Custom Software and Web Tool: Biochar Cost-Benefit assessment tool

Name: Biochar Cost-Benefit assessment tool

Description: This tool allows users to compute a cost-benefit analysis of applying biochar.

Source, Link: The tool and associated code will be available at http://pnwbiochar.org

Restrictions: This tool is freely available with the following caveat. This tool is intended only for educational purposes only and should not be used for commercial purposes, including marketing or investment planning.Use of the tool for educational purposes should include the following website citation. Phillips C, Lindsley A, Trippe K (2017) Pacific Northwest Biochar Atlas. http://pnwbiochar.org.

Maintenance and Support for the Web Tool: The tool will be maintained for 24 months after project completion.

Languages: R, R-Shiney

Environment: Windows

ScienceBase ID:

Custom Software and Web Tool: Biochar impact prediction tool

Name: Biochar impact prediction tool

Description: This tool allows users to estimate biochar impacts on soil chemistry, C storage, and physical properties, based on soil and biochar properties.

Source, Link: The tool and associated code will be available at http://pnwbiochar.org

Restrictions: This tool is freely available with the following caveat. This tool is intended only for educational purposes only and should not be used for commercial purposes, including marketing or investment planning.Use of the tool for educational purposes should include the following website citation. Phillips C, Lindsley A, Trippe K (2017) Pacific Northwest Biochar Atlas. http://pnwbiochar.org.

Maintenance and Support for the Web Tool: The tool will be maintained for 24 months after project completion.

Languages: R, R-Shiney

Environment: Windows

ScienceBase ID:

Custom Software and Web Tool: Biochar property selection tool

Name: Biochar property selection tool

Description: This tool allows users to view the chemical and physical properties associated with biochars from the UC Davis Biochar Database

Source, Link: The tool and associated code will be available at http://pnwbiochar.org

Restrictions: This tool is freely available with the following caveat. This tool is intended only for educational purposes only and should not be used for commercial purposes.Use of the tool for educational purposes should include the following website citation. Phillips C, Lindsley A, Trippe K (2017) Pacific Northwest Biochar Atlas. http://pnwbiochar.org.

Maintenance and Support for the Web Tool: The tool will be maintained for 24 months after project completion.

Languages: R, R-Shiney

Environment: Windows

ScienceBase ID:

Custom Software and Web Tool: Soil property selection tool

Name: Soil property selection tool

Description: This tool provides a clickable map for Oregon, Washington, and Idaho that allows users to determine soil properties related to soil fertility and hydraulics at a point of interest.

Source, Link: The tool will be available at http://pnwbiochar.org

Restrictions: None

Maintenance and Support for the Web Tool: The tool will be maintained for 24 months after project completion. Maintenance will include harmonizing SSURGO data between the selection tool and published NRCS data, as well as any security updates to Leaflet/Mapbox, the open-source mapping software used by the tool.

Languages: Javascript, SQL, HTML

Environment: Windows (development), Linux (server)

ScienceBase ID:

Data Input Existing Collection: Soil Survey Geographic Database (SSURGO) Soil Property Data

Name: Soil Survey Geographic Database (SSURGO) Soil Property Data

Description: Uppermost horizon soil properties that relate to hydrologic functioning and soil fertility, consolidated to the dominant soil series of each soil map unit, for Oregon, Washington, and Idaho.

Source: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053627

Restrictions: No use restrictions.

Format: SSURGO datasets consist of map data, tabular data, and information about how the maps and tables were created. Data can be downloaded as a shapefile format.

Fees: Available for free by download.

Quality Checks: Reviewed to make sure data downloaded accurately and completely, and to assess the proportion of missing data.

Data Processing and Scientific Workflows: Data are used to create a website-embedded map, allowing users to click on a location and generate a table of soil survey properties at that location. The soil survey properties are used to estimate the impacts of biochar amendment.

Backup and Storage: During the project, data are stored on an Amazon Web Service Account that also hosts the Pacific Northwest Biochar Atlas.

Volume Estimate: TB

Citation: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at https://websoilsurvey.nrcs.usda.gov/.

ScienceBase ID:

Data Input Existing Collection: UC Davis Biochar Database

Name: UC Davis Biochar Database

Description: An open-access database of biochar chemical properties, with submissions by commercial and non-commercial biochar manufacturers, and obtained from literature review.

Source: http://biochar.ucdavis.edu/

Restrictions: No restrictions with attribution.

Format: csv

Fees: None

Quality Checks: Submissions missing total carbon or organic carbon content are omitted. Values exceeding 2 standard deviations from database-wide mean are flagged for data quality.

Data Processing and Scientific Workflows: Biochar classifications are determined as described by:Camps-Arbestain M, Amonette JE, Singh B, et al (2015) A biochar classification system and associated test methods. In: Lehmann J, Joseph S (eds) Biochar for environmental management: science, technology and implementation, Second Edition. Routledge, New York, pp 165–193

Backup and Storage: During the project, data are continuously backed up to cloud-based server shared by lab members.

Volume Estimate: MB

Citation: http://biochar.ucdavis.edu/

ScienceBase ID:

Data Input New Collection: Chemistry impacts of biochar on six Oregon soils

Name: Chemistry impacts of biochar on six Oregon soils

Description: Soil pH, available nutrients, cation exchange capacity, and biomass and nutrient uptake of a wheat model crop determine from a greenhouse growth experiment with biochars applied at four rates.

Data Management Resources: Nine month salary of bioscience technician to collect and manage the data. Three months of a post-doc to analyze the data.

Exclusive Use: Exclusive use for 1 year following project to allow publication of study findings.

Restrictions: No restrictions with appropriate attribution.

Format: csv

Protocols: Methods described in :Trippe K, Griffith SM, Banowetz GM, Whittaker GW (2015a) Biochars derived from gasified feedstocks increase the growth of Triticum aestivum (L.) in agricultural alfisols. Agriculture 5:668–681.Trippe K, Griffith SM, Banowetz GM, Whittaker GW (2015b) Changes in soil chemistry following wood and grass biochar amendments to an acidic agricultural production soil. Agron J 107:1440–1446. doi: 10.2134/agronj14.0593

Quality Checks: Manual data entry by technicians will be validated by post doc using random checks, diagnostic plots, and evaluation of summary statistics.

Data Processing and Scientific Workflows: Regression model selection process to assess biochar fertility benefits as a function of amendment rate and pre-plant soil test values.

Metadata: EML

Volume Estimate: MB

Backup and Storage: During the project, data are continuously backed up to cloud-based server shared by lab members.

Repository for Data: ScienceBase will be the sole repository for these data.

Citation: Phillips, C.L., Light, S., Trippe, K.M., Biochar Impacts on soil and plant chemistry and growth of a model wheat crop for six soil types in Oregon, USA. USGS ScienceBase. http://dx/doi.org/10.xxxx/blahblah. Accessed 1 May 2018.

Digital Object Identifier, Link: Provide a digital object identifier (DOI)/link to the data when available publicly.

Lifespan of Data: 10-20 years

ScienceBase ID:

Data Input New Collection: Hydraulic properties of biochar-amended soil

Name: Hydraulic properties of biochar-amended soil

Description: Soil moisture retention, unsaturated hydraulic conductivity, and infiltration rate for seven soils from Oregon and Washington

Data Management Resources: Nine month salary of bioscience technician to collect and manage the data. Three months of a post-doc to analyze the data.

Exclusive Use: Exclusive use for 1 year following project to allow publication of study findings.

Restrictions: No restrictions with appropriate attribution.

Format: csv

Protocols: Soil moisture retention:Hyprop user manual (https://tp.dresden-concept.de/userdata/e2e7fda78c954ee94c5e2c4a81b07326.pdf)WP4 Water Potentiometer (http://manuals.decagon.com/Manuals/Discontinued/WP4-Operators-Manual-(discontinued).pdf)Water retention using pressure plates: Bouwer H (1982) Water Retention: Laboratory Methods. In: Klute A (ed) Methods of soil analysis, Part 1-Physical and Mineralogical Methods, 2nd ed. American Society of Agronomy: Soil Science Society of America, Madison, Wis, pp 835–840Unsaturated hydraulic conductivity:Van Genuchten method, as applied using Hyprop-FIT software (http://www.soil.tu-bs.de/download/downloads/reports/2015.SHYPFIT2.0_Users_Manual.pdf)Single ring infiltration rate:Bouwer H (1982) Water Retention: Laboratory Methods. In: Klute A (ed) Methods of soil analysis, Part 1-Physical and Mineralogical Methods, 2nd ed. American Society of Agronomy: Soil Science Society of America, Madison, Wis, pp 835–840

Quality Checks: Detailed in protocols above.

Data Processing and Scientific Workflows: Details of measurements and data processing are provided in protocols, above.

Metadata: EML

Volume Estimate: MB

Backup and Storage: During the project, data are continuously backed up to cloud-based server shared by lab members.

Repository for Data: In addition to the NCCWSC repository (ScienceBase), we plan to share the data through PANGEA (https://www.pangaea.de)

Citation: Phillips, C.L., Light, S., Trippe, K.M., Biochar Impacts on Hydraulic Properties for seven soil types in Oregon and Washington States, USA. USGS ScienceBase. http://dx/doi.org/10.xxxx/blahblah. Accessed 1 May 2018.

Digital Object Identifier, Link: TBD

Lifespan of Data: 10-20 years

ScienceBase ID:

Data Product: Pacific Northwest Biochar Atlas

Name: Pacific Northwest Biochar Atlas

Description: The PNW Biochar Atlas will provide a repository for the tools described above, and will also provide case studies from biochar users and directories for finding regional biochar producers and supplies.

Data Management Resources: 25% of a research associate's time to design the website and build the map tools, and 3 months of a post-docs time to populate the website with the research associate.

Format: SQL, web map services (Mapbox/Leaflet), R-Shiney

Exclusive Use: None

Restrictions: None

Quality Checks: Web site functionality will be evaluated across operating systems and browsers.

Data Processing and Scientific Workflows: Import SSURGO data into ArcMap 10.3.1 > Select relevant data from aggregated map unit, component, and horizon tables > Export reduced datasets as geodatabase > Convert geodatabase to spatial SQL for upload to Biochar Atlas website. Upload map unit shapefile to Biochar Atlas website.

Metadata: EML

Volume Estimate: TB

Backup and Storage: During the project, data are stored on an Amazon Web Service Account that is also the server for the website.

Repository for Data: Data used for the website will be stored in ScienceBase and will also be downloadable from the website itself.

Citation: Phillips C, Lindsley A, Trippe K (2017) Pacific Northwest Biochar Atlas. http://pnwbiochar.org.

Digital Object Identifier, Link: TBD

Lifespan of Data: 5-10 years

ScienceBase ID: