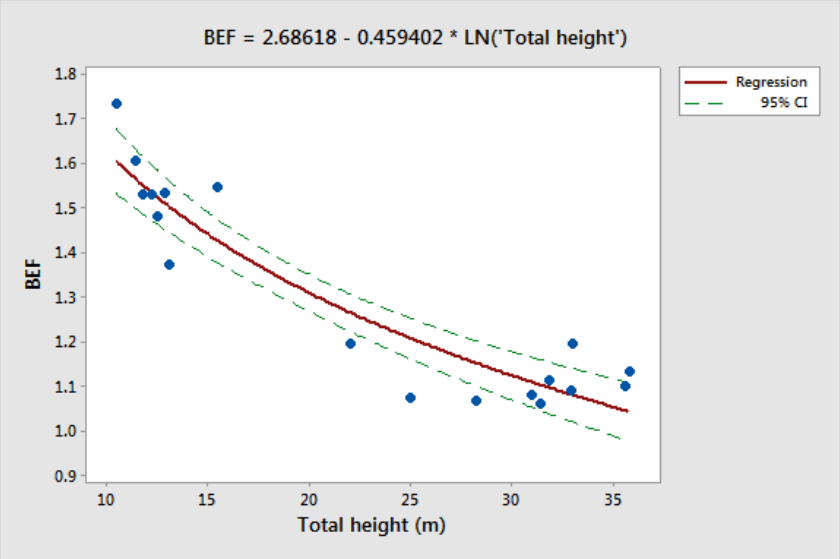
- Trees felled, stem measured in 1 m intervals, partitioned and weighed.
- MC, density, oven dry mass, CV, ash, chemical analysis



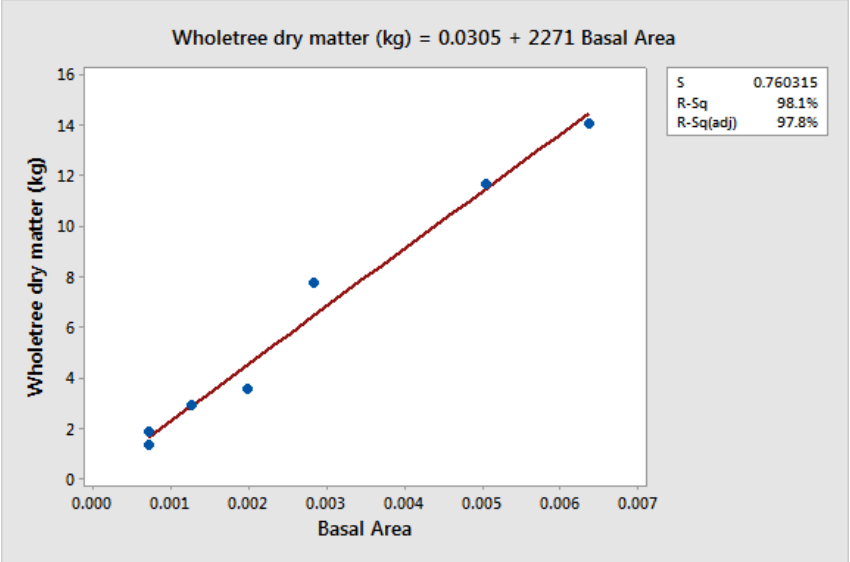
Local merch. volume equation for each site



Parameterised a dbh to height model from 305 measured trees



Parameterised a BEF equation from destructive samples



For trees below 7 cm dbh, another biomass equation

Results: Survival, Stocking

Site	Age	Surviving trees (ncl. less than 7 cm dbh)	% mortality	Canopy Cover %	Standing dead trees	No. Trees less 7 cm dbh per hectare	Stocking	Top height (m)	Basal Area per hectare (m2)
1	6	1600	36	43	0	270	1330	10.4	9.94
2	7	1414	43	44	0	643	771	8.9	5.3
3	7	1863	25	66	0	613	1250	12.9	11.3
4	7	950	62	22	0	740	210	7.2	1.1
5	7	1400	44	48	0	187	1213	13.3	14
6	7	1467	41	42	0	1050	417	11.6	4.3
7	7	1917	23	61	0	767	1150	13	12.2
8	7	1967	21	40	1	1134	833	8.5	4.9
9	7	2217	11	53	0	1117	1100	8.5	6.06
10	7	2100	16	52	0	962	1138	9.8	7.65
11	6	2200	12	55	0	900	1300	10.85	8.8

Merchantable Volume, Biomass production

Site	Age	Surviving trees (ncl. less than 7 cm dbh)	Merchantable roundwood volume per hectare (m3)	Avg. Tree merchantable roundwood volume (m3)	QMDBH (cm)		Merch Stem Biomass per ha (odt)	Residue biomass per ha (odt)	Wholetree biomass per ha (odt)	Productivity: odt per ha per year
1	6	1600	31	0.023	11		13	9	22	4
2	7	1414	15	0.020	10		6	7	13	2
3	7	1863	44	0.036	11		18	13	31	4
4	7	950	2	0.010	8		1	3	4	1
5	7	1400	65	0.054	13		27	15	49	7
6	7	1467	18	0.042	12		7	7	14	2
7	7	1917	50	0.044	12		21	14	34	5
8	7	1967	13	0.015	9		5	7	12	2
9	7	2217	16	0.014	9		7	8	15	2
10	7	2100	23	0.020	10		9	9	19	3
11	6	2200	30	0.023	10		12	11	23	4

Biomass characterisation:

											Ash fusion temperatures reducing °C			
Species	Site Location	Partition	S (%)	Cl (%)	C (%)	H (%)	N (%)	Na (mg/kg)	K (mg/kg)	GCV. (MJ kg-1 db)	Init. deform.	Soften.	Hemisph.	Flow
E. nitens	Kilmacthomas, Co. Waterford	Roundwood	0.03	0.11	49.6	5.83	0.28	384	1858	19.338	1040	1060	1090	1130
E. nitens	Kilmacthomas, Co. Waterford	Wood	<0.01	0.09	50.3	5.9	0.19	376	1615	19.341	<850	<850	<850	<850
E. nitens	Kilmacthomas, Co. Waterford	Bark	0.02	0.4	49.2	5.42	0.51	596	4914	18.02	>1500	>1500	>1500	>1500
E. nitens	Kilmacthomas, Co. Waterford	Leaf	0.08	0.24	57.5	6.01	1.55	947	5050	22.311	>1500	>1500	>1500	>1500
E. nitens	Kilmacthomas, Co. Waterford	Wholetree	0.02	0.2	51.7	5.83	0.5	504	3359	19.794	<850	<850	<850	<850
E. nitens	Kilmacthomas, Co. Waterford	Lop & top	0.05	0.19	52.9	5.9	0.99	1147	3611	20.551	1270	1310	1345	1380
E. nitens	Kilmacthomas, Co. Waterford	Live branches	0.01	0.12	51.6	5.75	0.42	797	2737	19.773	<850	<850	<850	<850
E. nitens	Kilmacthomas, Co. Waterford	Dead branches	0.01	0.22	49.3	6.13	0.34	341	199	19.289	>1500	>1500	>1500	>1500
E. delegatensis	Kilbora, Ferns, Co. Wexford	Wood	<0.01	0.07	49.9	6.11	0.23	140	457	19.131	<850	<850	<850	<850
E. delegatensis	Kilbora, Ferns, Co. Wexford	Bark	0.03	0.3	49.8	5.82	0.44	354	4132	18.638	>1500	>1500	>1500	>1500
E. delegatensis	Kilbora, Ferns, Co. Wexford	Leaf	0.1	0.25	54.2	5.75	1							
E. delegatensis	Kilbora, Ferns, Co. Wexford	Live branch wood	<0.01	0.05	50.5	5.96	0							
E. delegatensis	Kilbora, Ferns, Co. Wexford	Live branch bark	0.03	0.3	48.7	5.58	0							
E. delegatensis	Kilbora, Ferns, Co. Wexford	Live branches	0.03	0.18	50.6	6.07	0							
E. delegatensis	Kilbora, Ferns, Co. Wexford	Dead branches	0.01	0.05	50.8	6.06	0							

		Typical Values EN 1496-1: 2009		
		Virgin Wood Materials (with of without insignificant amounts of bark and leaves	Virgin Bark	Residues
GCV	MJ/kg d	19.4 - 20.4	18.0 - 22.7	19.5 - 20
Ash	% d	0.2 - 1.0	0.8 - 3.0	2.0 - 10.0
Carbon	% d	48 - 52	47 - 55	50 - 51
Hydrogen	% d	5.9 - 6.5	5.3 - 6.4	5.8 - 6.1
Oxygen	% d	41 - 45	32 - 42	40 - 43
Nitrogen	% d	<0.1 - 0.5	0.1 - 0.8	0.3 - 0.8
Sulphur	% d	<0.01 - 0.05	<0.02 to 0.2	0.01 - 0.08
Chlorine	% d	<0.01 - 0.03	<0.01 to 0.05	<0.01 - 0.02

Other samples from previous trials:

											reducing °C			
Species	Site Location	Partition	S (%)	Cl (%)	C (%)	H (%)	N (%)	Na (mg/kg)	K (mg/kg)	GCV. (MJ kg-1 db)	Init. deform.	Soften.	Hemisph.	Flow
E. nitens	Redbog, Bree, Co. Wexford	Roundwood	0.01	0.11	50	5.8	0.2	437	1366	18.999	1055	1075	1095	1135
E. nitens	Redbog, Bree, Co. Wexford	Lop & top	0.03	0.15	52	5.9	0.6	608	2320	19.852	1260	1305	1345	1370
E. nitens	Redbog, Bree, Co. Wexford	Wood	<0.01	0.14	50	6.2	0.2	406	907	19.212	<850	<850	<850	<850
E. nitens	Redbog, Bree, Co. Wexford	Bark	0.02	0.38	48	5.5	0.4	1412	3031	17.234	>1500	>1500	>1500	>1500
E. nitens	Redbog, Bree, Co. Wexford	Top	0.03	0.1	50	5.8	0.5	570	1716	20.104	>1500	>1500	>1500	>1500
E. nitens	Dundrum, Co. Tipperary	Stem	<0.01	0.09	50	6.1	0.2	388	1335	18.81	>1500	>1500	>1500	>1500
E. nitens	Dundrum, Co. Tipperary	Lop & top	0.03	0.17	52	6	0.8	337	3905	20.47	1240	1290	1335	1370
E. nitens	Dundrum, Co. Tipperary	Wood	0.02	0.1	50	6.1	0.2	271						
E. nitens	Dundrum, Co. Tipperary	Bark	0.01	0.32	47	5.5	0.4	703						
E. nitens	Dundrum, Co. Tipperary	Leaf	0.07	0.14	57	6.1	1.5	555						
E. nitens	Medite Storage Trial Bin 2	Roundwood	0.03	0.04	53	5.9	0.5	638						
E. nitens	Medite Storage Trial Bin 5	Roundwood	0.01	0.02	52	5.9	0.2	103						
E. nitens	Coillte Sawmill Storage Trial (Normal Roller Pressure)	Roundwood	<0.01	0.02	50	5.9	0.2	178						
E. nitens	Coillte Sawmill Storage Trial (High Roller Pressure)	Roundwood	<0.01	0.07	50	5.9	0.2	278	689	19.349	1080	1100	1130	1170

		Typical Values EN 1496-1: 2009		
		Virgin Wood Materials (with of without insignificant amounts of bark and leaves	Virgin Bark	Residues
GCV	MJ/kg d	19.4 - 20.4	18.0 - 22.7	19.5 - 20
Ash	% d	0.2 - 1.0	0.8 - 3.0	2.0 - 10.0
Carbon	% d	48 - 52	47 - 55	50 - 51
Hydrogen	% d	5.9 - 6.5	5.3 - 6.4	5.8 - 6.1
Oxygen	% d	41 - 45	32 - 42	40 - 43
Nitrogen	% d	<0.1 - 0.5	0.1 - 0.8	0.3 - 0.8
Sulphur	% d	<0.01 - 0.05	<0.02 to 0.2	0.01 - 0.08
Chlorine	% d	<0.01 - 0.03	<0.01 to 0.05	<0.01 - 0.02

Further work:

Samples from Glenshelane to be analysed, and all data to be put up on the database.