Table 1. Description of studies included in the meta-analysis. Full article citations are listed after the table.

| **Reference** | **ID** | **Turfgrass Use** | **Location** | **Year since establishment** | **Function for SOC vs. years**  | **Depths evaluated** | **Climate Description** | **Prior Land use** | **Dominant Species** | **Seasonality** | **Data source** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Acuna et al., 2017 | Acuna2017\_Bingo | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Tall fescue | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_C.dactylon | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Bermuda (Cynodon dactylon) | Warm | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_CindyLou | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Red fescue (Festuca rubra L. ssp. Rubra) | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Cochise | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Tall fescue | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Derby | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Ryegrass (Lolium perenne) | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Kenblue | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Kentucky bluegrass (Poa pratensis) | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Premier | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Ryegrass (Lolium perenne) | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Sabre | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Poa (Poa trivialis) | Cool | No response. Imputed SE. |
| Acuna et al., 2017 | Acuna2017\_Tifway | Small plots | Pirque, Chile | 0 - 2 | Linear | 0-10, 10-20, 20-30 | Mediterranean | Cropland | Hybrid bermuda (Cynodon dactylon L. × C. transvaalensis Burtt Davy) | Warm | No response. Imputed SE. |
| Braun and Bremer, 2019 | Braun2019\_HMI | Small plots | Manhattan, Kansas, USA | 0 - 3 | Linear | 0-10, 10-20, 20-301 | Continental Hot Summer | Pasture/ Turf | Zoysia (Zoysia matrella) | Warm | No response. Imputed SE. |
| Braun and Bremer, 2019 | Braun2019\_LMI | Small plots | Manhattan, Kansas, USA | 0 - 3 | Linear | 0-10, 10-20, 20-301 | Continental Hot Summer | Pasture/ Turf | Zoysia (Zoysia matrella) | Warm | No response. Imputed SE. |
| Campbell et al. 2014 | Campbell 2014\_ Roanoke | Lawns | Roanoke, Virginia, USA | 5 - 52 | Linear2 | 0-5, 5-10, 10-20, 20-30 | Humid subtropical | Forest | Mix | Transitional | Author shared data. |
| Contosta et al., 2020 | Contosta 2020\_ Manchester | Lawns | Manchester, New Hampshire, USA | 8-149 | Linear | 0-10, 10-20, 20-30, 30-40, 40-50 | Continental Mild Summer | Unknown/Multiple | Mix | Cool | [Data available in data repository Zenodo at 10.5281/zenodo.3588461](https://doi.org/10.5281/zenodo.3588461) |
| Gautam et al., 2019 | Gautum2020\_Lubbock | Fairways | Lubbock, Texas, USA | 93 | Quadratic | 0-7.5, 7.5-15 | Semi-Arid | Cropland | Bermudagrass (Cynodon spp.)  | Warm | Author shared data. |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Golubiewski 2006 and Pouyat et al. 2009 | Golubiewski2006\_ Denver | Lawns | Denver, Colorado, USA | 0-50 | Linear | 0-10, 10-20, 20-30, 30-100 | Semi-Arid | Grassland | Kentucky bluegrass (Poa pratensis) | Cool | WebPlotDigitizer, only coarse ages (decades) known for housing age. |
| Huh et al., 2008 | Huh2008\_ NewZealand | Putting Greens | Palmerston North, New Zealand | 5 - 40 | Linear | 0-10, 10-25 | Mediterranean | Pasture/ Turf | Bluegrass (Poa annua L.) | Cool | WebPlotDigitizer. Corresponding author does not appear to be active. |
| Huyler et al. 2017 | Huyler2017\_Auburn\_ PureLawns | Lawns | Auburn, Alabama, USA | 1-51 | Linear/Spline3 | 0-15, 15-30, 30-50 | Humid subtropical | Forest | Zoysia (Zoysia matrella) | Warm | Author shared data. |
| Huyler et al. 2017 | Huyler2017\_Auburn\_ LawnsWithTrees | Lawns | Auburn, Alabama, USA | 3-87 | Polynomial | 0-15, 15-30, 30-50 | Humid subtropical | Forest | Zoysia (Zoysia matrella) | Warm | Author shared data. |
| Law et al. 2016 | Law2017\_clippingcollectted | Small plots | West Lafyette, Indiana, USA | 1-3 | Linear | 0-5.1 | Continental Hot Summer | Pasture/ Turf | Mix | Cool | Did not contact because baseline SOC stocks were estimated. Imputed SE. |
| Law et al. 2016 | Law2017\_clippingreturned | Small plots | West Lafyette, Indiana, USA | 1-3 | Linear | 0-5.1 | Continental Hot Summer | Pasture/ Turf | Mix | Cool | Did not contact because baseline SOC stocks were estimated. Imputed SE. |
| Law et al. 2016 | Law2017\_ KBG | Small plots | West Lafyette, Indiana, USA | 1-3 | Linear | 0-5.1 | Continental Hot Summer | Pasture/ Turf | Kentucky bluegrass (Poa pratensis) | Cool | Did not contact because baseline SOC stocks were estimated. Imputed SE. |
| Law et al. 2016 | Law2017\_ TF | Small plots | West Lafyette, Indiana, USA | 1-3 | Linear | 0-5.1 | Continental Hot Summer | Pasture/ Turf | Tall fescue | Cool | Did not contact because baseline SOC stocks were estimated. Imputed SE. |
| Qian and Follett, 2002 | Qian2002\_ FairwaysCO | Putting Greens | Near Denver and Loveland, Colorado, USA | 2 - 45 | Quadratic | 0-11.4 | Semi-Arid | Grassland | Kentucky bluegrass (Poa pratensis) | Cool | Data no longer available. Used WebPlotDigitizer. |
| Qian and Follett, 2002 | Qian2002\_ Fairways WY | Fairways | Near Denver and Loveland, Colorado, USA | 2 - 45 | Quadratic | 0-11.4 | Continental Mild Summer | Grassland | Kentucky bluegrass (Poa pratensis) | Cool | No response. Used WebPlotDigitizer. |
| Qian and Follett, 2002 | Qian2002\_ GreensCO | Fairways | Saratoga, Wyoming, USA | 18-34 | Linear | 0-15.2 | Semi-Arid | Grassland | Creeping bentgrass (Agrostis stolonifera) | Cool | Data no longer available. Used WebPlotDigitizer. |
| Qian et al., 2010 | Qian2010\_ Bentgrass | Roughs | Nebraska City, Nebraska, USA | 0.17 - 4 | Linear | 0-10, 10-20 | Continental Hot Summer | Cropland | Creeping bentgrass (Agrostis stolonifera) | Cool | No response, imputed standard errors. |
| Qian et al., 2010 | Qian2010\_ FineFescue\_Irr | Roughs | Nebraska City, Nebraska, USA | 0.17 - 4 | Linear | 0-10, 10-20 | Continental Hot Summer | Cropland | Fine fescue (Festuca spp.) | Cool | No response, imputed standard errors. |
| Qian et al., 2010 | Qian2010\_FineFescue\_ Unirr | Roughs | Nebraska City, Nebraska, USA | 0.17 - 4 | Linear | 0-10, 10-20 | Continental Hot Summer | Cropland | Fine fescue (Festuca spp.) | Cool | No response, imputed standard errors. |
| Qian et al., 2010 | Qian2010\_ KBG | Roughs | Nebraska City, Nebraska, USA | 0.17 - 4 | Linear | 0-10, 10-20 | Continental Hot Summer | Cropland | Kentucky bluegrass (Poa pratensis) | Cool | No response, imputed standard errors. |
| Raciti et al., 2011 | Raciti2011\_Baltimore\_ fromAg | Lawns | Baltimore, Maryland, USA | 4-58 | Linear4 | 0-10, 10-30, 30-70, 70-100 | Humid subtropical | Cropland | Mix | Cool5 | https://doi.org/10.6073/pasta/3847c58578bd9d5987a49e55066b497b |
| Raciti et al., 2011 | Raciti2011\_Baltimore\_ fromForest  |  | Baltimore, Maryland, USA | 4-58 | Linear4 | 0-10, 10-30, 30-70, 70-100 | Humid subtropical | Forest | Mix | Cool5 | https://doi.org/10.6073/pasta/3847c58578bd9d5987a49e55066b497b |
| Sapkota et al. 2020 | Sapkota2020\_Lubbock | Lawns | Lubbock, Texas, USA | 0-63 | Quadratic | 0-10 | Semi-Arid | Cropland | Bermuda (Cynodon dactylon) | Warm | Did not contact, because data extracted with WebPlotDigitizer recreated the published regression very well. |
| Selhorst and Lal, 2011 | Selhorst2011\_OHFairways | Fairways | Ohio, USA | 1 - 97 | Quadratic | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Hot Summer | Cropland | Mix | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2011 | Selhorst2011\_OHRoughs | Roughs | Ohio, USA | 1 - 97 | Quadratic | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Hot Summer | Cropland | Mix | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Albuquerque | Lawns | Albuquerque, New Mexico, USA | 0 - 83 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Arid | Desert | Bermuda (Cynodon dactylon) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Atlanta | Lawns | Atlanta, Georgia, USA | 0 - 94 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Humid subtropical | Forest | Zoysia (Zoysia matrella) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Cheyenne | Lawns | Cheyenne, Wyoming, USA | 0 - 93 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Semi-Arid | Grassland | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Dallas | Lawns | Dallas, Texas, USA | 0 - 93 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Humid subtropical | Unknown/Multiple | Zoysia (Zoysia matrella) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Denver | Lawns | Denver, Colorado, USA | 0 - 83 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Semi-Arid | Grassland | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Duluth | Lawns | Duluth, Minnesota, USA | 0 - 100 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Mild Summer | Unknown/Multiple | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Houston | Lawns | Houston, Texas, USA | 0 - 100 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Humid subtropical | Unknown/Multiple | St Augustine (Stenotaphrum secundatum) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_LasVegas | Lawns | Las Vegas, Nevada, USA | 0 - 73 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Arid | Desert | Bermuda (Cynodon dactylon) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Minneapolis | Lawns | Minneapolis, Minnesota, USA | 0 - 83 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Mild Summer | Unknown/Multiple | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Orlando | Lawns | Orlando, Florida, USA | 0 - 100 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Humid subtropical | Unknown/Multiple | St Augustine (Stenotaphrum secundatum) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Phoenix | Lawns | Phoenix, Arizona, USA | 0 - 74 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Arid | Desert | Bermuda (Cynodon dactylon) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Portland | Lawns | Portland, Maine, USA | 0 - 93 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Mild Summer | Unknown/Multiple | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_SanFrancisco | Lawns | San Francisco, California, USA | 0 - 83 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Mediterranean | Unknown/Multiple | Bentgrass (Agrostis palustris) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Seattle | Lawns | Seattle, Washington, USA | 0 - 83 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Mediterranean | Unknown/Multiple | Bentgrass (Agrostis palustris) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Wichita | Lawns | Wichita, Kansas, USA | 0 - 93 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Hot Summer | Cropland | Buffalo (Buchloe dactyloids) | Warm | Original data are no longer available, used WedPlotDigitizer. |
| Selhorst and Lal, 2013 | Selhorst2013\_Wooster | Lawns | Wooster, Ohio, USA | 0 - 100 | Polynomial | 0-2.5, 2.5-5, 5-10, 10-15 | Continental Hot Summer | Cropland | Kentucky bluegrass (Poa pratensis) | Cool | Original data are no longer available, used WedPlotDigitizer. |
| Seth-Carley et al., 2011 | Seth-Carley2011\_NorthCarolina | Putting Greens | North Carolina, USA | 1 - 14 | Rational | 0-2.5, 2.5-7.5 | Humid subtropical | Unknown/Multiple | Creeping bentgrass (Agrostis stolonifera) | Cool | Author shared data. |
| Shi et al. 2011 | Shi2012\_NorthCarolina | Fairways | North Carolina, USA | 1 - 103 | Rational | 0-15 | Humid subtropical | Unknown/Multiple | Bermuda (Cynodon dactylon) | Warm | Author shared data. |
| Smith et al., 2018 | Smith2018\_SLC | Lawns | Salt Lake Valley, Utah, USA | 1 - 100 | Linear | 0-10, 10-20, 20-30, 30-40 | Continental Hot Summer | Grassland | Mix | Cool5 | Author shared data. |
| Townsend and Czimick, 2010 | Townsend2010\_LA\_AthleticFields | Athletic Fields | Los Angeles, California, USA | 2 - 33 | Linear | 0-20 | Mediterranean | Shrubland | Unknown | Unknown | Did not contact. Small and old dataset, values were easy to extract with WebPlotDigitizer |
| Townsend and Czimick, 2010 | Townsend2010\_LA\_ Lawns | Lawns | Los Angeles, California, USA | 2 - 33 | Linear | 0-20 | Mediterranean | Shrubland | Unknown | Cool5 | Did not contact. Small and old dataset, values were easy to extract with WebPlotDigitizer |
| Trammell et al 2020 | Trammell2020\_ Baltimore | Lawns | Baltimore, Maryland, USA | 4 - 122 | Linear | 0-10, 10-30 | Humid subtropical | Unknown/Multiple | Unknown | Cool | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Trammell et al 2020 | Trammell2020\_Boston | Lawns | Boston, MA, USA | 10 - 170 | Linear | 0-10, 10-30 | Continental Hot Summer | Unknown/ Multiple | Unknown | Cool | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Trammell et al 2020 | Trammell2020\_LosAngeles | Lawns | Los Angeles, California, USA | 7 - 81 | Linear | 0-10, 10-30 | Mediterranean | Shrubland | Unknown | Cool5 | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Trammell et al 2020 | Trammell2020\_Miami | Lawns | Miami, Florida, USA | 8 - 62 | No trend | 0-10, 10-30 | Tropical | Forest | Unknown | Warm | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Trammell et al 2020 | Trammell2020\_Minneapolis | Lawns | Minneapolis/ St.Paul, Minnesota | 6 - 101 | No trend | 0-10, 10-30 | Continental Mild Summer | Unknown/ Multiple | Unknown | Cool | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Trammell et al 2020 | Trammell2020\_Phoenix | Lawns | Phoenix, Arizona, USA | 7 - 59 | Linear | 0-10, 10-30 | Arid | Desert | Unknown | Warm | Carbon concentration data available at <https://doi.org/10.6073/pasta/ae6a8154bf0df6492a7358e19ee08fc6>. Author shared other data. |
| Wang et al. 2014 | Wang2014\_ForestConversion | Fairways | Durham, NC, USA | 0 - 80 | Two-part linear | 0-10 | Humid subtropical | Forest | Bermuda (Cynodon dactylon) | Warm | No response. Used WebPlotDigitizer. |

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| --- | --- | --- | --- |
| Footnotes: |  |  |  |
| 1. The total sequestration reported here differs from that reported by Braun and Bremer (2019), because they reported mean rather than total SOC sequestration rate across depths. |
| 2. Campbell et al., (2014) reported 0-5 cm depth with a linear fit, and did not report the non-linear relationships for deeper interals. We fit 3rd order polynomials to all intervals. |
| 3. Authors used linear regression in Huyler et al., 2014 and localized polynomial fitting in Huyler et al., 2017. We applied the most parsimonious polynomial regressions to each depth interval, which were a linear, 2nd order, and third order polynomial to the top, mid, and bottom interval, respectively. |
| 4. Raciti et al., (2011) applied a linear regression to the whole profile, but the 10-30, 30-70, and 70-100 cm intervals had non-linear trends. We fit these intervals with 3rd order polynomials, and fit a linear regression to the whole profile. |
| 5. Seasonality for these cities is based on findings by Trammell et al. (2019, <https://doi.org/10.1002/eap.1884>). Contrary to expectation based on climate, they showed C3 species dominated lawns in Los Angeles, CA. |

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