Watershed Assessment Program Team

Georgia Report

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Outline

- <u>Monitoring Activities</u>
- Modeling Activities
- Remote Sensing / GIS
- Sources of Funding
- What do We Need for Extension

Monitoring Activities

- Several projects with headwater stream monitoring sites
  - Un-refrigerated ISCO samplers and pressure transducers
  - Measuring
    - Suspended sediment (filter method)
    - Total P and dissolved reactive P (DRP)
    - Fecal coliform grab samples on some streams
    - E. coli grab samples on some streams
    - Stage height
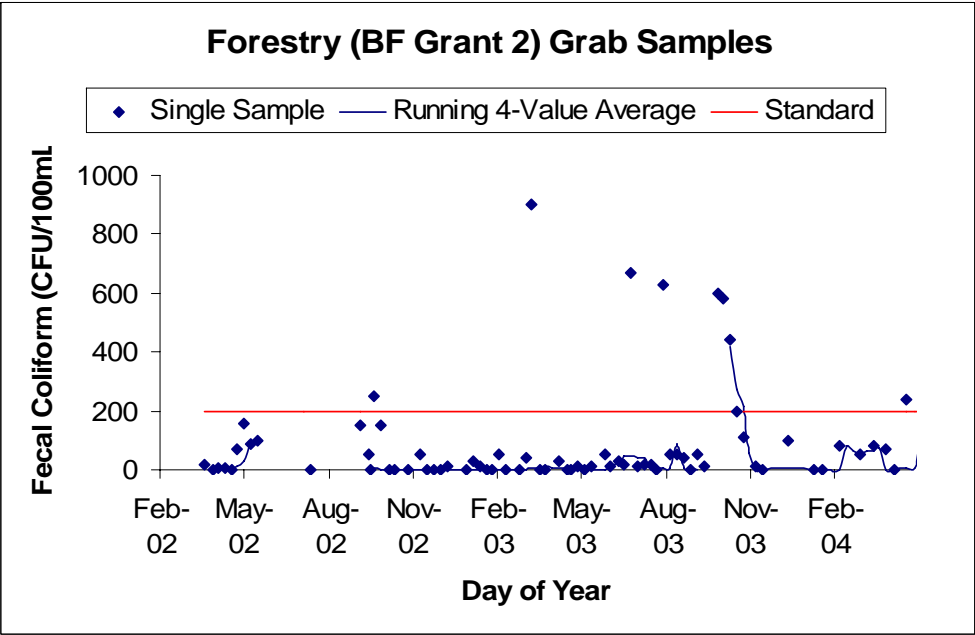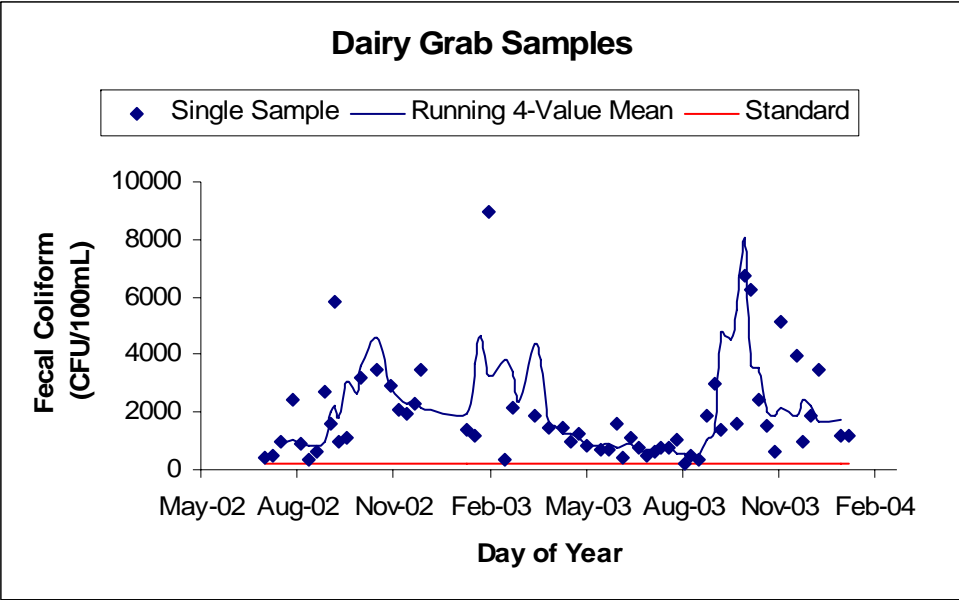- Converting stage height to flow is a problem

Monitoring Activities

- Project comparing 6 headwater streams
  - 2 forested watersheds
  - 2 agricultural watersheds (1 dairy and 1 poultry/cattle)
  - 2 suburban watersheds on septics

Dairy Grab Samples

Single Sample — Running 4-Value Mean — Standard

Fecal Coliform (CFU/100mL)

Day of Year

Forestry (BF Grant 2) Grab Samples

Single Sample — Running 4-Value Average — Standard

Fecal Coliform (CFU/100mL)

Day of Year

Monitoring Activities

- Project comparing 12 headwater streams
  - 3 forested watersheds
  - 9 poultry and cattle watersheds with different levels of BMPs for litter and cattle
- Project comparing three 2nd-3rd order streams for sediment control
  - Paired watersheds
  - One control and 2 treatment watersheds
  - Focus on road/ditch erosion

Monitoring Activities

- TMDL related monitoring
  - State has a 5-year rotating basin approach
  - 5 basins in state are monitored intensely for 2 years before updating TMDL
  - Monitoring is done by USGS on contract from state

Monitoring Activities

- Much more monitoring being done by cities and local governments
  - Source water assessment work done by consultants
  - Phase I and II Municipal Separate Stormwater Systems (MS4) requirements
  - Used in implementation phase of TMDLs to identify bacteria sources

Monitoring Activities

- ## What have we learned?
  - Measuring flow correctly is important
  - Forested streams have best water quality
    - Usually meet bacteria standards
  - Agricultural stream water quality varies widely
    - Worst when animal density is high
  - Suburban streams are intermediate
    - We need to know more about urban flow and pollutant concentrations

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Modeling Activities

- Most of our work is with SWAT
  - Modeling flow, sediment, and P
  - Watershed scale and smaller headwater stream scale
- Problems in modeling smaller scale
  - Need SSURGO data and not always available
  - Difficult to fit hydrograph -- use hourly time step?

Modeling Activities

- Exploring issues on modeling P
  - Getting parameter values for adsorption (*PHOSKD*) and initial soil P (*SOL_LABP*)
  - Getting records for point sources such as poultry processing plants
  - No information on in-stream parameters
  - Effect of ponds and lakes?

Modeling Activities

- Some work with HSPF
  - Draft book chapter
  - Proposal to model urban storm-water control practices
- Teach advanced graduate course
  - BASINS and SWAT
  - Policy issues

Modeling Activities

- Large effort on using Parameter Estimation (PEST) software with SWAT and HSPF
  - Sensitivity analysis
  - Auto-calibration
  - Prediction uncertainty
- Done by a post-doc (Zhulu Lin)
  - Hard work!

Parameter	Sensitivity to Flow	Parameter	Sensitivity to Sediment	Parameter	Sensitivity to P
AGWRC	8.647 ✓	AGWRC	1.4283	XFIX	0.2260 ✓
UZSN	0.0625 ✓	EXPSND	0.2347 ✓	INFILT_F	0.0879
LZETP_F	0.0589 ✓	TAUCSS	0.1996 ✓	N1	0.0767
IRC	0.0575 ✓	TAUCSC	0.1996	INFILT_P	0.0752
INFILT_F	0.0494 ✓	KSAND	0.0645	LZETP_P	0.0605
LZSN	0.0377 ✓	TAUCDS	0.0344 ✓	K1	0.0605 ✓
LZETP_P	0.0298 ✓	M	0.0197 ✓	IRC	0.0538
CEPSC_F	0.0182	LZETP_F	0.0180	INTFW	0.0367
INTFW	0.0165	LZSN	0.0156	SPFAD_P	0.0303 ✓
INFILT_P	0.0161	UZSN	0.0138	AGWRC	0.0276
DEEPFR	0.0079	IRC	0.0118	BRPO4	0.0238 ✓
LZETP_U	0.0052	INFILT_F	0.0094	UZSN	0.0191
LSUR	0.0040	LZETP_P	0.0085	SLMPF	0.0173 ✓
NSUR	0.0040	INFILT_P	0.0068	KMP	0.0170 ✓
INFILTU	0.0038	INFILT_U	0.0053	LZETP_F	0.0159

Modeling Activities

- State is doing very little model work for TMDLs
  - Relies mostly on monitoring to calculate current loads
  - Little effort to identify sources or run scenarios
- Some lake TMDLs are done by consultants
  - Nice work done by TetraTech using HSPF and WASP
- TMDL implementation is left to regional and local governments
  - They are struggling with little funding or guidance

Modeling Activities

- What have we learned?
  - Watershed P load dominated by non-point sources
  - SWAT & HSPF very similar
    - Easier to get soil parameters for SWAT
    - More detail of in-stream processes and hourly time step with HSPF
  - P adsorption and initial P in soil sensitive parameters
  - Using PEST for auto-calibration probably not worth the trouble
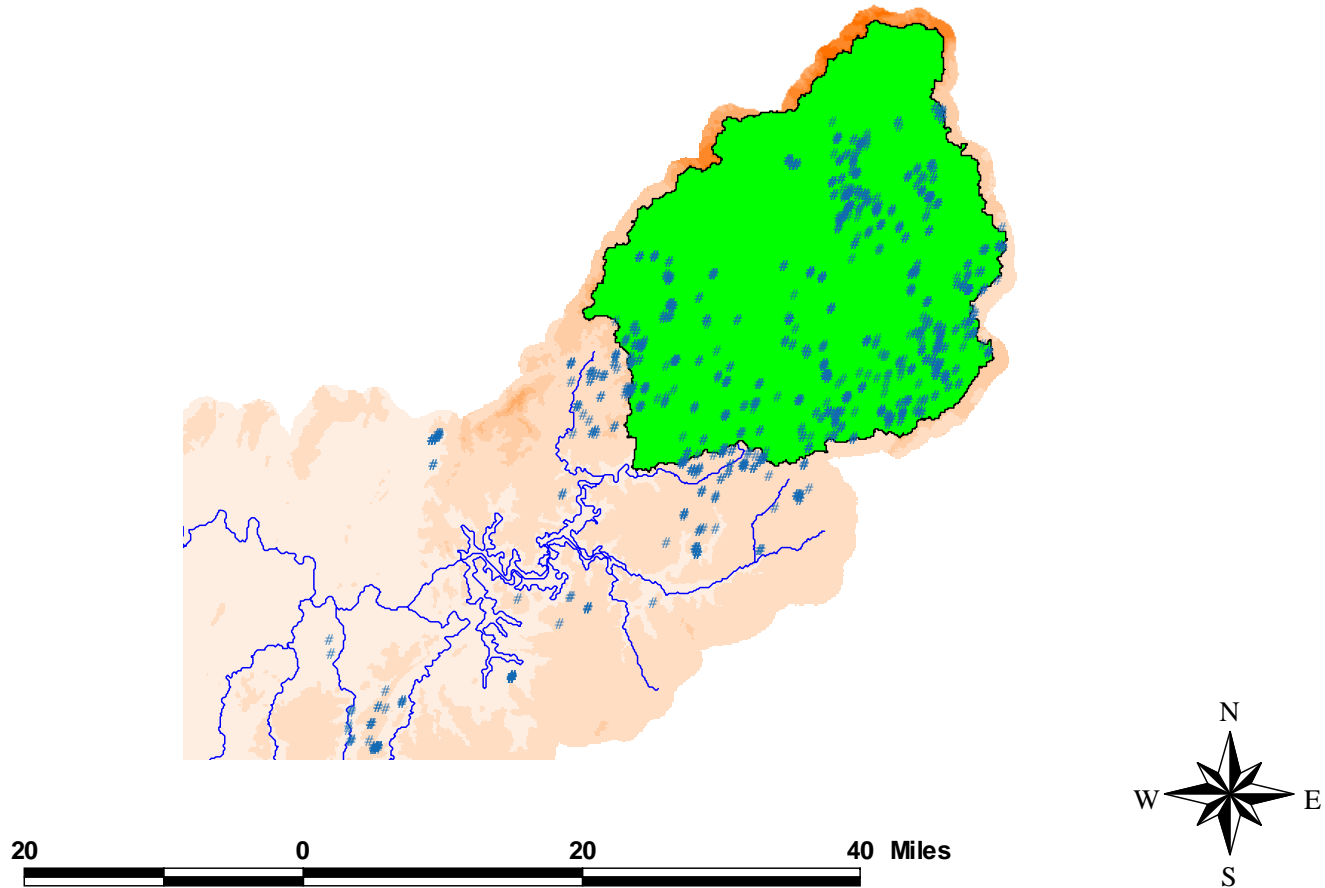   - Good for sensitivity analysis and first step toward uncertainty analysis

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Remote Sensing & GIS

- Very little work in this area
  - Use data that is available on the web
  - Need SSURGO data for some counties
- Used UGA soil test lab database for soil test P values in watersheds
- Generated map of poultry operations used aerial photos

Remote Sensing & GIS

20   0   20   40 **Miles**

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Sources of Funding

- CSREES 406 water quality grant on establishing a framework for trading P credits
- Two 319 grants subcontracts for monitoring
  - One on riparian buffer demonstration
  - Second on watershed restoration focusing on road/ditch erosion
- Preparing proposal for EPA Region 4 RFP on urban storm-water control practices

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Products for Extension?

- What watershed assessment tools/results can we provide?

- Is there some sort of training or workshops we could provide?

- Is there something we could make available on the web?

Extension Products

- We can provide conventional research results
  - Probably in the form of journal articles
  - Monitoring studies provide information on water quality associated with different land uses
  - Model results give estimates of P and sediment "budgets" for watersheds

Products for Extension

- Unlikely we will be training county agents or even extension specialists to run models
  - Simple models might be an exception (PLOAD) but how useful would they be?
- May be possible that researchers will be working with extension specialists and stakeholder groups to run different model scenarios for watersheds
  - Will need to be ready to respond quickly to requests from stakeholders

Products for Extension

- Should we consider putting some of our results in "white papers"?
  - We have done one on Sediment TMDLs
  - Another is in draft stage on Bacteria TMDLs
- Are there watershed assessment tools short of models that extension could use?
  - BASINS has a "Watershed Characteristics" capability
    - Delineates watershed
    - Gives point sources, land uses, soils, etc.