

Walnut Creek Watershed

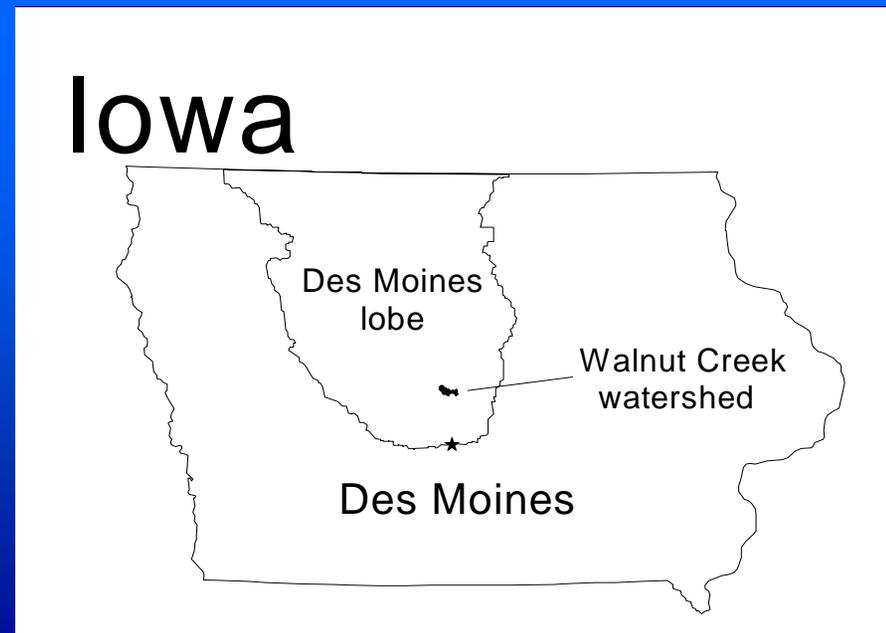
CEAP Plans and Progress



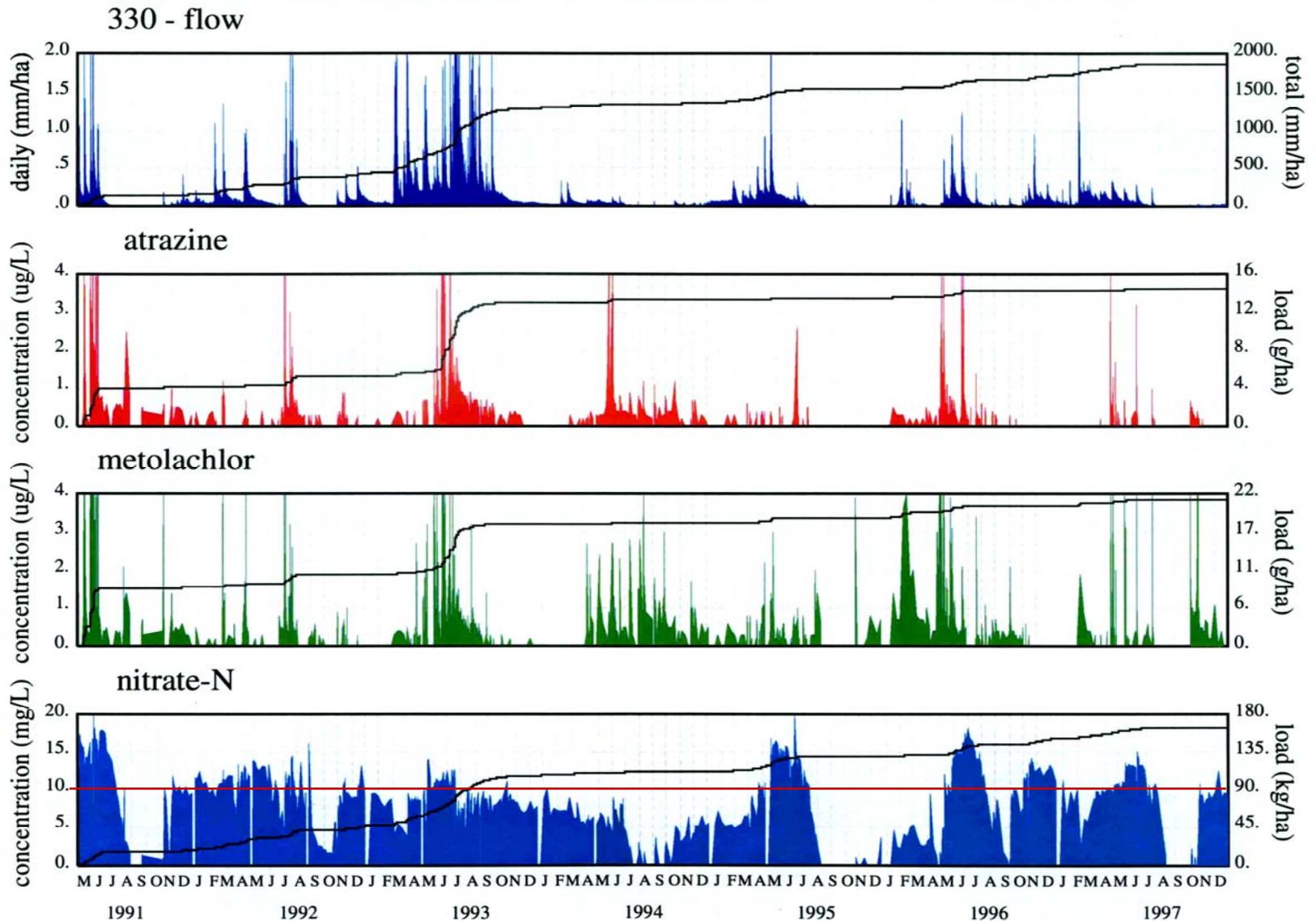
Photo courtesy of Dr. Bill Simpkins

Walnut Creek, Story Co., IA

- MSEA watershed (1991- present)
- Central IA and MN till prairies MLRA 103
- Des Moines Lobe physiographic region
- Western Cornbelt
Plains Ecoregion
- 5130 ha



Historical Water-Quality Patterns



CEAP Objectives

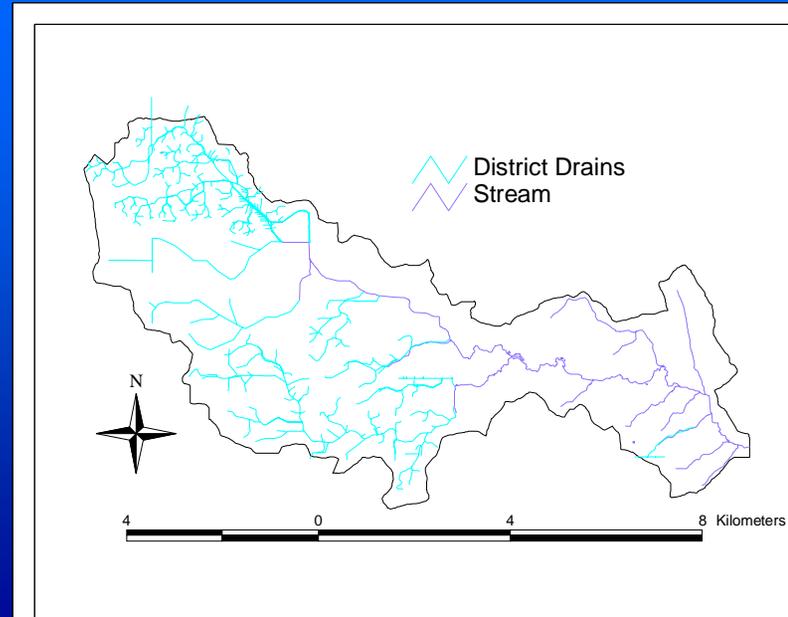
- Test models for simulating nutrient and pesticide losses from a tile-drained watershed.
- Provide measurements in a control watershed to compare with S. Fork Iowa River.

Model Testing

- SWAT revisions and testing since 1999 with ARS – Temple, TX and TIAER – Tarleton State Univ.
- AnnAGNPS starting in 2005.

Measurements

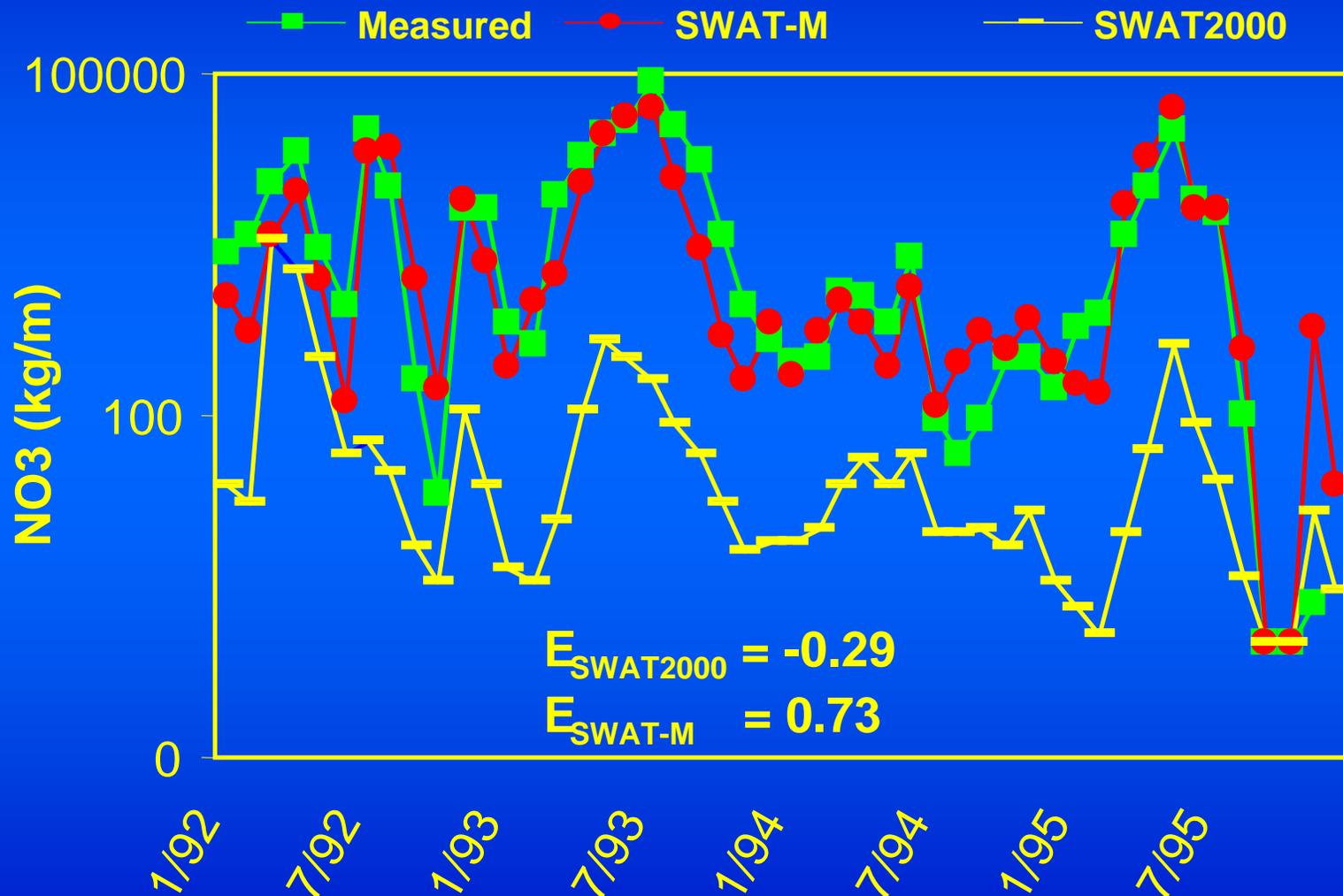
- Continuous stage recorders in 3 streams, 3 district drains, and 2 field tile drains
- 5 min and 4 hour discharge rates
- Weekly and event samples for NO₃, atrazine, alachlor, metribuzin, metolachlor since 1992
- Recently total P
- Complete weather station



Progress: SWAT-M Modifications

- Modified depression-storage water balance
- Restrictive soil layer
- Soil profile saturation pattern
- Water table depth calculation
- Pothole/HRU orientation
- Subsurface agrichemical accounting

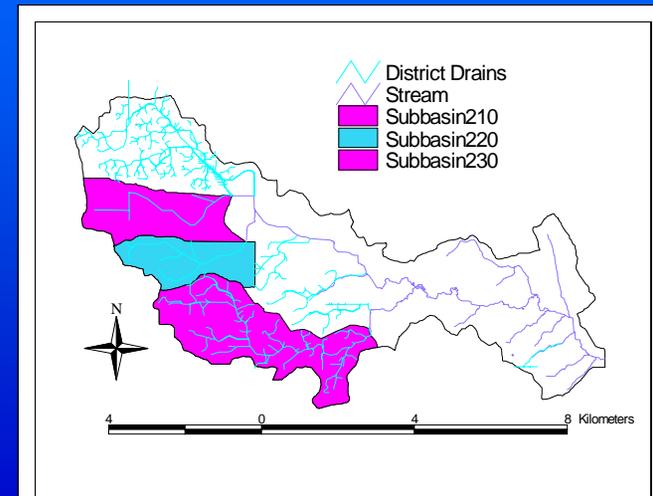
NO₃ During Calibration - Site 330



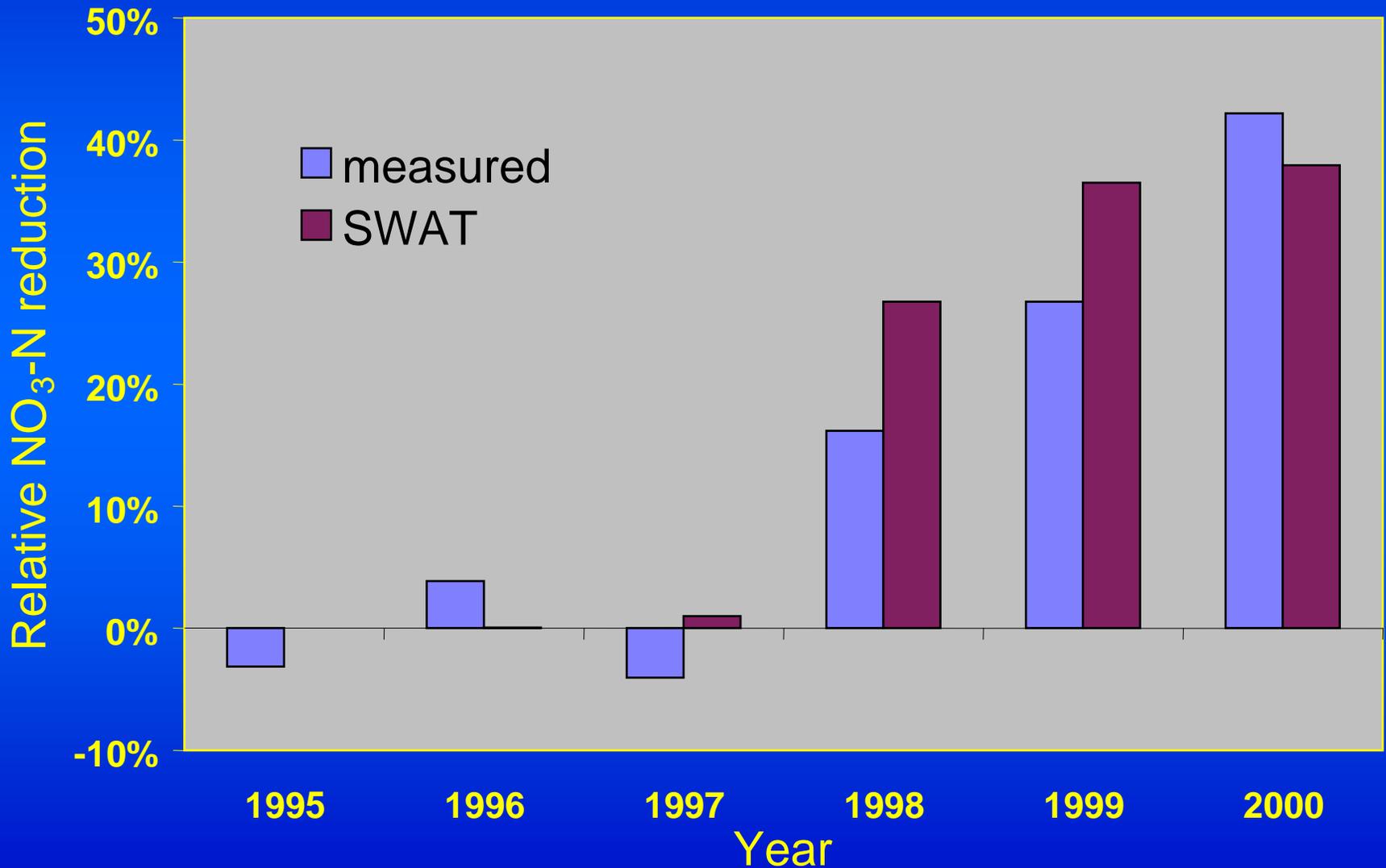
Progress:

Impact of intensive N fertilizer management on water quality

- Used Late Spring Nitrogen Test to determine N fertilizer rate
- Sidedressed corn 1997-2000
- Paired watershed design
- Results: 30% decrease in NO₃-N concentration in surface outflow
- Jaynes et al., 2004. JEQ 33:669-677.



SWAT simulation compared to observed



Future SWAT Modeling

- Continue testing and refinement of model for atrazine fate and transport in the tile-drained watershed.
- Model and compare application of LSNT to subbasin.
- Potential paired watershed testing of cover crop affect on NO_3 in surface water

Completed Research: Impacts of current farming practices on water quality

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