

## John K. Buck, CPSS

### Project Manager III

Mr. Buck is a certified professional soil scientist (CPSS Certification Number 24816) with more than 30 years of experience in environmental sciences. His areas of expertise include reclamation and revegetation of drastically disturbed land; beneficial use of waste materials (residual wastes, biosolids, and agricultural wastes); phytoremediation of contaminated soils and groundwater; evaluation of plant uptake of nutrients and trace/toxic elements; wetland treatment system design and performance evaluation; stream and wetland restoration; alternative cap and cover systems; and monitoring the performance of green roof and bioretention/rain garden systems. His experience includes studies of soil/plant relationships in natural and disturbed settings, revegetation for wildlife habitat on disturbed sites, evaluation and revegetation of salt-affected soils, revegetation of steep slopes without using cover soil, and design/build revegetation and invasive plant management. Mr. Buck has substantial experience in evaluation of soils for stormwater and wastewater infiltration and systems. Mr. Buck is a Chatham University adjunct faculty member.

### PROJECT EXPERIENCE

#### Soil Drainage Evaluations

In a supporting role to engineers and landscape architects, Mr. Buck evaluated the limitations of soil drainage for development of storm water bioretention areas and high-performance sports and landscape turf at several sites. Bioretention area studies included soil sampling and characterization and use of the Guelph Permeameter, Aardvark Permeameter, suction infiltrometer, and/or double-ring infiltrometer for in-situ evaluation of saturated hydraulic conductivity (Kfs) or infiltration rates at various depth intervals. Turf evaluations included Shelby-tube sampling and undisturbed permeability testing, hydrologic modeling, and design of drainage systems including blanket drains and slot drains. Mr. Buck has also performed soil characterization and drainage evaluations of sites for on-lot septic effluent application and construction of cemeteries, landfill alternative cover evapotranspiration cap systems, green roofs, and conducted extensive field measurements and hydrologic modeling to optimize groundwater recharge at a reclaimed soil borrow site.

#### Chatham University Eden Hall Campus, Richland Township, PA

Established a continuous weather and soil monitoring network at several sites where weather, soil temperature water content, and soil water potential are measured every 5 minutes. These data have demonstrated unexpectedly rapid whole-soil drainage in contrast to poor drainage expectations from test soil morphological examinations conducted by Andrasko and Associates for onlot septic infiltration permitting.

#### Greater Pittsburgh Community Food Bank, Storm Water Management, Revegetation, and Landscape Architecture, City of Pittsburgh, PA

Designed a bioretention system for stormwater pre-treatment, revegetation plans that minimized cover soil requirements and included, a landscaping plan that includes a warm season grass and wildflower meadow, and tree and shrub

### EDUCATION

*B.S., Biology, Lehigh University*

*M.S., Agronomy, The Pennsylvania State University*

### CERTIFICATIONS

*Certified Professional Soil Scientist*

### PROFESSIONAL AFFILIATIONS

*American Society of Agronomy*

*Soil Science Society of America*

planting plans that emphasized native species. This work was done for the Food Bank on a 10-acre brownfield parcel on a steel mill site in Duquesne, Pennsylvania. The building (designed by others) and stormwater and landscape design project was one of the first projects in Pittsburgh awarded LEED Certification for green-building design.

#### **Green Infrastructure Monitoring System Design and Installation, City of Pittsburgh, PA and St. Paul, MN**

Designed and installed Internet-connected green infrastructure monitoring systems on green roofs in Pittsburgh at the Allegheny County Office Building (details: <http://gis-prod.cecinc.com/alleghenycounty/>), David L. Lawrence Convention Center, Scalo Solar Sunscape Project, and the Phipps Center for Sustainable Landscapes, and the Penfield building in St. Paul, MN (details: [http://gis-prod.cecinc.com/Penfield\\_Weather/](http://gis-prod.cecinc.com/Penfield_Weather/)). The Convention Center and Scalo Solar projects include use of the monitoring system to enable and disable an irrigation system based on remotely programmable soil moisture parameters.

#### **Rain Garden and Bioswale Performance Monitoring, City of Pittsburgh and Scottdale, PA**

Continuously monitored rain garden and bioswale performance at the Negley Run Blvd. Project 15206 bioswale and rain garden, Jacobs Creek Watershed Association green streets projects, East Liberty Presbyterian Church rain garden, and three rain gardens at Phipps Center for Sustainable Landscapes. The project 15206 project includes monitoring of flows to the stormwater system for 1 year prior to construction as a baseline, plus post-construction monitoring.

#### **Wastewater Treatment System Design Collaboration, Powdermill Nature Center, Rector, PA**

Working in concert with the project architect (Pfaffmann + Associates) and Marsh Machine greenhouse-based wastewater treatment system engineer (Mike Zavoda, P.E.), Mr. Buck designed and permitted components of a system that biologically cleansed, disinfected, and recycled approximately 2/3 of the wastewater at the Carnegie Museums Powdermill Nature Center. Mr. Buck and his CEC design team also designed subsurface stormwater infiltration and grass paving systems that contributed to the LEED design effort.

#### **City of Pittsburgh Planning Department's Pittsburgh Regional Parks Natural Areas Study, Pittsburgh, PA**

In a Biohabitats-lead team for the City of Pittsburgh Planning Department's Pittsburgh Regional Parks Natural Areas Study, Mr. Buck led CEC's GIS, soils, and geology effort. The GIS work included development of collaborative GIS tools (ArcGIS web pages) and geodatabases describing biological resources (forest character and land cover), biological liabilities (invasive plants), US Forest Service UFORE assessment conclusions, other natural resources including geology and soils, and amenities including trails, roads, and recreational facilities in the approximately 1700 acre, four-park study area. This effort will help identify

natural resource management priorities and restoration recommendations and in the identification of follow-up pilot projects.

#### **Riverbank Landscape Vegetative Armoring & Landscape Restoration Guideline Development, City of Pittsburgh, PA**

As a subcontractor to Andropogon Associates and working for Riverlife Task Force, Mr. Buck provided key technical contributions to guideline document: "Three Rivers Park: Landscape Management Guidelines" Mr. Buck and his CEC team developed "green" shoreline revegetation and stabilization techniques using vegetative reinforcement approaches and invisible soil reinforcement materials within the Pittsburgh Pool of the Allegheny, Monongahela, and Ohio Rivers.

#### **Nine Mile Run Brownfield Site - Feasibility Study in Greenhouse and Field, Full-Scale Implementation of Direct (Soil-Less) Revegetation System on Steep Slag Slopes, including Invasive Plant Management, City of Pittsburgh, PA**

Revegetation research, design-build for direct (soil-less) revegetation, and invasive plant management, Pittsburgh Pennsylvania. Conducted greenhouse and field studies to identify low-cost innovative approaches to establish vegetation directly on steep slag slopes. Following the feasibility study and design phase CEC directly seeded about 15 acres of steep (1.4:1 horizontal:vertical) slag slopes, delineated invasive plants using GPS and GIS on 110 acres, and managed invasive plants using selective approaches on 18 acres of slag and 24 acres of natural soils in Lower Frick Park. Plans and cost estimates were developed to increase the management area to a total of 92 acres. Used a combination of traditional ground-based vegetation success monitoring and aerial imagery GIS pixel analysis to document success.

#### **Steep Slope View Analysis, Invasive Plant Management, Native View-Compatible Landscape Design and Installation - Mount Washington Community Development Corporation, City of Pittsburgh, PA**

In a design-build role Mr. Buck and the CEC team are managing invasive plants that block the views of Pittsburgh from Mt. Washington, and have designed and installed low-maintenance native plant landscape treatments that will not obscure the view of the city. Work included public meetings to solicit input and gain acceptance of the project approach, plant inventories, soils evaluations, development of automated irrigation systems with electronic soil moisture monitoring, landscape design with CEC LA staff, planting, seeding using traditional and compost blanket techniques, and selective invasive plant management in a high profile urban setting.

#### **TRAINING**

NRC-Nuclear Densometer Training-N/A

OSHA-HAZWOPR Initial

OSHA-HAZWOPR Refresher

OSHA-OSHA 10-Hour Construction Training

**PUBLICATIONS**

Pecovich, Brandi L., Robert Thomas and John K. Buck, 2010-Present. Green Roof Performance Summaries as Rich Internet Web Sites. Self-updating web pages summarizing avoided stormwater discharges from the Allegheny County Office Building in Pittsburgh, PA. (<http://gis.cecinc.com/AlleghenyCounty/index.html>) and the Pennfield in St. Paul, MN ([http://gis.cecinc.com/Penfield\\_weather/index.html](http://gis.cecinc.com/Penfield_weather/index.html)).

Buck, John K., Larry L. LaBuz, 2005. "Bottom Ash Fines as a Soil Amendment for Turfgrass and Site Closure – Laboratory and Mesocosm Studies at PPL Brunner Island and Montour Steam Electric Station", World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA; Ash Library, <http://www.flyash.info/2005/201buc.pdf>, paper number 201.

"Invasive Plant Delineation, Growing Greener Environmental Stewardship and Watershed Protection Grant, Revegetation at Nine Mile Run, Pittsburgh, Pennsylvania," March 1, 2002. Summary of dominant invasive and non-invasive plants in 110 acre portion of Lower Frick Park and future Nine Mile Run Greenway extension of Frick Park. Presented as GIS mapping and as an interactive web page.

"Revegetation at the Nine Mile Run Site, Pittsburgh, PA", February 2001. Final report to the City of Pittsburgh, Department of City Planning and USEPA on CEC/CMU research activities concerning direct (soil-less) revegetation of steep slag slopes.

Thomas, Paul R. and John K. Buck. 1999. Agronomic Management for Phytoremediation. In Andrea Leeson and Bruce C. Alleman (ed.), Phytoremediation and Innovative Strategies for Specialized Applications 5(6) (Proceedings of the Fifth International In Situ and On-Site Bioremediation Symposium, Sand Diego, California). Battelle Press, Columbus, Ohio.