Appendix S1: Map of study locations

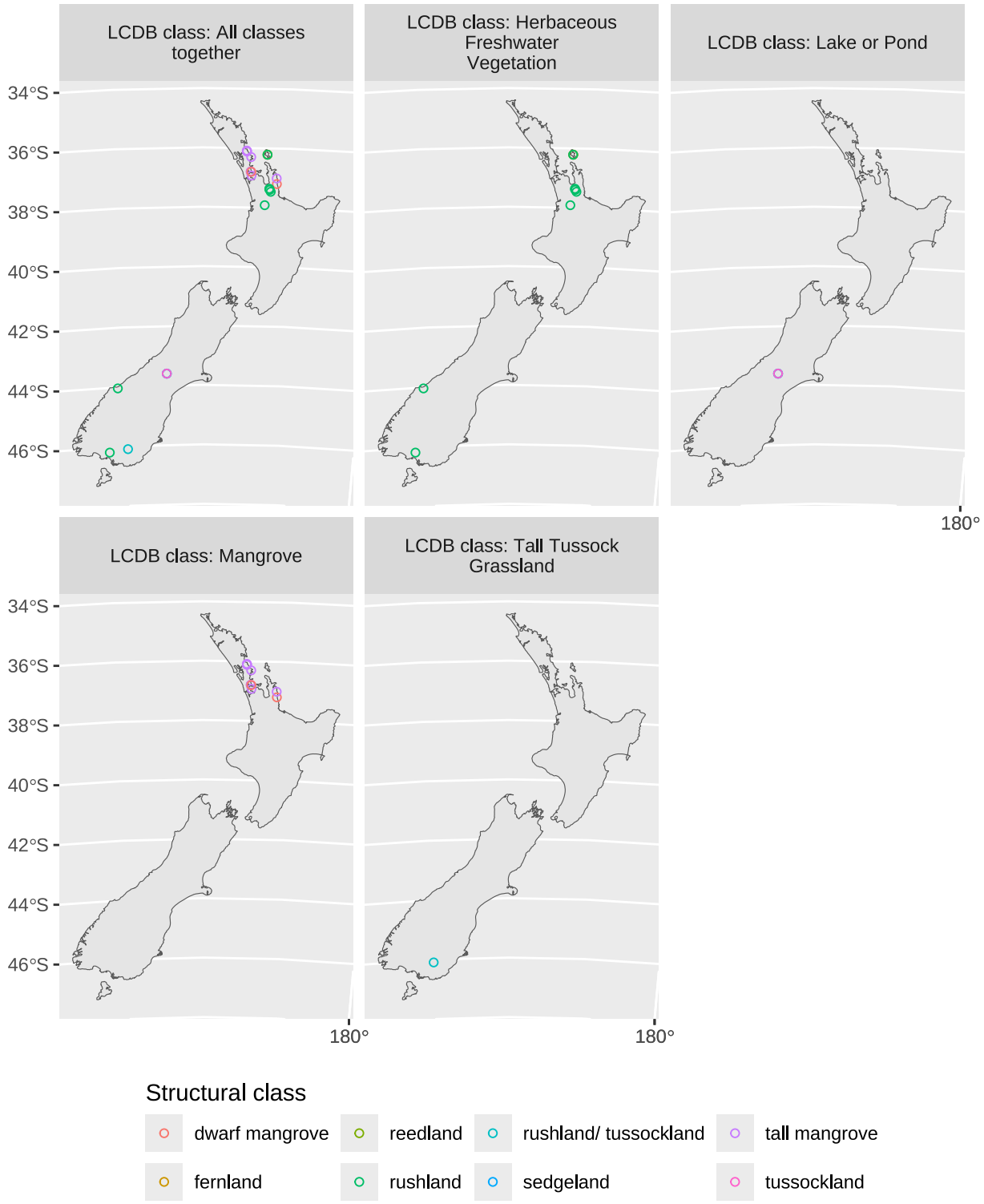

Figure S1: Source locations of the 10 studies (with 25 observations at the level of structural class) that were used in our meta-analyses, with colour indicating the structural class the observation was assigned to. Note that the observation of 'rushland/ tussockland' was aggregated into 'mixed rushland' structural class for analysis. Source observations are shown with respect to different land cover (LCDB) classes; the first panel combines all other panels.

Appendix S2: LCDB class areas

Table S2: LCDB classes (from LCDB v5) that intersect with the LUM Wetland - Vegetated non forest class for 2008 (for LCDB year 2008), 2012 (for LCDB year 2012) and 2016 (for LCDB year 2018), along with total carbon stocks for the relevant year by LCDB class.

LCDB	LCDB Year	Area (ha)	Carbon density above ground (mean)	Carbon density below ground (mean)	Carbon density total (mean)	Carbon density above ground (SE)	Carbon Stock (Total; Mg C)
Herbaceous Freshwater Vegetation	2008	113028.0	10.17	7.06	17.23	1.68	1947472.440
Manuka and/or Kanuka	2008	26993.5	26.30	5.24	31.54	7.97	851374.990
Herbaceous Saline Vegetation	2008	12170.2	3.74	6.59	10.33	0.32	125718.166
Deciduous Hardwoods	2008	10946.3	29.34	4.98	34.32	10.32	375677.016
Tall Tussock Grassland	2008	9799.4	27.16	8.35	35.51	3.57	347976.694
High Producing Exotic Grassland	2008	8626.2	1.05	1.22	2.27	0.14	19581.474
Low Producing Grassland	2008	7287.4	0.84	3.02	3.86	0.11	28129.364
Flaxland	2008	5669.0	10.52	8.76	19.28	1.38	109298.320
Indigenous Forest	2008	5358.8	193.28	34.65	227.93	3.31	1221431.284
Fernland	2008	3981.0	6.14	4.27	10.41	0.81	41442.210
Broadleaved Indigenous Hardwoods	2008	3559.8	124.32	22.06	146.38	7.33	521083.524
Gorse and/or Broom	2008	2742.0	34.39	7.56	41.95	6.49	115026.900
Estuarine Open Water	2008	1936.4	0.00	0.00	0.00	0.00	0.000
Lake or Pond	2008	1344.9	0.00	0.00	0.00	0.00	0.000
Mixed Exotic Shrubland	2008	1218.2	50.72	10.17	60.89	28.56	74176.198
Exotic Forest	2008	1182.7	85.39	21.35	106.74	5.77	126241.398
Mangrove	2008	620.9	18.40	24.13	42.53	0.75	26406.877
River	2008	589.8	0.00	0.00	0.00	0.00	0.000
Sand or Gravel	2008	574.0	0.00	0.00	0.00	0.00	0.000
Gravel or Rock	2008	530.5	0.00	0.00	0.00	0.00	0.000
Matagouri or Grey Scrub	2008	520.2	29.54	5.84	35.38	3.98	18404.676
Alpine Grass/Herbfield	2008	78.1	10.10	6.71	16.81	1.74	1312.861
Forest - Harvested	2008	73.2	0.00	0.00	0.00	0.00	0.000
Sub Alpine Shrubland	2008	66.0	98.17	17.14	115.31	34.51	7610.460
Urban Parkland/Open Space	2008	57.8	10.17	7.06	17.23	1.68	995.894
Short-rotation Cropland	2008	53.0	3.50	1.50	5.00	1.91	265.000
Built-up Area (settlement)	2008	33.5	0.00	0.00	0.00	0.00	0.000
Surface Mine or Dump	2008	30.3	0.00	0.00	0.00	0.00	0.000
Depleted Grassland	2008	28.6	0.37	2.12	2.49	0.05	71.214
Orchard, Vineyard or Other Perennial Crop	2008	8.0	0.00	0.00	0.00	0.00	0.000
Landslide	2008	2.3	0.00	0.00	0.00	0.00	0.000
Transport Infrastructure	2008	2.2	0.00	0.00	0.00	0.00	0.000
Herbaceous Freshwater Vegetation	2012	112201.1	10.17	7.06	17.23	1.68	1933224.953
Manuka and/or Kanuka	2012	26601.0	26.30	5.24	31.54	7.97	838995.540
Herbaceous Saline Vegetation	2012	12130.1	3.74	6.59	10.33	0.32	125303.933
Deciduous Hardwoods	2012	10799.1	29.34	4.98	34.32	10.32	370625.112

Table S2: LCDB classes (from LCDB v5) that intersect with the LUM Wetland - Vegetated non forest class for 2008 (for LCDB year 2008), 2012 (for LCDB year 2012) and 2016 (for LCDB year 2018), along with total carbon stocks for the relevant year by LCDB class. *(continued)*

LCDB	LCDB Year	Area (ha)	Carbon density above ground (mean)	Carbon density below ground (mean)	Carbon density total (mean)	Carbon density above ground (SE)	Carbon Stock (Total; Mg C)
Tall Tussock Grassland	2012	9705.2	27.16	8.35	35.51	3.57	344631.652
High Producing Exotic Grassland	2012	8493.2	1.05	1.22	2.27	0.14	19279.564
Low Producing Grassland	2012	7291.5	0.84	3.02	3.86	0.11	28145.190
Flaxland	2012	5589.2	10.52	8.76	19.28	1.38	107759.776
Indigenous Forest	2012	5345.8	193.28	34.65	227.93	3.31	1218468.194
Fernland	2012	3859.1	6.14	4.27	10.41	0.81	40173.231
Broadleaved Indigenous Hardwoods	2012	3561.8	124.32	22.06	146.38	7.33	521376.284
Gorse and/or Broom	2012	2488.2	34.39	7.56	41.95	6.49	104379.990
Estuarine Open Water	2012	1938.0	0.00	0.00	0.00	0.00	0.000
Lake or Pond	2012	1347.3	0.00	0.00	0.00	0.00	0.000
Mixed Exotic Shrubland	2012	1175.6	50.72	10.17	60.89	28.56	71582.284
Exotic Forest	2012	1157.2	85.39	21.35	106.74	5.77	123519.528
Sand or Gravel	2012	632.0	0.00	0.00	0.00	0.00	0.000
Mangrove	2012	620.9	18.40	24.13	42.53	0.75	26406.877
River	2012	588.1	0.00	0.00	0.00	0.00	0.000
Gravel or Rock	2012	541.7	0.00	0.00	0.00	0.00	0.000
Matagouri or Grey Scrub	2012	512.4	29.54	5.84	35.38	3.98	18128.712
Forest - Harvested	2012	80.6	0.00	0.00	0.00	0.00	0.000
Alpine Grass/Herbfield	2012	78.1	10.10	6.71	16.81	1.74	1312.861
Short-rotation Cropland	2012	76.7	3.50	1.50	5.00	1.91	383.500
Sub Alpine Shrubland	2012	66.0	98.17	17.14	115.31	34.51	7610.460
Urban Parkland/Open Space	2012	58.8	10.17	7.06	17.23	1.68	1013.124
Built-up Area (settlement)	2012	33.6	0.00	0.00	0.00	0.00	0.000
Depleted Grassland	2012	28.6	0.37	2.12	2.49	0.05	71.214
Surface Mine or Dump	2012	24.0	0.00	0.00	0.00	0.00	0.000
Orchard, Vineyard or Other Perennial Crop	2012	9.4	0.00	0.00	0.00	0.00	0.000
Landslide	2012	2.3	0.00	0.00	0.00	0.00	0.000
Transport Infrastructure	2012	2.2	0.00	0.00	0.00	0.00	0.000
Herbaceous Freshwater Vegetation	2018	111816.2	10.17	7.06	17.23	1.68	1926593.126
Manuka and/or Kanuka	2018	26207.3	26.30	5.24	31.54	7.97	826578.242
Herbaceous Saline Vegetation	2018	12069.3	3.74	6.59	10.33	0.32	124675.869
Deciduous Hardwoods	2018	10692.6	29.34	4.98	34.32	10.32	366970.032
Tall Tussock Grassland	2018	9689.2	27.16	8.35	35.51	3.57	344063.492
High Producing Exotic Grassland	2018	8755.9	1.05	1.22	2.27	0.14	19875.893
Low Producing Grassland	2018	7644.2	0.84	3.02	3.86	0.11	29506.612
Flaxland	2018	5565.3	10.52	8.76	19.28	1.38	107298.984
Indigenous Forest	2018	5335.8	193.28	34.65	227.93	3.31	1216188.894
Fernland	2018	3824.2	6.14	4.27	10.41	0.81	39809.922
Broadleaved Indigenous Hardwoods	2018	3536.2	124.32	22.06	146.38	7.33	517628.956

Table S2: LCDB classes (from LCDB v5) that intersect with the LUM Wetland - Vegetated non forest class for 2008 (for LCDB year 2008), 2012 (for LCDB year 2012) and 2016 (for LCDB year 2018), along with total carbon stocks for the relevant year by LCDB class. *(continued)*

LCDB	LCDB Year	Area (ha)	Carbon density above ground (mean)	Carbon density below ground (mean)	Carbon density total (mean)	Carbon density above ground (SE)	Carbon Stock (Total; Mg C)
Gorse and/or Broom	2018	2341.4	34.39	7.56	41.95	6.49	98221.730
Estuarine Open Water	2018	1886.5	0.00	0.00	0.00	0.00	0.000
Lake or Pond	2018	1358.9	0.00	0.00	0.00	0.00	0.000
Mixed Exotic Shrubland	2018	1174.6	50.72	10.17	60.89	28.56	71521.394
Exotic Forest	2018	1120.4	85.39	21.35	106.74	5.77	119591.496
Sand or Gravel	2018	726.9	0.00	0.00	0.00	0.00	0.000
Mangrove	2018	620.9	18.40	24.13	42.53	0.75	26406.877
River	2018	587.3	0.00	0.00	0.00	0.00	0.000
Gravel or Rock	2018	541.7	0.00	0.00	0.00	0.00	0.000
Matagouri or Grey Scrub	2018	510.7	29.54	5.84	35.38	3.98	18068.566
Forest - Harvested	2018	107.7	0.00	0.00	0.00	0.00	0.000
Alpine Grass/Herbfield	2018	78.1	10.10	6.71	16.81	1.74	1312.861
Short-rotation Cropland	2018	76.7	3.50	1.50	5.00	1.91	383.500
Sub Alpine Shrubland	2018	66.0	98.17	17.14	115.31	34.51	7610.460
Urban Parkland/Open Space	2018	59.3	10.17	7.06	17.23	1.68	1021.739
Surface Mine or Dump	2018	45.4	0.00	0.00	0.00	0.00	0.000
Built-up Area (settlement)	2018	36.0	0.00	0.00	0.00	0.00	0.000
Depleted Grassland	2018	28.6	0.37	2.12	2.49	0.05	71.214
Orchard, Vineyard or Other Perennial Crop	2018	12.5	0.00	0.00	0.00	0.00	0.000
Transport Infrastructure	2018	3.0	0.00	0.00	0.00	0.00	0.000
Landslide	2018	2.3	0.00	0.00	0.00	0.00	0.000
Not land	2018	0.8					

Appendix S3: Meta-analysis results by wetland type: above-ground

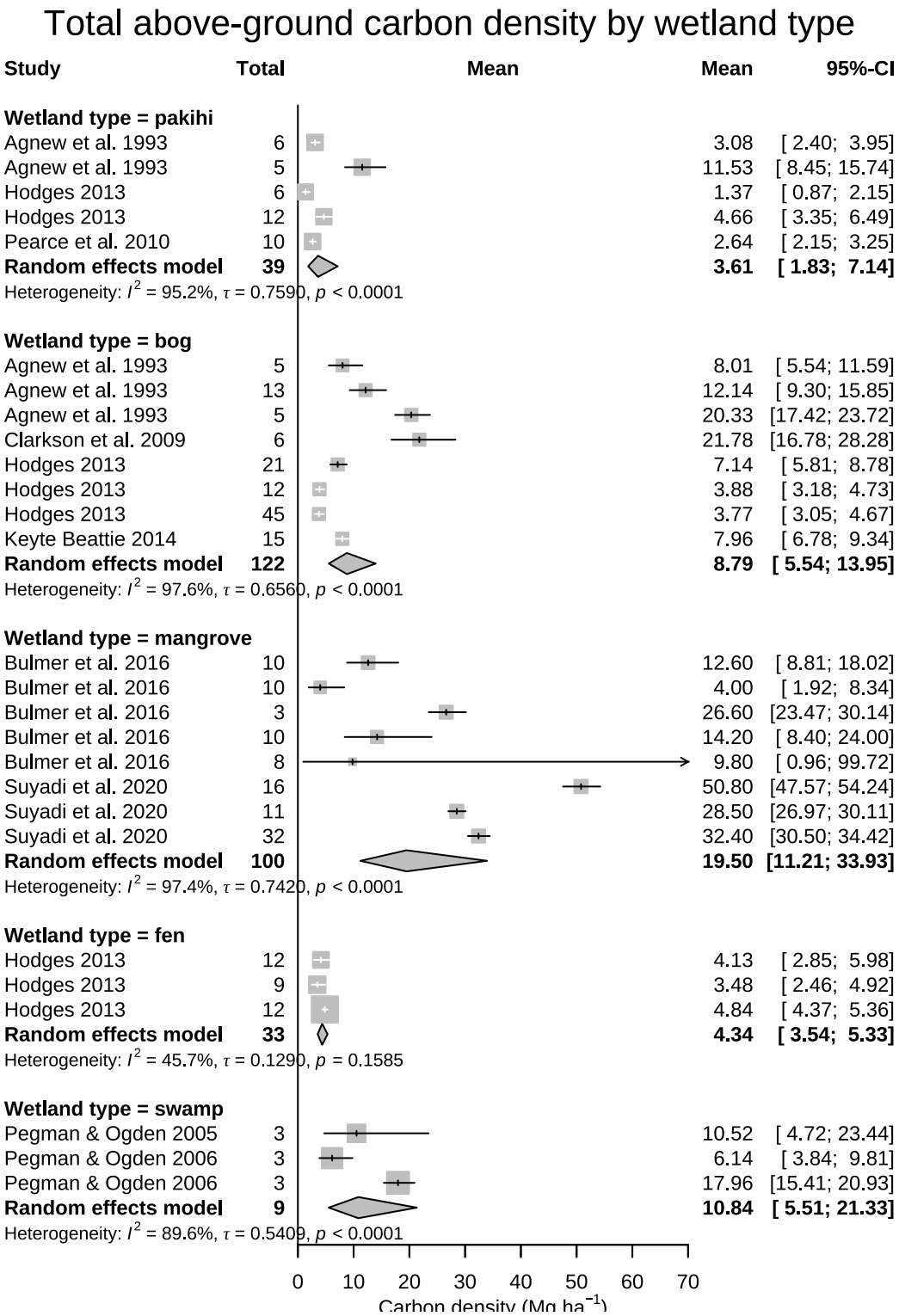

Figure S3: Summary of above-ground carbon density by wetland type. Cross-study group means and heterogeneity estimates (grey diamond) were derived from a random effects meta-analysis.

Appendix S4: Meta-analysis results by wetland type: below-ground

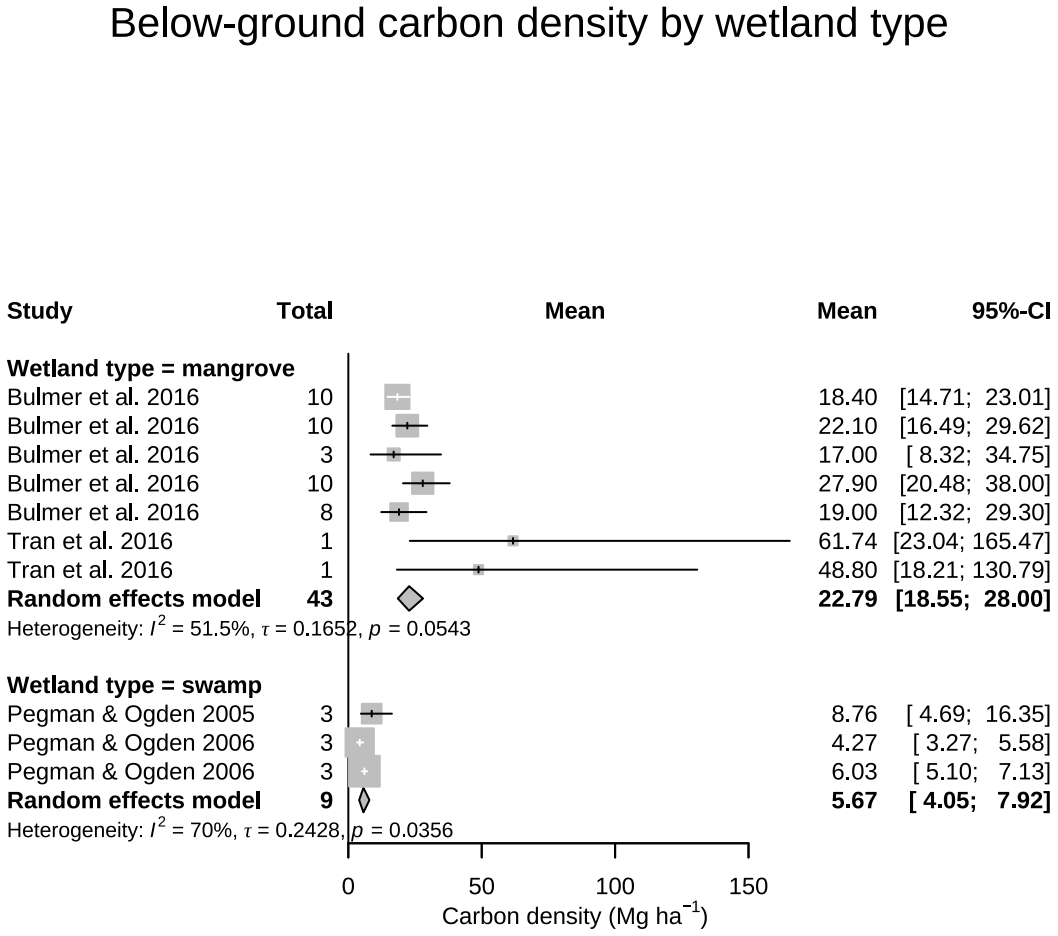

Figure S4: Summary of total below-ground carbon density by wetland type. Cross-study group means and heterogeneity estimates (grey diamond) were derived from a random effects meta-analysis.