Project Objective: Develop and evaluate a hydrodynamic and sediment transport model on a study reach of the Elk River.

Study reach includes vicinity of North and South Fork Elk River confluence
Tasks

1. Evaluate and process existing flow, sediment and cross-section data for use in hydrodynamic/sediment transport model.

2. Describe, sample and analyze sediment composition of bed, bank and floodplain; analyze particle size of existing suspended sediment samples.

3. Generate topographic surface integrating 2002 cross-section data LIDAR data.

4. Develop and calibrate hydrodynamic/sediment transport model.

5. Evaluate and compare model predictions to observed conditions:
   - Depositional patterns (spatial pattern and rate) observed in cross sections
   - Observed suspended sediment concentrations
   - Bed material grain size

6. Evaluate effects of reduced sediment loads to the study reach
Existing Data

- Monitoring stations on North Fork and South Fork: stage, discharge, suspended sediment concentrations (SSC) at 10 min steps, SSC sand fraction.
- Monitoring station on the mainstem at steel bridge (HRC station 166): stage, discharge, SSC at 15 minute steps.
- Cross sections surveyed in 2002.
- LiDAR (Light Detection and Ranging) data acquired in 2005 by the North Coast Regional Water Quality Control Board.
Additional Data Collected

- Observations of channel sediment storage and roughness characteristics.

- Bulk sampling of channel bed, bank, and floodplain sediment deposits.

- Sediment cores of channel bed material.

- Laboratory analysis to determine grain size distribution and bulk density of channel bed, bank, and floodplain sediment.
Mainstem Elk River
Silt:Clay Ratio

Gravel is also present in this sample.

channel bed deposits

channel bank deposits

floodplain deposits
Graph showing cumulative percent finer for different environments:

- **Channel Bed**: Blue line
- **Channel Bank**: Red line
- **Floodplain**: Green line

**Particle Diameter, mm**

**Cumulative Percent Finer**

- **0.001**
- **0.01**
- **0.1**
- **1**
- **10**
- **100**

**Grain Size**

- **-10**: 1024 Very Large
- **-9**: 512 Large
- **-8**: 256 Medium
- **-7**: 128 Small
- **-6**: 64 Very small
- **-5**: 32 Very coarse
- **-4**: 16 Coarse
- **-3**: 8 Medium
- **-2**: 4 Fine
- **-1**: 2 Very fine
- **0**: 1 microns Very coarse
- **1**: 0.5 Coarse
- **2**: 0.25 Medium
- **3**: 0.125 Fine
- **4**: 0.063 Very fine
- **5**: 0.031 Coarse
- **6**: 0.016 Medium
- **7**: 0.008 Fine
- **8**: 0.004 Very fine
- **9**: 0.002 Clay
Potential Deep-Seated Landslide Terrain

- 2 (smooth)
- 0 (rough)

Sources:
- DSLER-Rough: Department of Geological Sciences, University of Oregon, 2007
- Shaded Relief: Derived from NCRWQCB 1m LiDAR

Scale: 0 1 2 3 4 Km
Model Development and Implementation