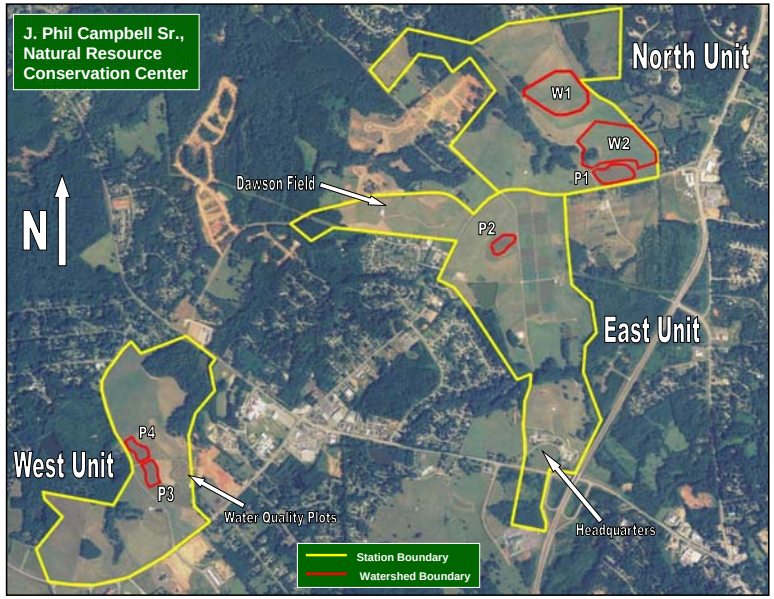
INTEGRATED WATERSHED RESEARCH

Avenue Towards Sustainable Economic and Environmental Agricultural Production

USDA, Agricultural Research Service – J. Phil Campbell Sr., Natural Resource Conservation Center - Watkinsville, GA

PURPOSE

- In order to efficiently utilize and protect our natural resources we must understand what they are made of and how the pieces function in harmony
- Integrated watershed research offers us an opportunity to do just that through collection, documentation, interpretation and dissemination of basic data, information, and knowledge of watershed processes and function
- These activities serve as a basis for design, implementation, monitoring, evaluating, and understanding watershed management practices and programs and their impact, and to predict watershed response to alternative land use and management practices
- Water flow creates a physical link between the land and streams. Water is erosive, a solvent for nutrients, and a key component of agriculture and natural habitats. To understand our natural environment, we must know how water gets from land to streams and what it does in the process



RESOURCES AND CAPABILITIES

- Located within a typical Southern Piedmont landscape
- Cropped watersheds: P1, P2, P3, P4
- Grazed watersheds: W1, W2, and 14 at Dawson Field
- Experimental watershed, an outside hydrologic laboratory: the North Unit with measurable springs, stream, ponds, and cropped and grazed catchments
- Twelve instrumented water quality plots
- Twenty six groundwater monitoring wells
- Several full and partial weather stations
- Soil physical, chemical, and microbiological laboratory facilities
- Laboratory capability for map analysis using geographic information system and global positioning system
- Interdisciplinary team
- Partners and Cooperators: UGA, EPA, NRCS, other ARS locations, other universities, environmental groups, local, state and federal agencies involved in natural resource issues, farmers and producer groups and commissions


P1 Flume


W2 Flume


W1 Flume


W2 Spring Flume

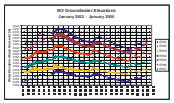

Pond Inflow Weir


Pond Level Sensor


Pond Outflow Weir


Conventional-Till Runoff


No-Till Runoff



Groundwater level - W2 Wells

PRODUCTS

- Rainfall-runoff relationships, and transport of sediment, nutrients (such as nitrogen and phosphorus), fecal bacteria and pathogens within different land uses across multi-scale watersheds
- Hydrologic and chemical response of groundwater and springs to land use and variable climate
- Effectiveness of small wetlands and farm ponds to sequester nutrients and fecal bacteria
- Components of nitrogen in wetlands and shallow subsurface
- Knowledge of controlling factors of spatial and temporal distribution of soil water across landscapes
- Evaluation of tillage (conservation vs conventional) and fertilizer (inorganic vs poultry litter) practices on productivity and environmental response of watersheds
- Improved management practices
- Database for testing and evaluating environmental models
- Integrated grazing and cropping system analysis
- Analysis of agricultural-urban interface interactions


P1 in Conventional Tillage

Vs.


P1 in Conservation Tillage


Water Quality Plots (12) – West Unit


Dawson Field Paddocks (14)


Outreach

SCIENTISTS

Dinku Endale, Harry Schomberg, Dwight Fisher, Wayne Reeves, Michael Jenkins, Dory Franklin, Clara Parker, Alan Franzleubbers, Ron Sharpe

PRIMARY SUPPORT PERSONNEL

Stephen Norris, Robin Woodroof, Tony Dillard, Jeff Scarbrough, Steve Knapp, Shaheen Humayoun, Ronald Phillips, Beth Barton, Jessica Sterling, Eric Elsner

CONTACTS

USDA-ARS-JPCSNRCC, 706-769-5631

Dinku Endale - Agricultural Engineer, Ext. 239, Dinku.Endale@ars.usda.gov

Stephen Norris - Agricultural Research Technician, Ext. 221, Stephen.Norris@ars.usda.gov

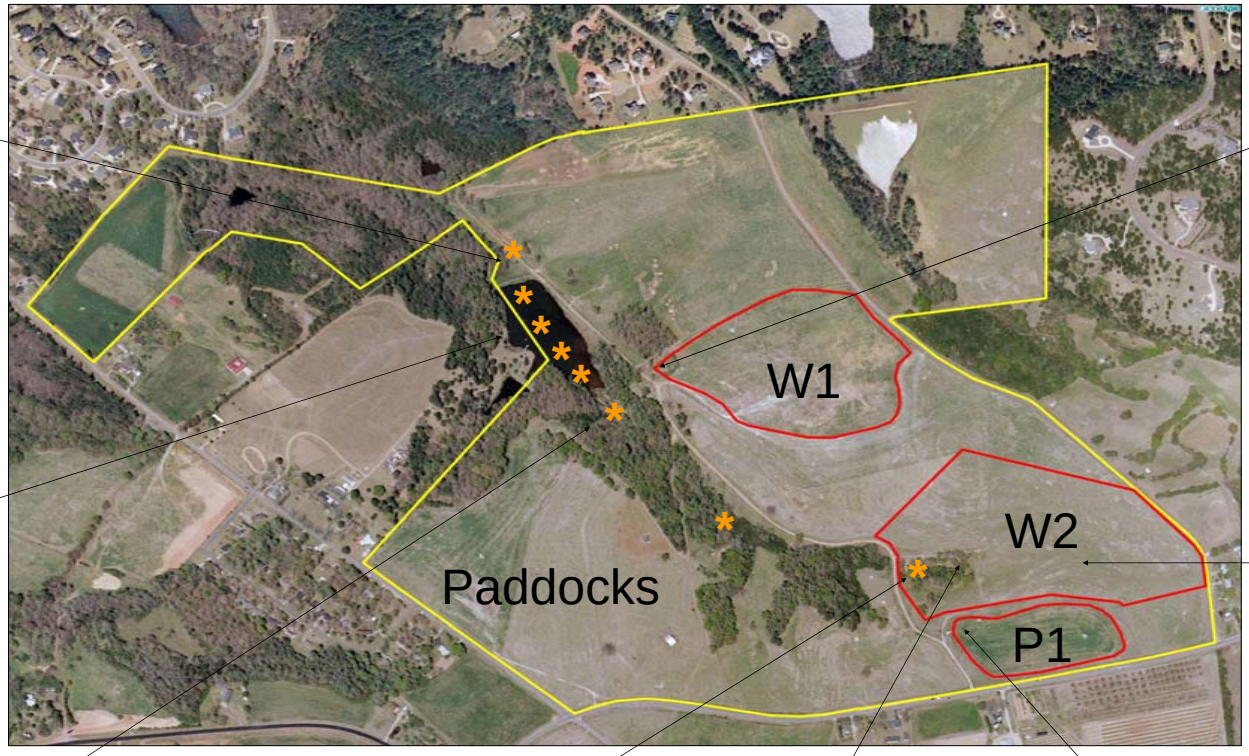
North Unit Outdoor Hydrological Laboratory

USDA, ARS - J. Phil Campbell, Sr., Natural Resource Conservation Center – Watkinsville, GA


Pond Outflow Flume


Pond Level Recorder

* = NRI Pathogen Study Sampling Locations




Runoff Weir at W1


Monitoring Well
(10 plus 27 piezometers)


Pond Inflow Weir


Runoff Flume at W2


Flume at Spring in W2


Runoff Flume at P1