Humboldt Redwood COMPANY, LLC

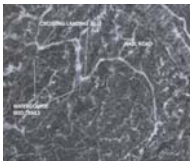
HRC Road Upgrade and Abandonment

About the program, and
Does it help water quality?

November 2010

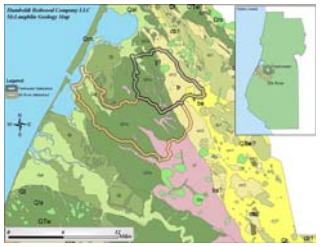
The Problem

- HRC has an extensive road system
- Built over 60 year period to various standards
- Must bring them all up to modern "Storm proof" standard

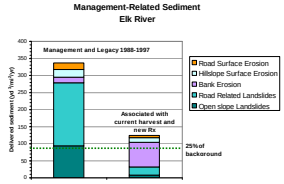


200,000 Acres—
More than 1500 miles of road

Geology



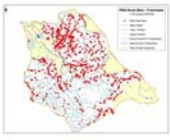
Ecologic Goal



Prevent	➢LS Avoidance on unstable terrain ➢Repair roads
Minimize	➢Best management practices ➢Site specific Rx
Restore	➢Road restoration and decommissioning ➢Legacy site cleanup

Elements of the Roads Program

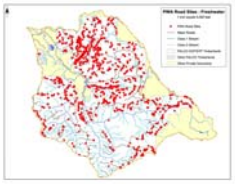
- Inventory
- Construction standards
- Schedule
- Do the work
- Audit to standards
- Wet weather inspections
- Annual road maintenance inspections

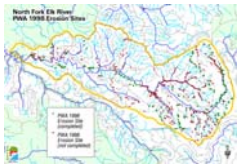


All weather, dry weather, and abandoned roads are the major focus

Humboldt Crossing

Over 1000 sites per watershed





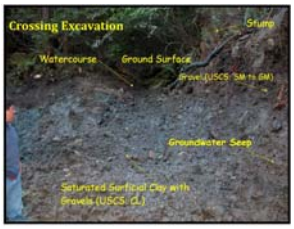
Design standards

- Hydrologically disconnect
- "Harden" roads at stream crossings
- Restore natural gradient
- Ensure passage of flow and fish

Construction from the bottom up

Minimize delivery of sediment to streams

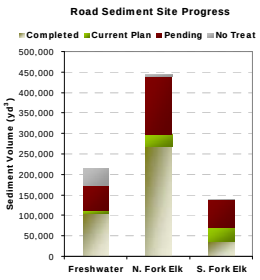
Have to react to conditions at each site



Decommissioning and Abandoning

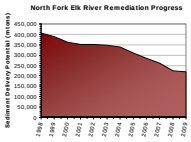
Wild Cat "Blue Goo"

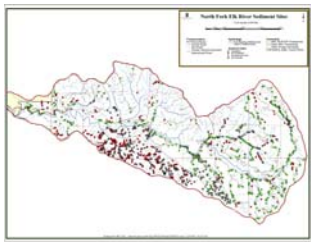
Inventoried Sites



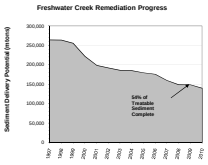
Progress to Date

North Fork Elk River

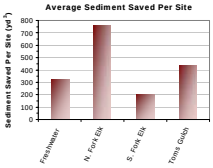


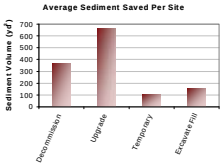


Progress to Date
Freshwater

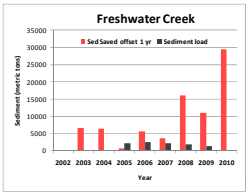


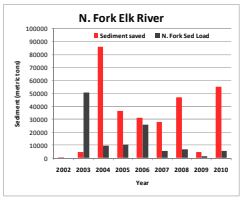
Sediment saved per site



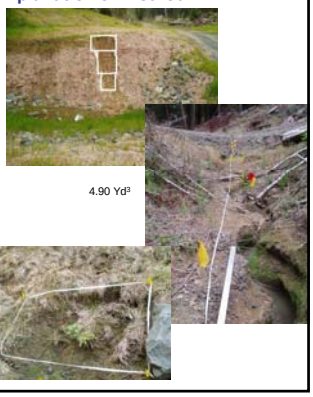


How much sediment removal is this?

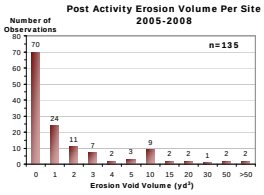




Erosion After Site Construction
Explanation of Method

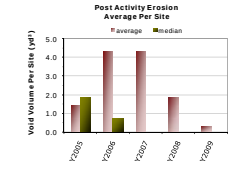


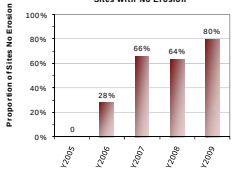
Erosion After Site Construction



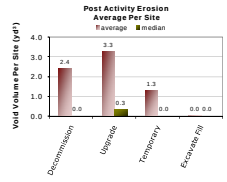
	Yds Saved	Yds Eroded	
Erosion Study	70,074	441.0	
		0.6%	----- proportion of saved later eroded
Study observed		24%	sites
		33%	saved sediment

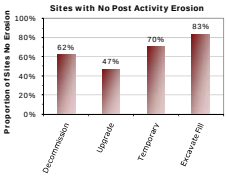
Average Post Activity Erosion By Year



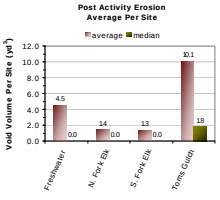


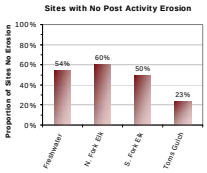
Average Erosion by Project Type



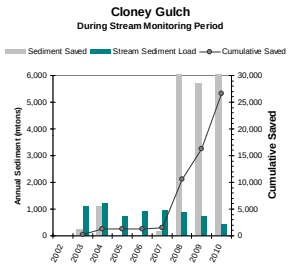


Average Erosion by Watershed

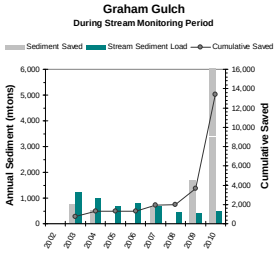




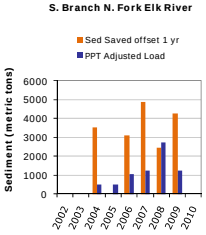
Effect on Water Quality— Cloney Gulch



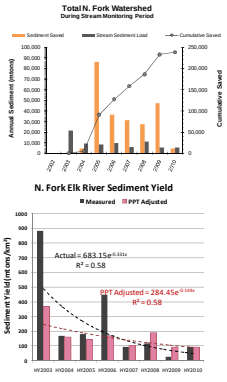
Effect on Water Quality -- Graham Gulch



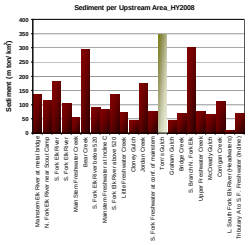
Effect on Water Quality -- S. Branch N. Fork Elk River



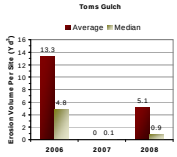
Effect on Water Quality -- N. Fork Elk River

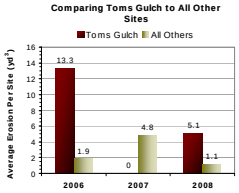


Comparison of Sediment Yield at HRC Water Quality Trend Sites

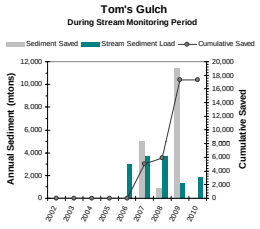


Toms Gulch has been more of a problem generally





Water Quality—Toms Gulch



Despite more erosion following construction, water quality has been improving