

Cedar River Gravel Study

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Lake Washington GI Project

Cooperating Agencies

- US Army Corps of Engineers, Seattle District
- King County
- City of Seattle
- City of Renton

Cedar River Gravel Study Project Team

- Jones & Stokes
- Perkins Geosciences
- Harper, Houf, & Righellis

Cedar River Gravel Study Objectives

- Evaluate whether current Cedar River gravel conditions are capable of adequately sustaining long-term spawning conditions

Cedar River Gravel Study Approach

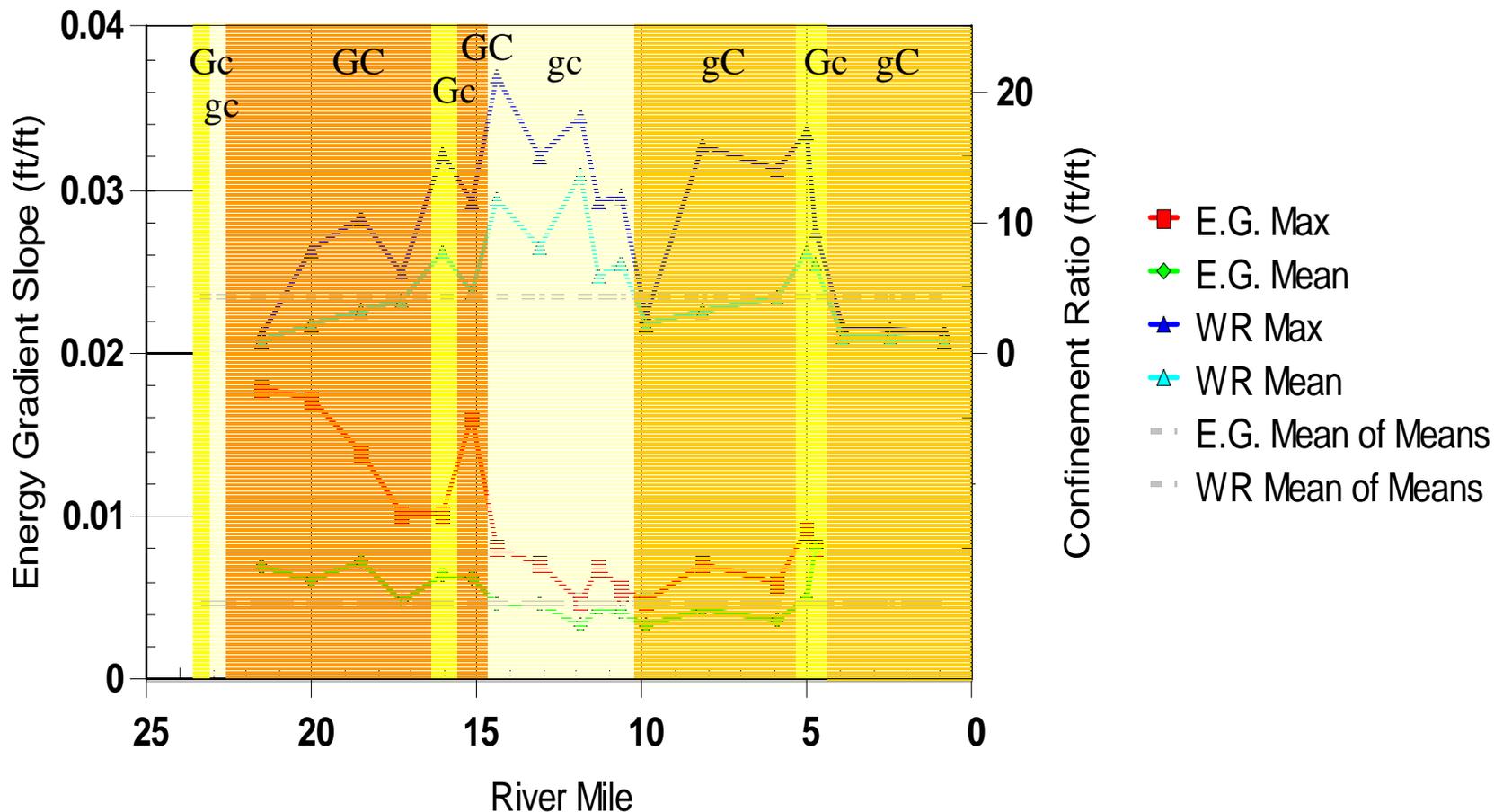
- Phase 1
 - Compile existing data
 - Field data collection
- Phase 2
 - HEC-RAS modeling to calculate scour potential
 - Incipient motion analyses on gravel distributions
 - Evaluate current gravel supply

Phase 1 Activities

- Compile existing data and develop study plan for additional data collection:
 - River cross sections
 - Surface bed material distributions
 - Subsurface bed material distributions
 - Fine sediment
 - Spawning counts and redd surveys

Study Segment Descriptive Criteria		Confinement (10 yr width to BF width)	
		Mean ≤ 4.36	Mean > 4.36
Gradient (Energy Grade Line)	Mean ≤ 0.47%	gC	gc
	Mean > 0.47%	GC	Gc

Energy Gradients and Confinement Ratios for Q10 Event

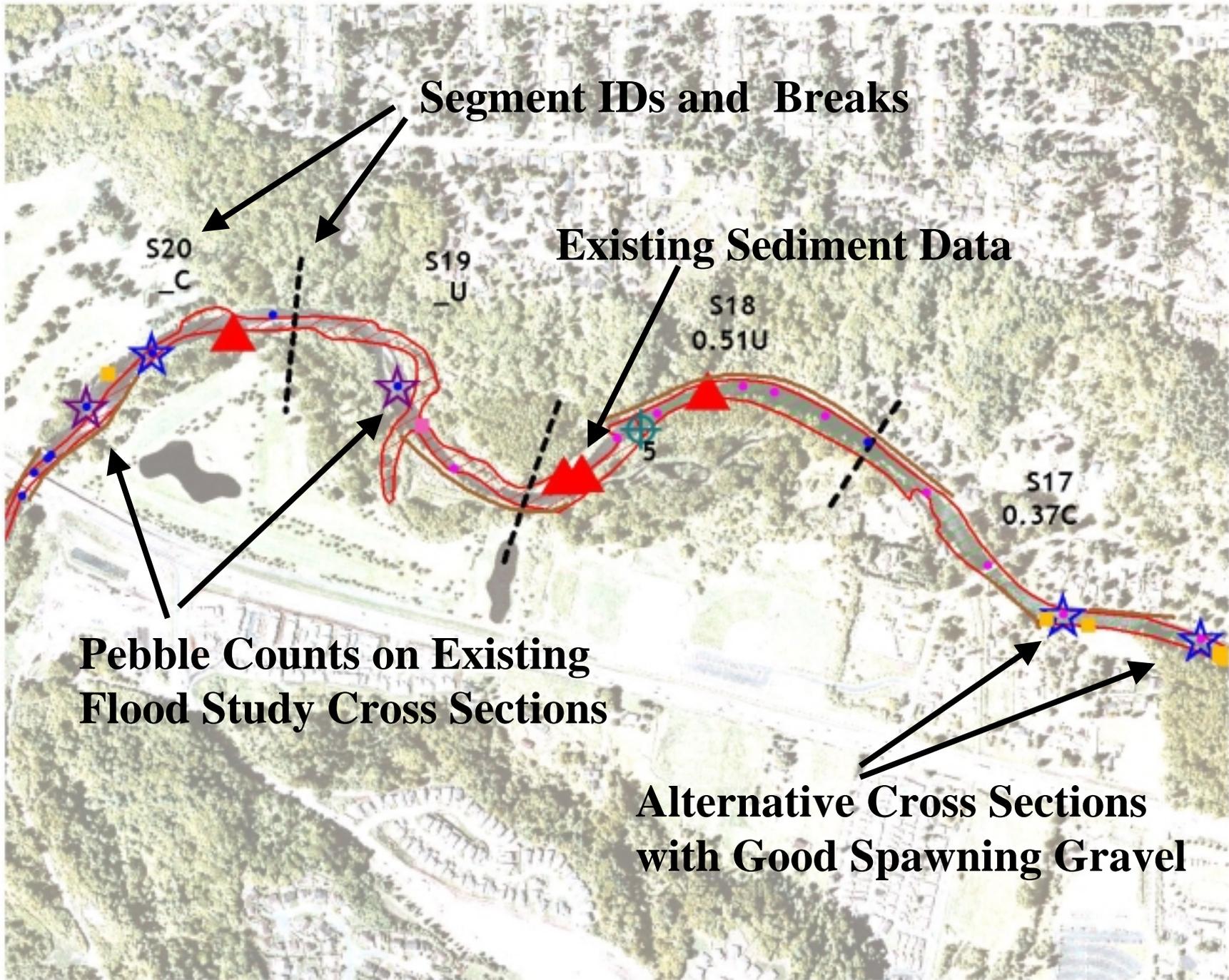


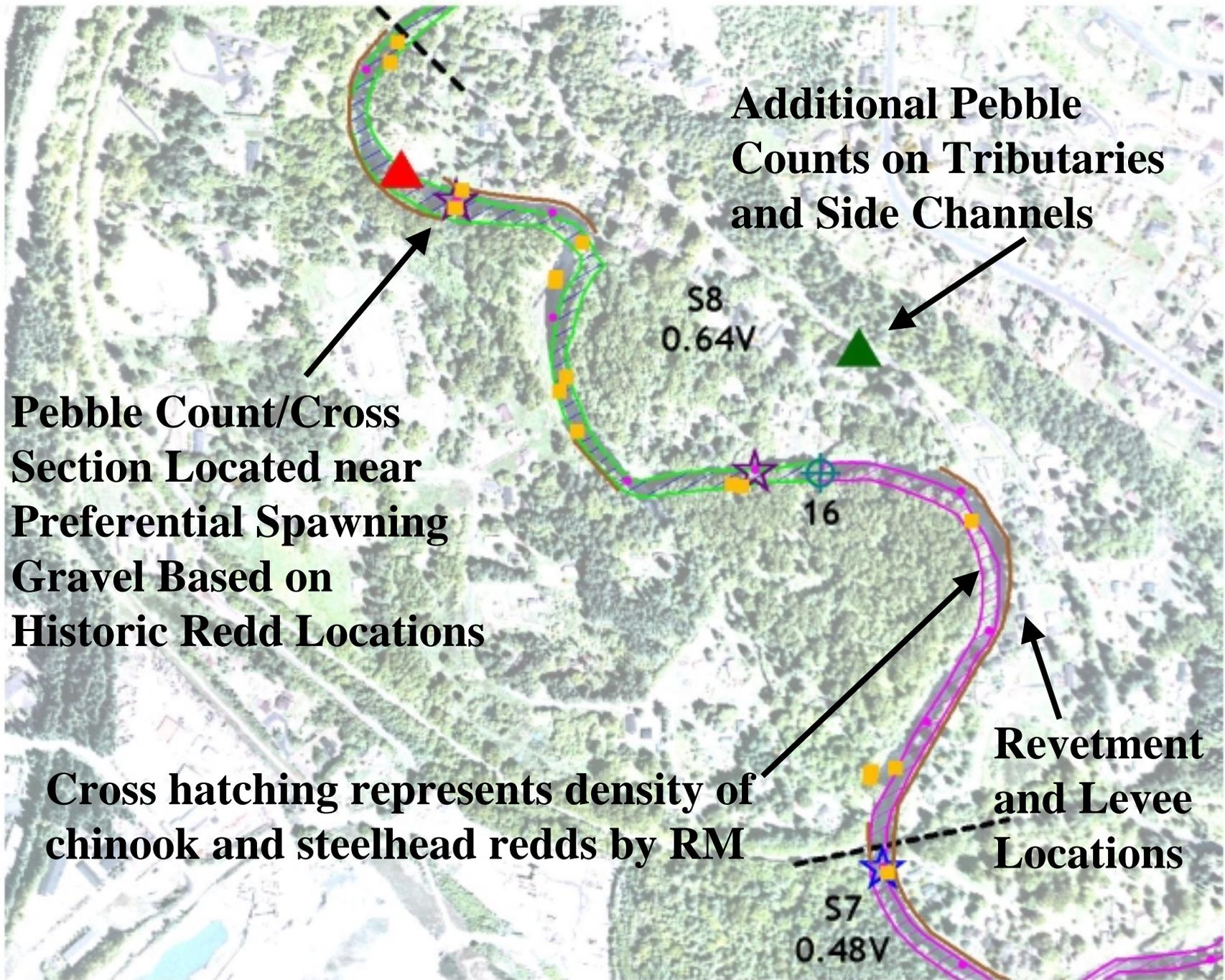
Segment IDs and Breaks

Existing Sediment Data

**Pebble Counts on Existing
Flood Study Cross Sections**

**Alternative Cross Sections
with Good Spawning Gravel**





Additional Pebble Counts on Tributaries and Side Channels

Pebble Count/Cross Section Located near Preferential Spawning Gravel Based on Historic Redd Locations

Cross hatching represents density of chinook and steelhead redds by RM

Revetment and Levee Locations

S8
0.64V

16

S7
0.48V

**New Channel and
Floodplain Cross
Sections for HEC-RAS
Modeling Upstream of
Landsburg**

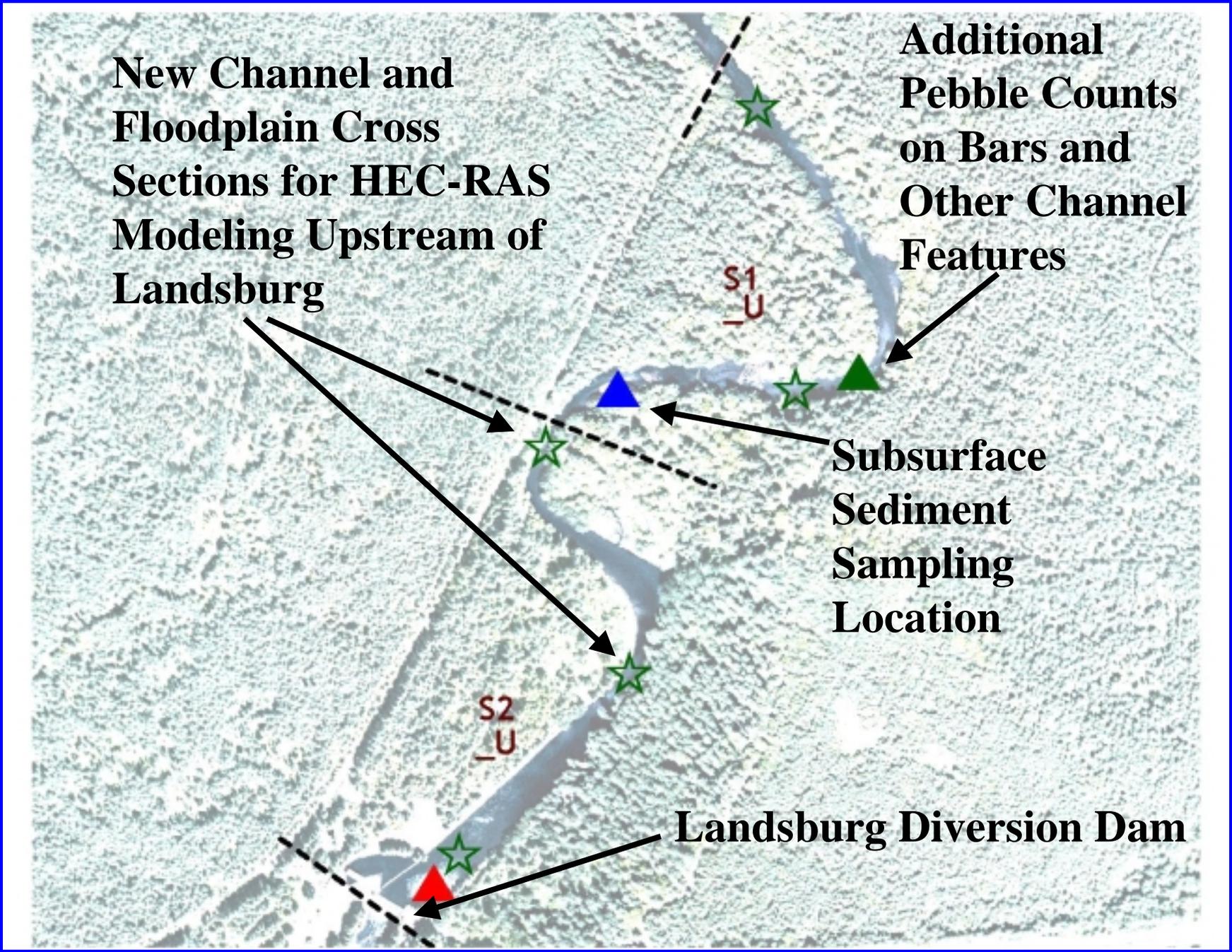
**Additional
Pebble Counts
on Bars and
Other Channel
Features**

S1
_U

**Subsurface
Sediment
Sampling
Location**

S2
_U

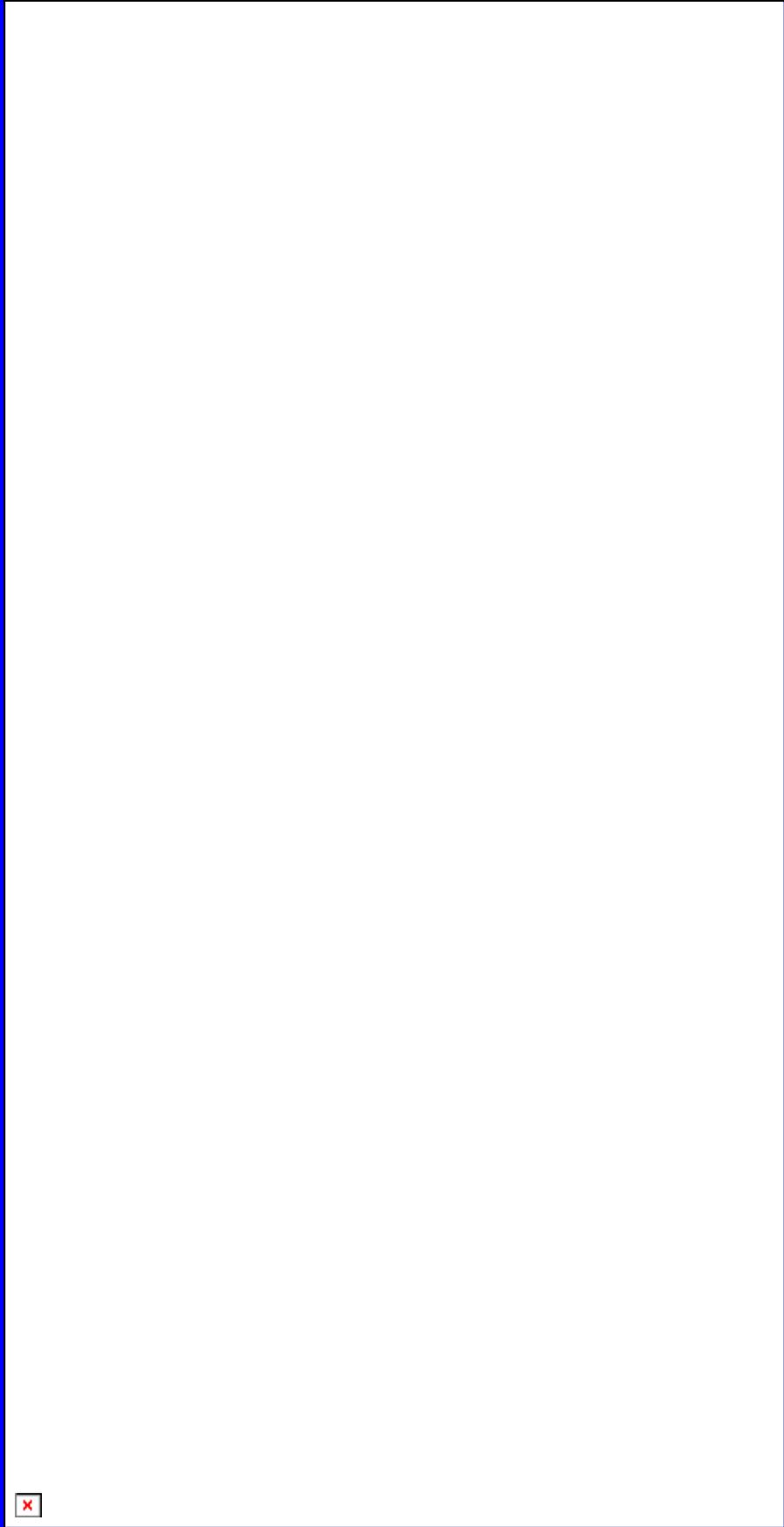
Landsburg Diversion Dam



Cross Section and Profile Surveying

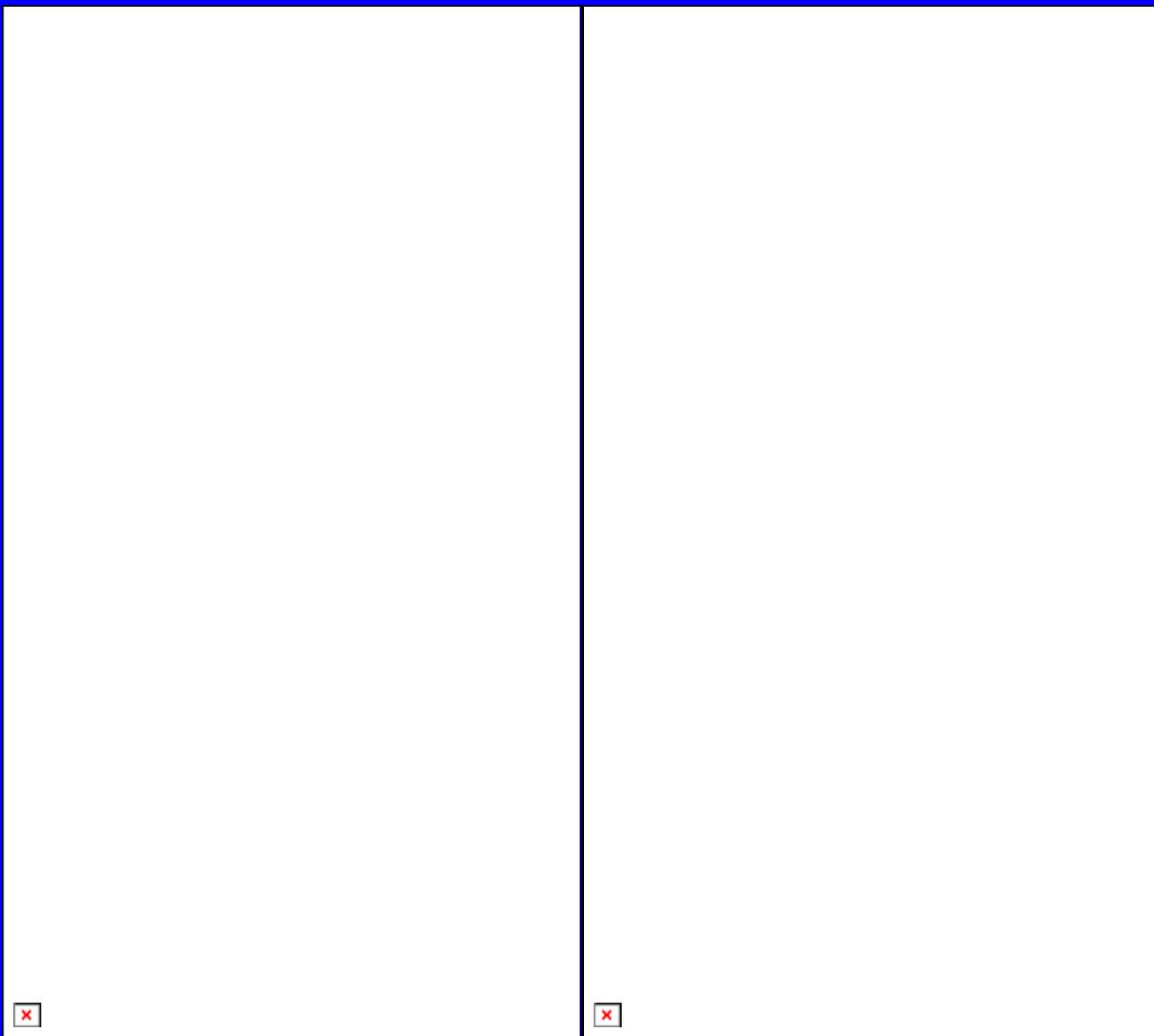




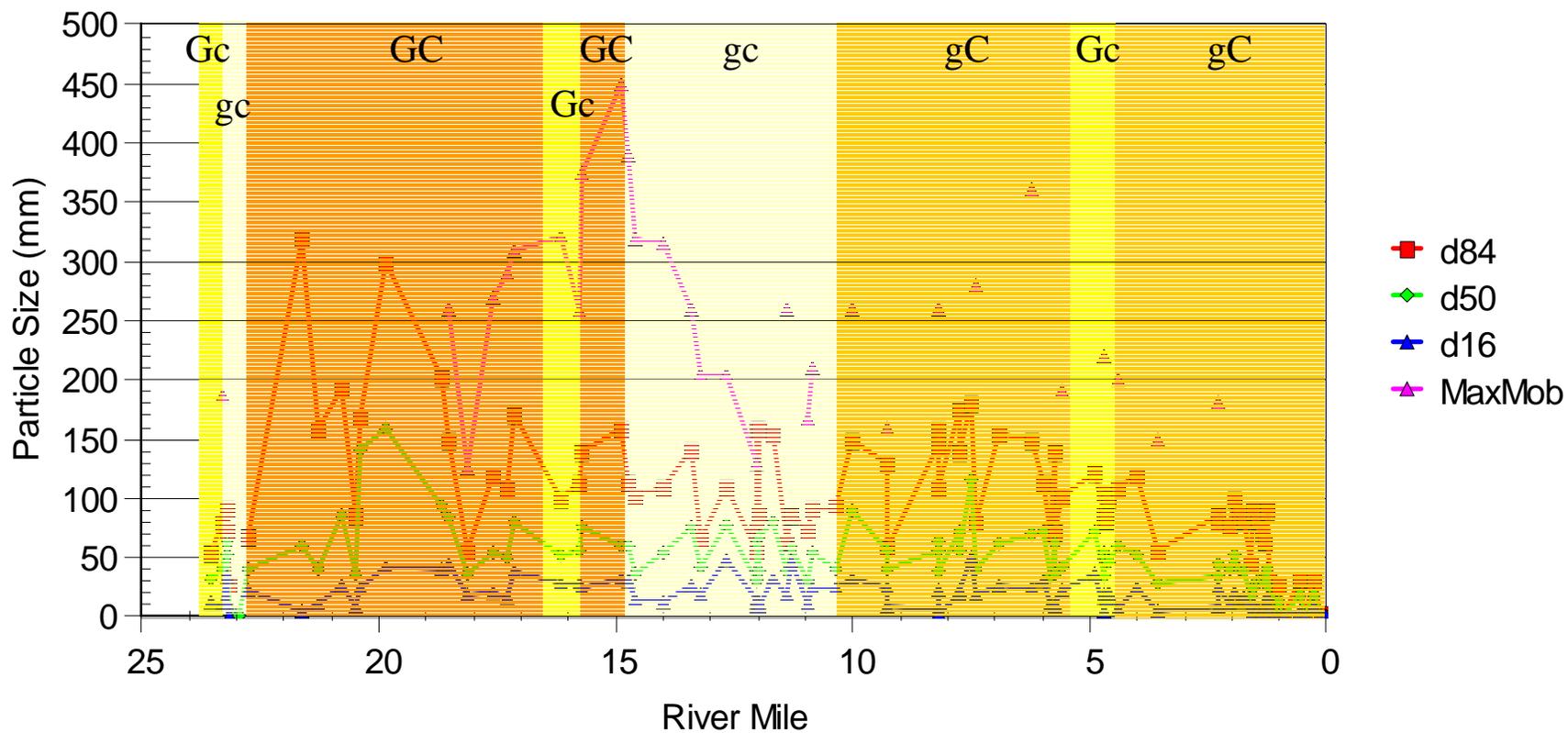


Pebble Counts to Characterize Surface Bed Material





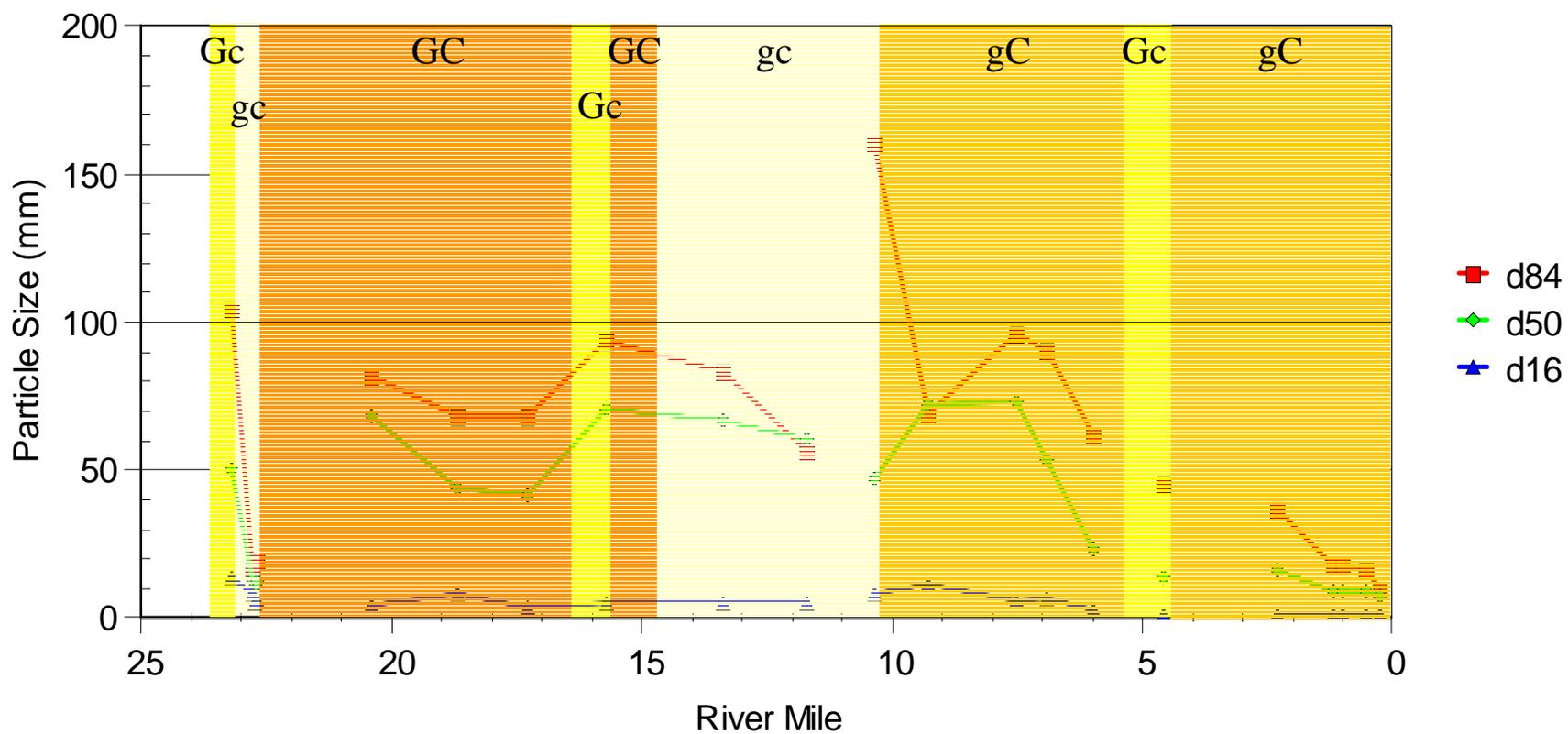
Surface Bed Material from Pebble Counts



Subsurface Gravel Sampling

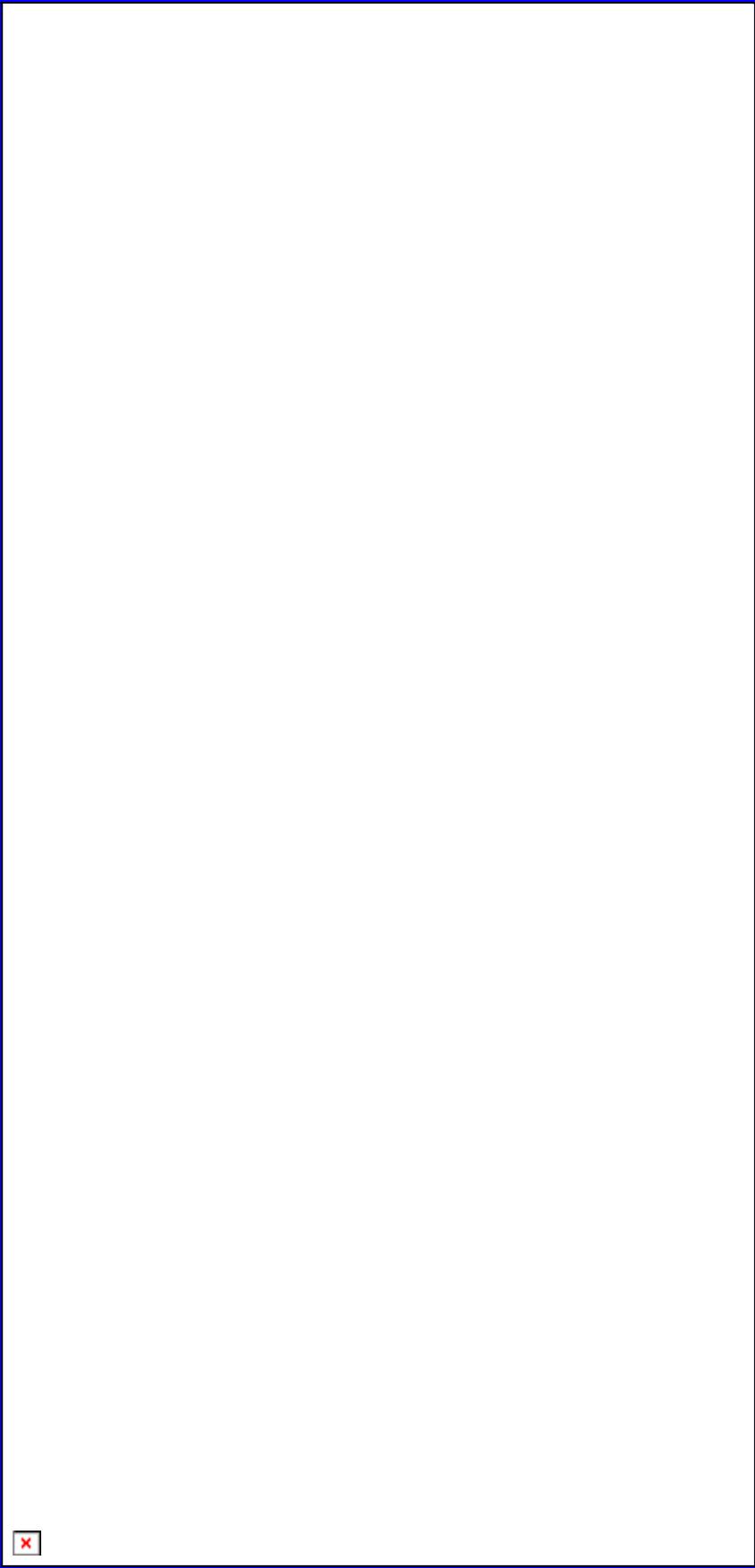


Subsurface Bed Material Distributions



Documenting Sediment Sources And Fine Sediment Deposition





Redd Counts and Preferred Spawning Habitat



Phase 2 Activities

- HEC-RAS modeling: new cross sections; upstream of Landsburg; calculate hydraulics
- Gravel movement calculations: incipient motion analyses on actual bed material distributions
- Evaluate sediment supplies, including spatial and temporal changes in last century

Phase 2 Activities, continued

- Evaluate changes in sediment mobility due to changes in cross section and gradient
- Correlate gravel size and abundance with transport and supply
- Determine morphologies most conducive to providing abundant spawning gravel
- Recommend solutions to identified problems

