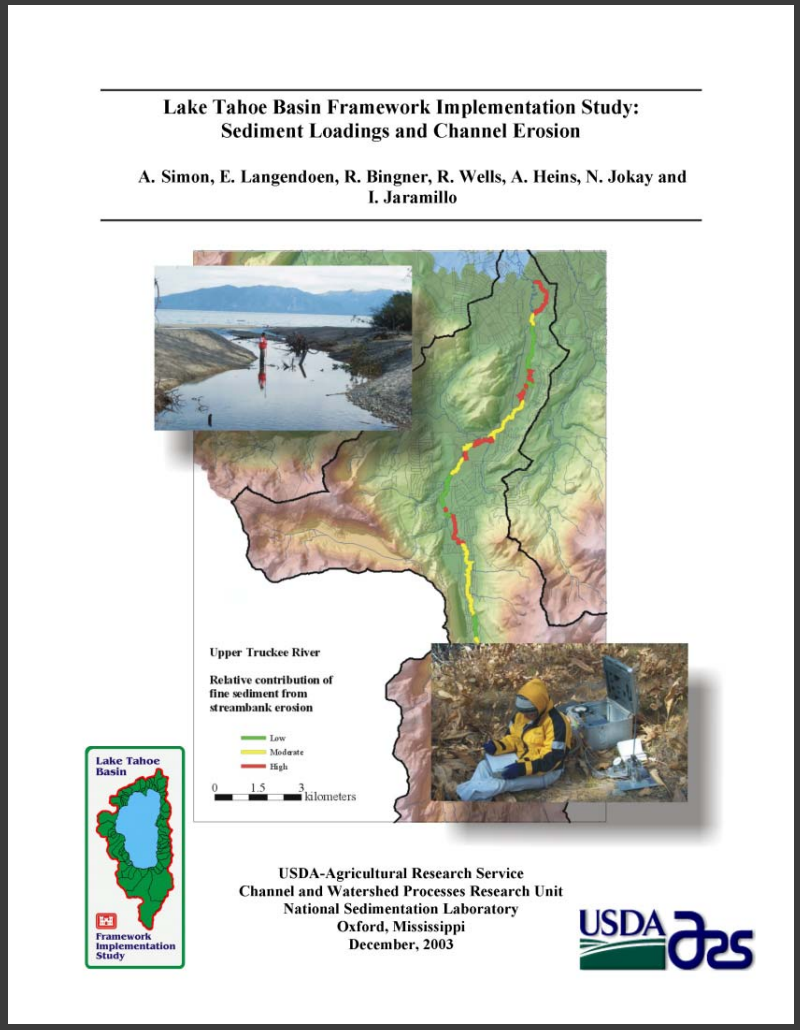
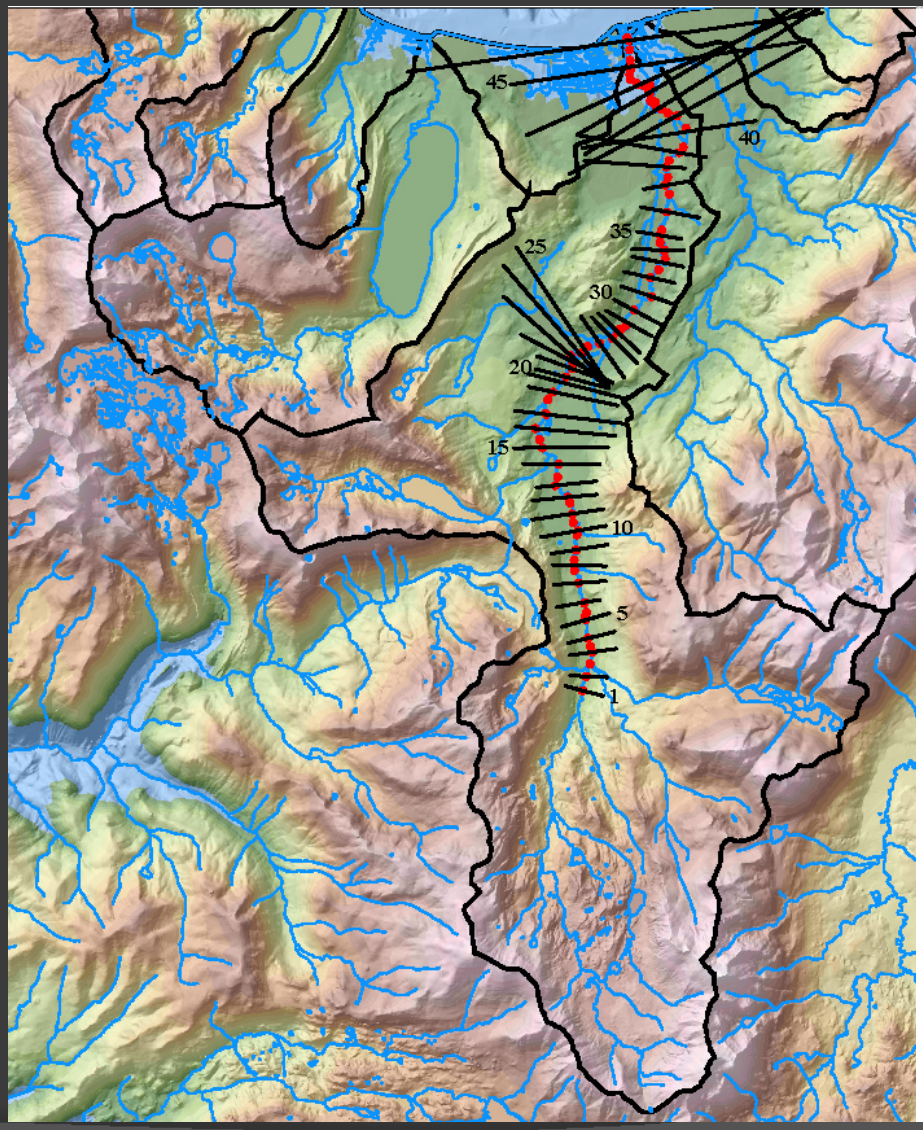
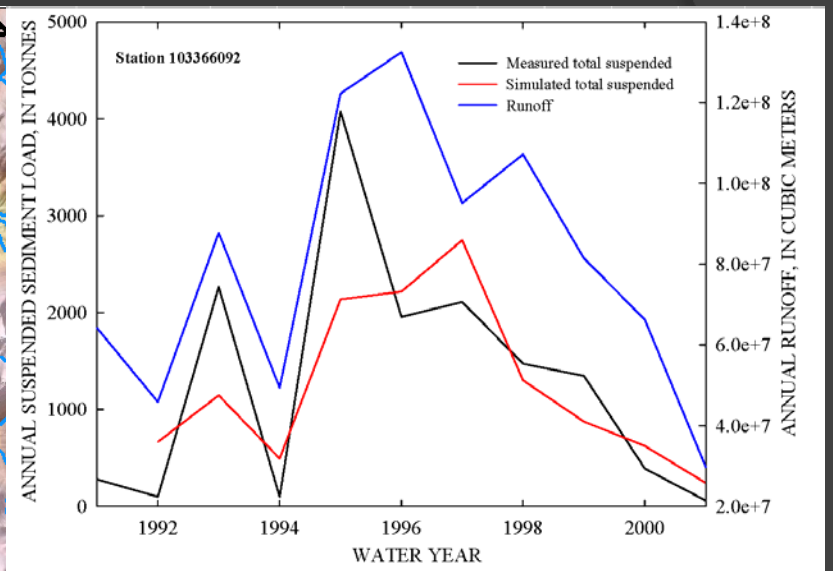
Phase 1 TMDL Studies

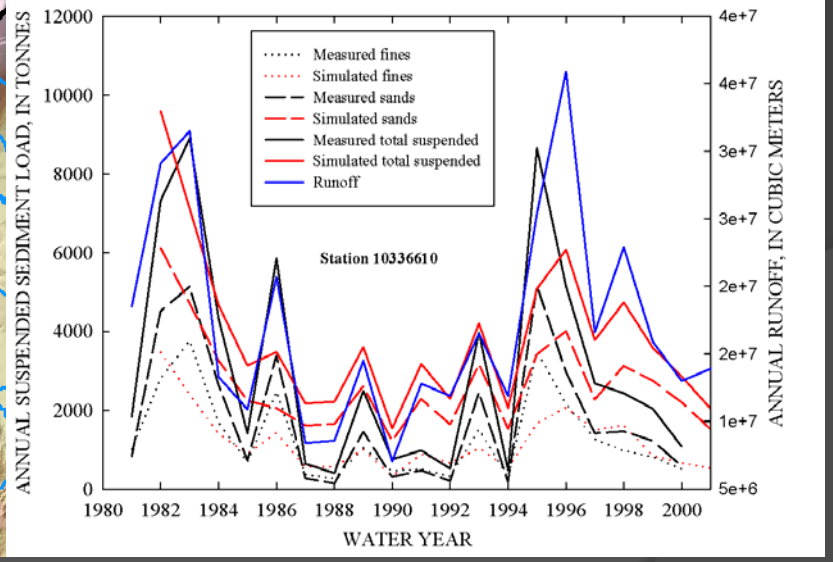


- Over 300 sites
- CONCEPTS tool
- Rivers
  - Blackwood Creek
    Upper Truckee River
    Ward Creek
- Historic Validations
- 50-year Simulations

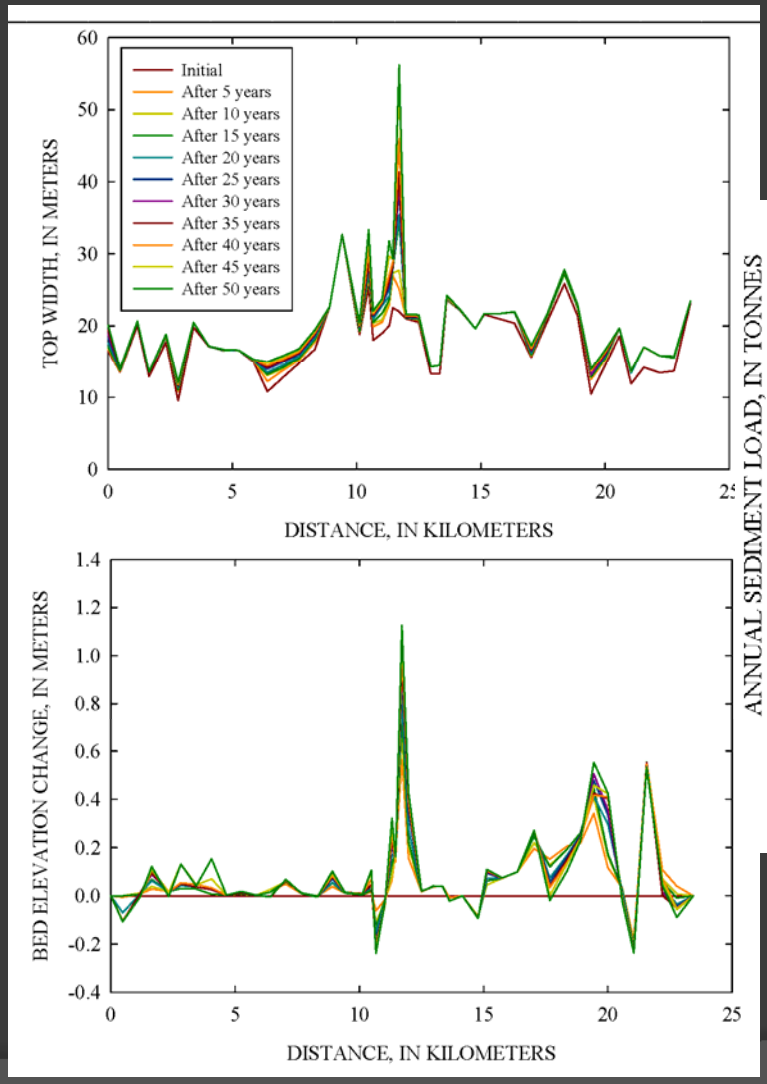
Upper Truckee River

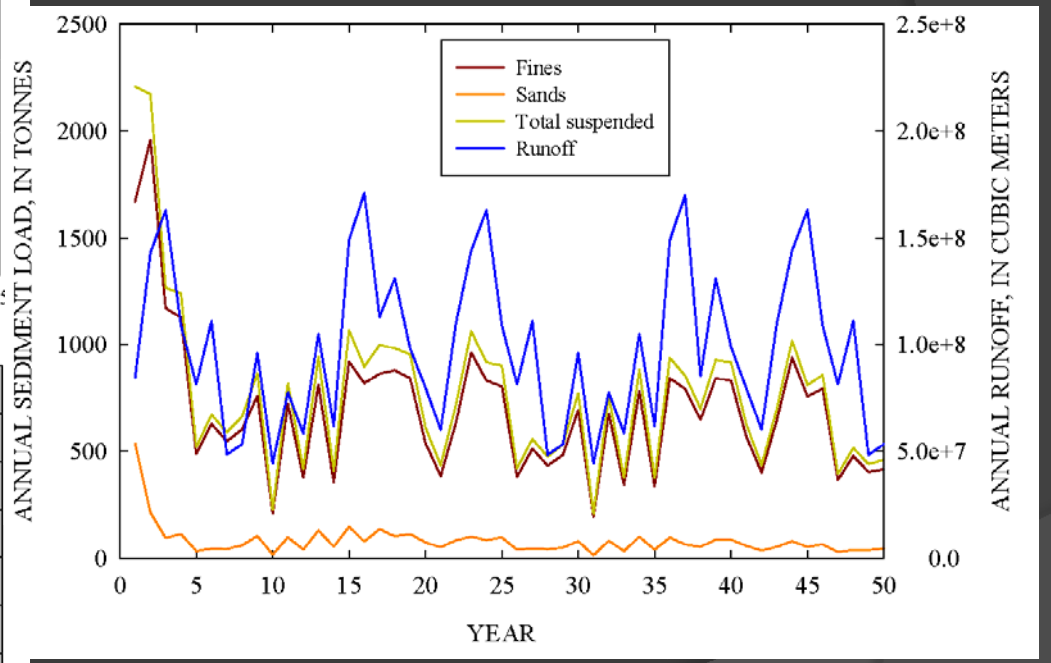






Simulated Channel and Sediment Conditions





Phase 2 TMDL Studies

- Stream Channel Source Control
- BSTEM tool
- Sites
  - Blackwood Creek
    Upper Truckee River
    Ward Creek
- Representative Flows
- Range of Treatments

Simon and Others 2009. Journal of the American Water Resources Association. 45(1)1-17.

Treatment	Representation in BSTEM
Bank Protection- stone toe	Complete
Bank Strengthening- wet meadow vegetation	Complete
Bank Strengthening- woody riparian vegetation	Complete
Channel reconstruction / Channel restoration	Partial

Treatment	Sediment Load Reduction (%)
Bank Protection-stone toe	**~100%** (design standards)
Bank Strengthening- wet meadow vegetation	**90%** decrease in failure numbers; **84%** decrease migration
Bank Strengthening-woody riparian vegetation	**44 to 60%** reduction vs agricultural land
Bank lowering +floodplain excavation/ Bank lowering +angle reduction	**23 to 91 %** **8 to 93%**
Channel reconstruction/ Channel restoration	**20 to 34 %** functioning vs degraded stream; **51 to 77%** functioning vs degraded marsh

Cumulative Effects Analysis

- Environmental Documents for Upper Truckee River Restoration Projects
  - BSTEM results
  - TMDL treatment tiers for Alternatives
  - Sub-reach estimates
- Quantitative comparison of source reduction benefits
  - River-wide
  - Project Reaches

Alternatives Refinement

- Detailed CONCEPTS model of UTR Golf Course Reach
  - Existing Conditions projected into future
  - Stabilization Alternative
  - Restoration Alternatives
- In-progress…for design development
  - Iterative hydraulics, sediment transport, channel geometry comparisons

…next, input from environmental analyses

SNPLMA-Funded Enhancements

Reports & Training 2010

- 2007-2009 Field Data Collection
- Flume Experiments & Lab Analysis
- Modeling and Validation

How could they be used?

- Real-Time Adaptive Management
  - As-Built Conditions
  - Post-Project Simulations
- Varied Scales
  - Problem locations
  - Project reaches
  - Multi-Reach response
- Specific Treatment Performance
- Sensitivity to Climate Change

What would it take?

- Collect Critical Data
  - For Model Input
  - For Calibration

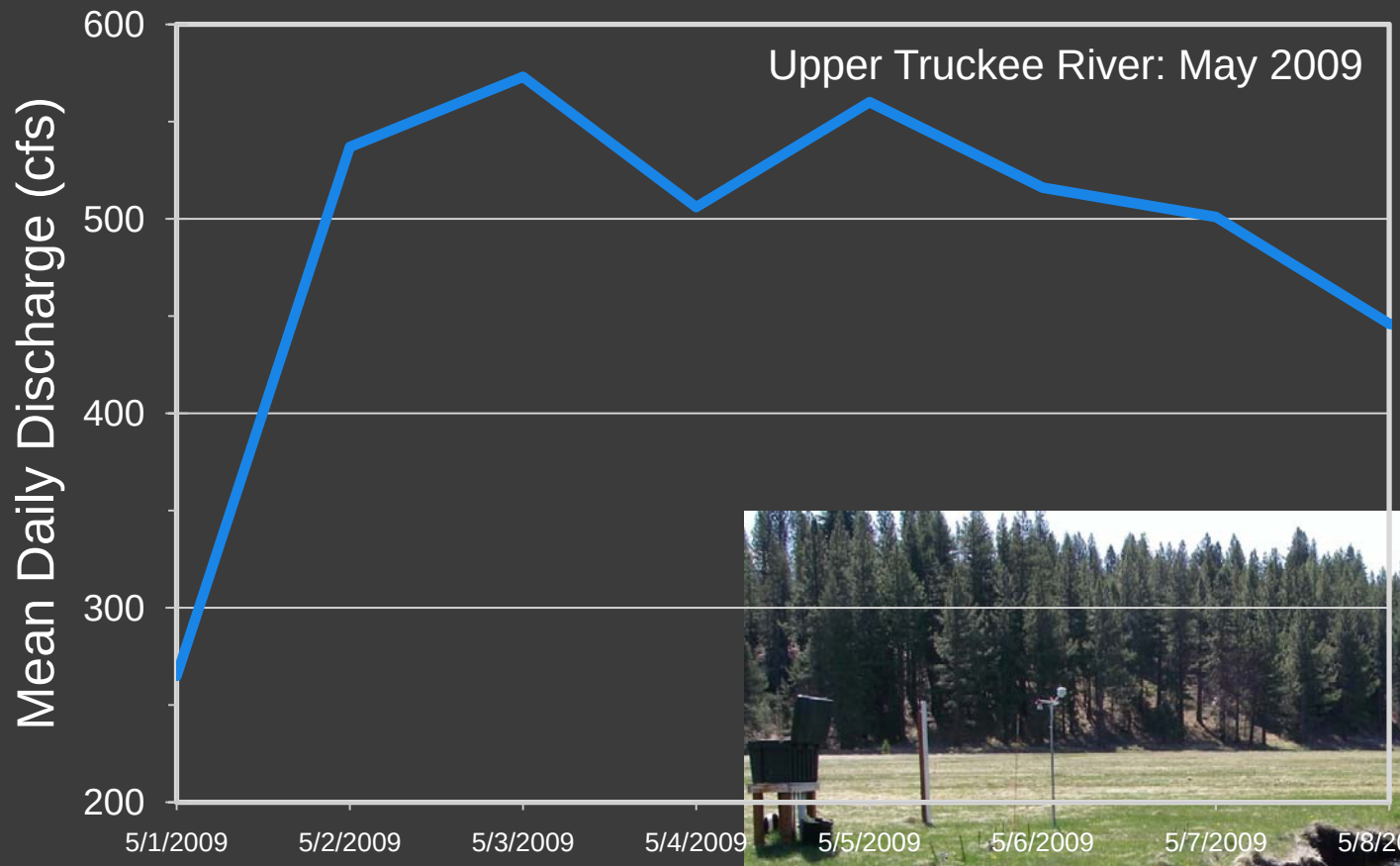
Critical Data

- Repeat topographic surveys
- Streambank stratigraphy and materials
- Streambed (and subsurface) materials
- Streamside vegetation
- Near-bank groundwater
- Observed bank failures

Tributary and main channel water and sediment discharges


UTR #3 15July08


UTR #3 18August09



UTR #3 08May09

What would it take?

- Collect Critical Data
  - For Model Input
  - For Calibration
- Integrate in Project Planning Process
  - Pre- project
- Continue in Monitoring Programs
  - Post- project


Is it Feasible?
Is it
Worthwhile?