



**Title:** Agricultural Runoff, TMDLs and Water Quality: Field and Watershed Scale, Science-Teacher Education

**Name:** Joe Lepo

**Email:** jlepo@uwf.edu

**Organization:** University of West Florida

**State:** Florida    **Region:** Southern

**Year of Funding:** 2001

**Theme:** Pollution Assessment and Prevention

**Situation:** This project integrates scientific validation of selected agricultural BMPs in N.W. Florida with education and extension activities that promote such BMPs; the environmental ramifications of runoff impacts to surface and ground water are addressed at the field/local scale and watershed scale. BMPs consist of a vegetated filter strip (VFS) for aquaculture pond effluent, use of biosolids for pastureland fertilizer, and management of runoff in row-crop and silviculture fields.

**Objectives:** 1) To evaluate the effect of BMPs on water quality of agricultural runoff; 2) to characterize land use and nutrient loads in drainages of the local river systems affected by runoff from study sites with BMPs; 3) to educate secondary school teachers about water quality science and societal issues pertaining to agricultural runoff, BMPs, and environmental water-quality monitoring; and 4) to use generated by this project on BMP performance for public education on water quality issues associated with agricultural runoff and to promote BMP use.

**Methods:** At BMP sites and at watershed sampling points, samples are collected for analysis of soil and water chemistry and microbiology, with particular attention to nutrient dynamics. Standard methods were used to analyze particulate and dissolved nutrients. Selective and non-selective media were used to enumerate bacteria and protists. GIS was used to compile watershed data and identify hotspots for nutrient and fecal loadings. Field sites were foci for educational and extension activities, e.g., summer workshops for teachers, bus tour of BMPs, and discussions with citizens' groups.

**Partnerships:** Three Rivers Res. Conserv. Dev. (3RRCD); NRCS; Fla. Dept. Env. Prot. (FDEP); Fla. Sea Grant (FSG); Univ. Fla. Inst. Food Agric. Sci.(IFAS); Escambia Co. Ext. Serv.(ECES); Escambia and Santa Rosa Depts. Health, EPA Gulf Ecol. Div. (GED); Bay Area Res.Coun.; W. Fla. Reg. Planning Council (WFPC).

**Research:** All components of the project involve undergraduate and graduate students, regional science teachers, and students and science teachers in training at UWF. The project develops secondary school teaching modules in agricultural water quality, and in GPS- and GIS- technology. Cooperation with NRCS, FDACS, EPA, DEP, and IFAS promotes understanding BMPs within the farming community, and educational outreach and extension disseminates the information to the public. Activities highlight project study sites and agriculture as stewards of watershed scale environmental quality.

**Resources:** 3RRCD, EPA, NRCS, FDACS: VFS, seed funds. Tate School Farm, ECES: land use, BMPs. Escambia Co. Dept. Health, Santa Rosa Co., Fla., WFPC: fecal source tracking, loading. GED, FDEP: water quality sampling. Application to EPA Watersheds Initiative Prog. by citizens and WFPC used our data.

**Results:** Research validated the VFS as effective in attenuating NH<sub>4</sub> and TSS, and improving DO in aquaculture runoff. Biosolids released nutrients over a longer time period than did inorganic fertilizers but supported lower productivity in pastureland. A fall 2003 bus tour of BMPs in Escambia County in cooperation with NRCS, FDACS and FSG highlighted project study sites as well as outreach to individuals requesting information, e.g., regional farmers, scientists, educators and extension personnel. Workshops provided K-12 science teachers classroom lesson plans based on BMP study sites.



*The mission of CSREES is to advance knowledge for agriculture, the Environment, human health and well being, and communities.*

