Discharge of water and suspended sediments to the South Bay from Coyote Creek and Guadalupe River watersheds:

Water Years 2003 – 2005

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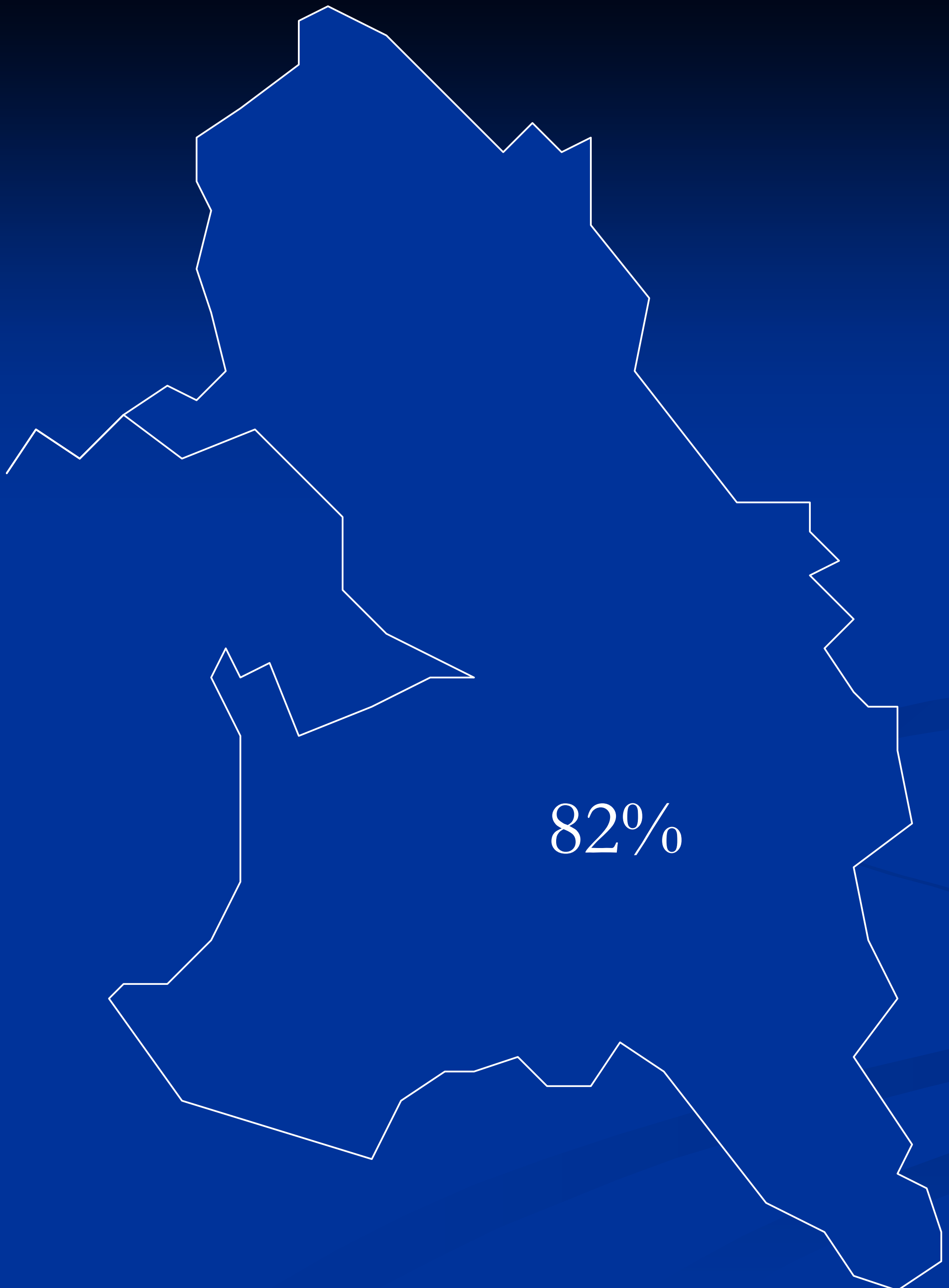
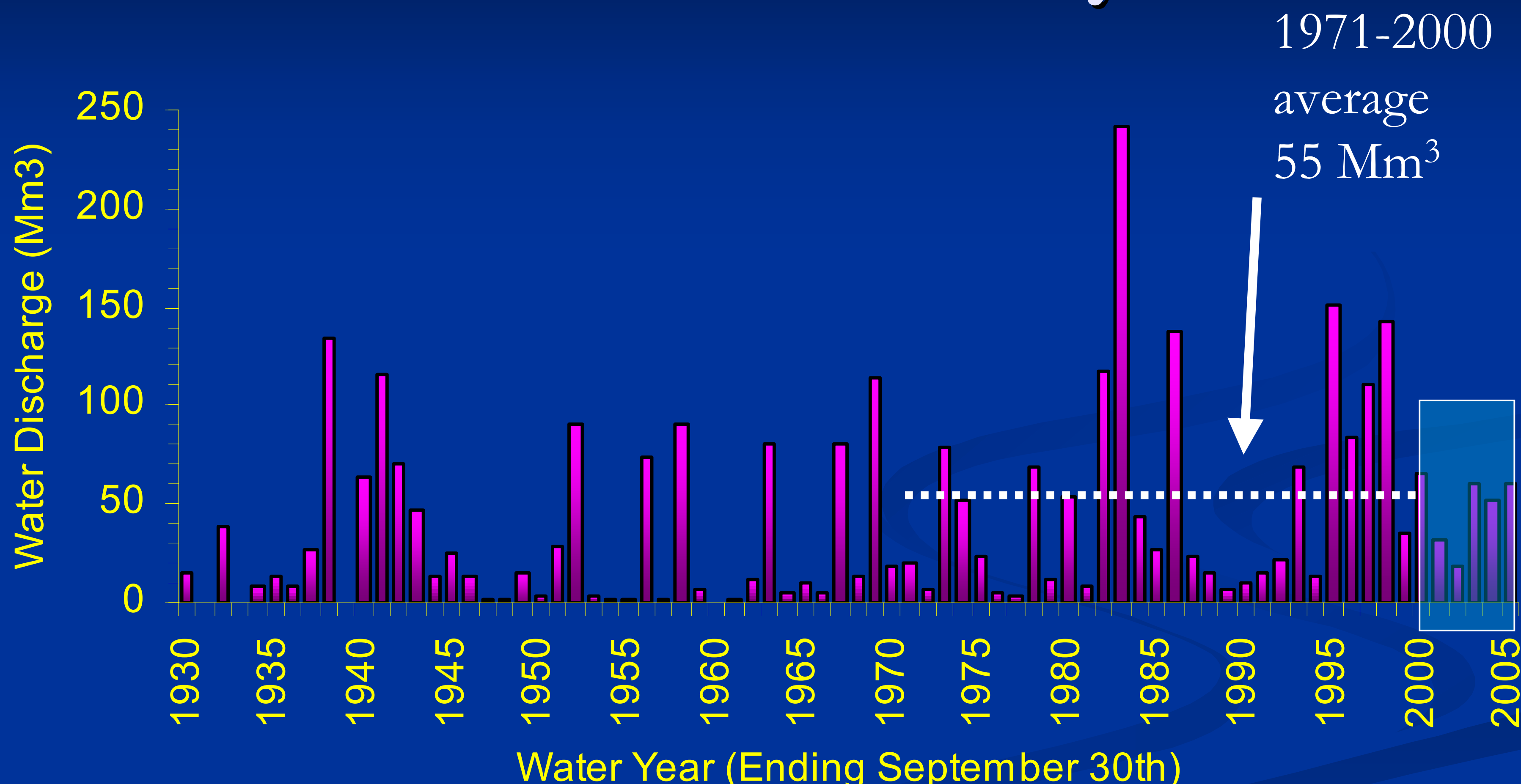
Outline

- Geography
- Water discharge variability
- Sediment loads
- Grainsize
- Maintenance sediment removal
- Sediment quality
- Summary and conclusions

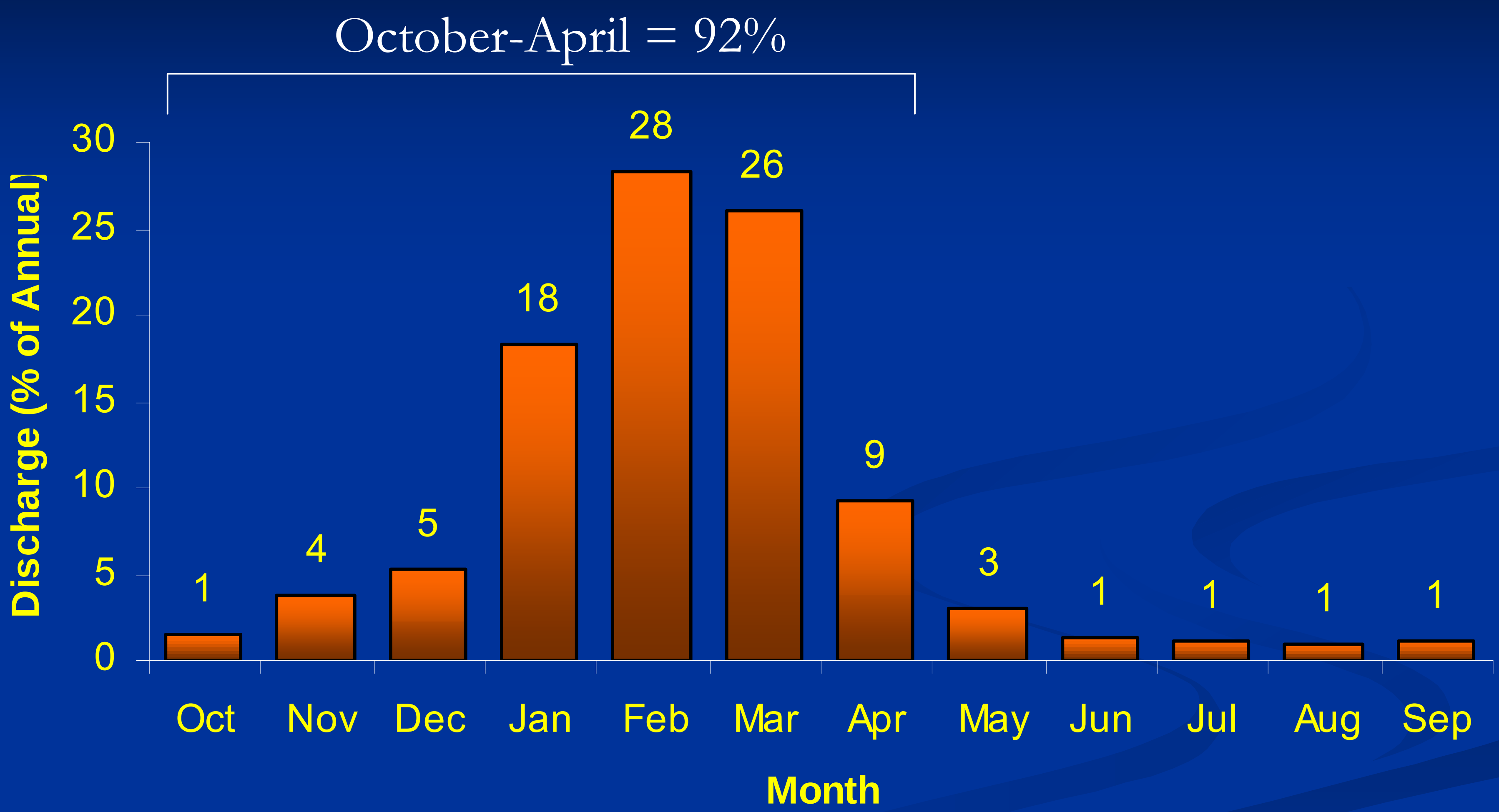


Watersheds of the South Bay

Water Discharge Inter-annual Climatic Variability



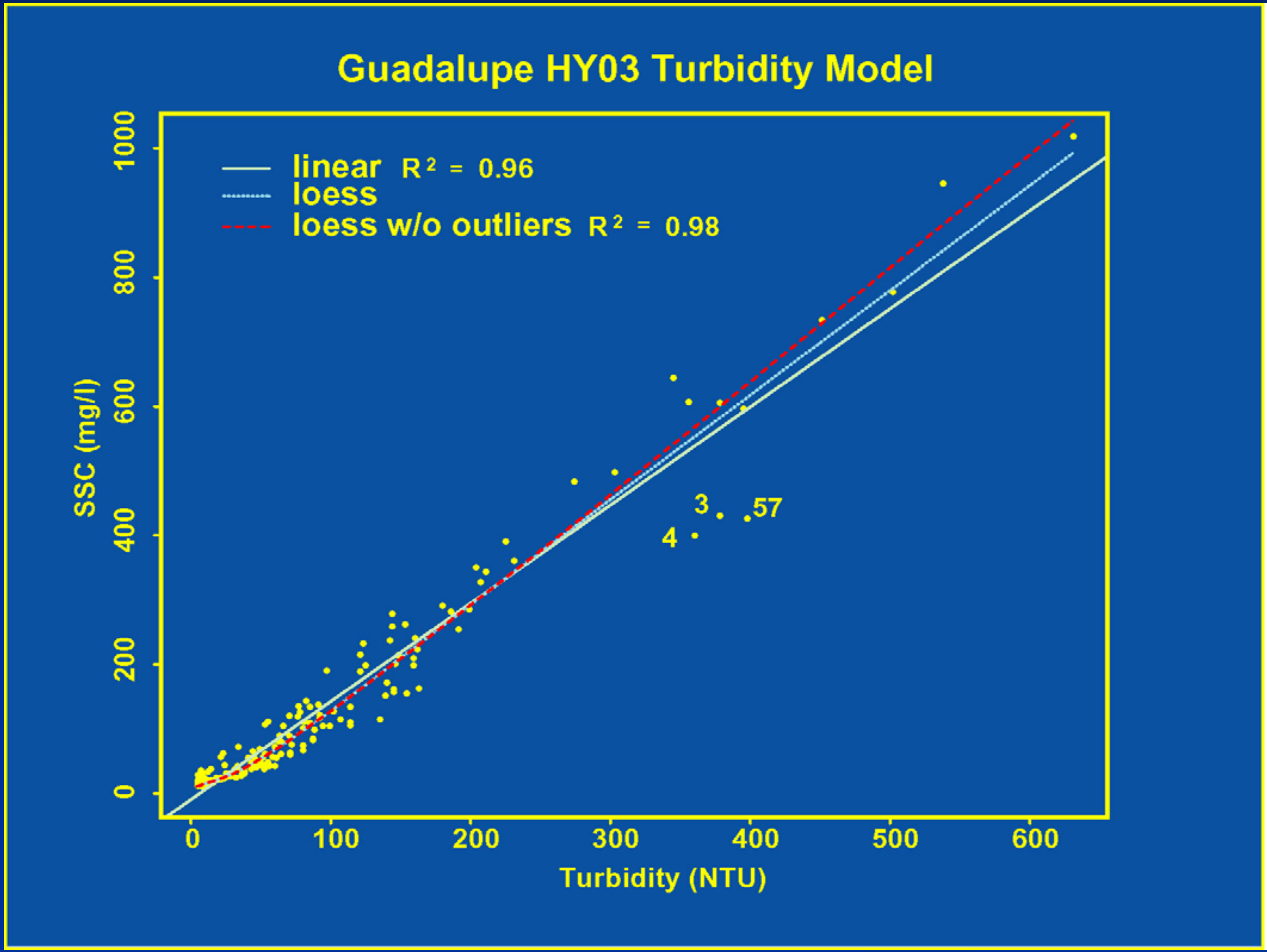
Intra-annual Runoff - Guadalupe



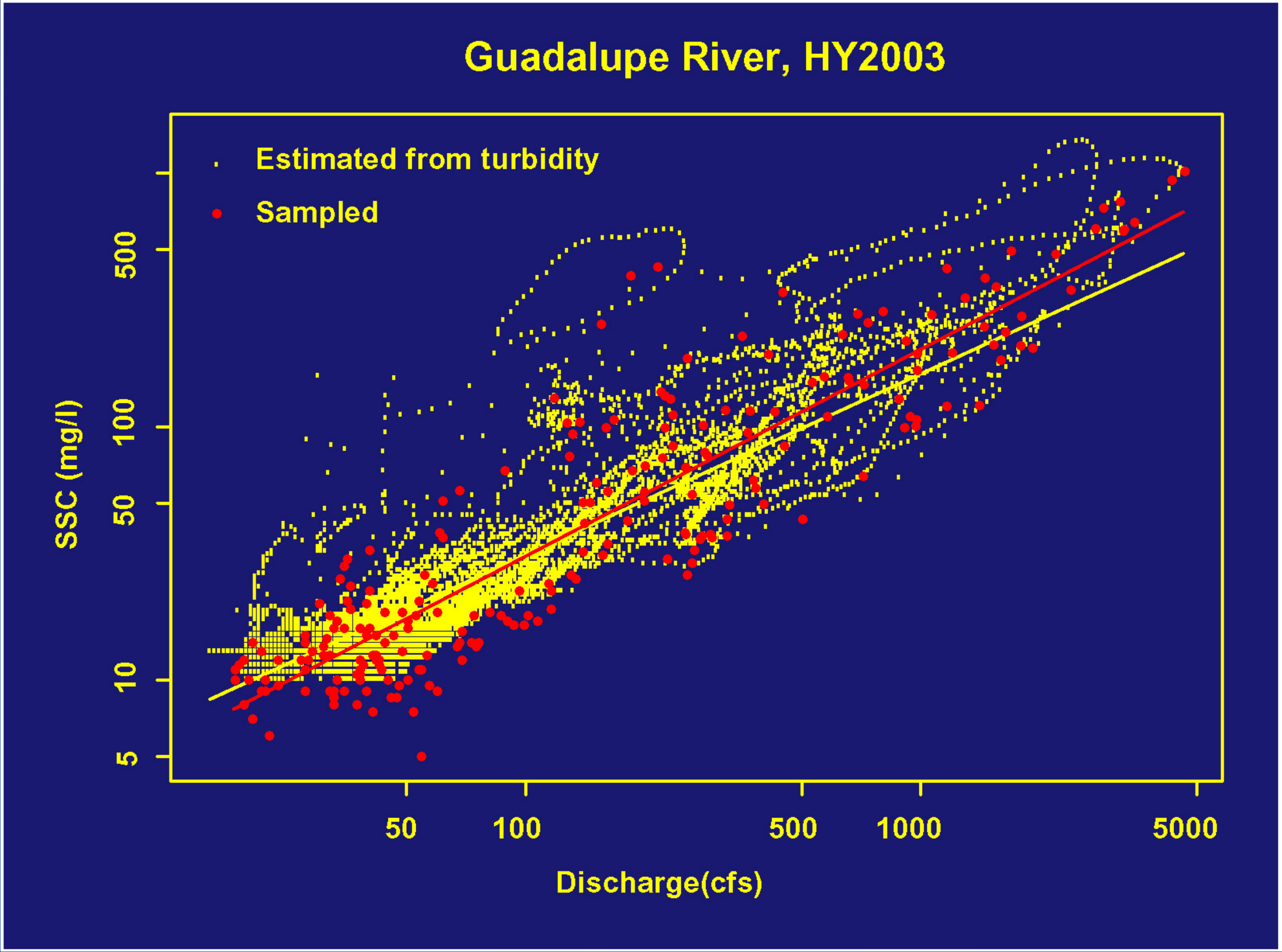
Suspended Load

Guadalupe Sediment Data Collection

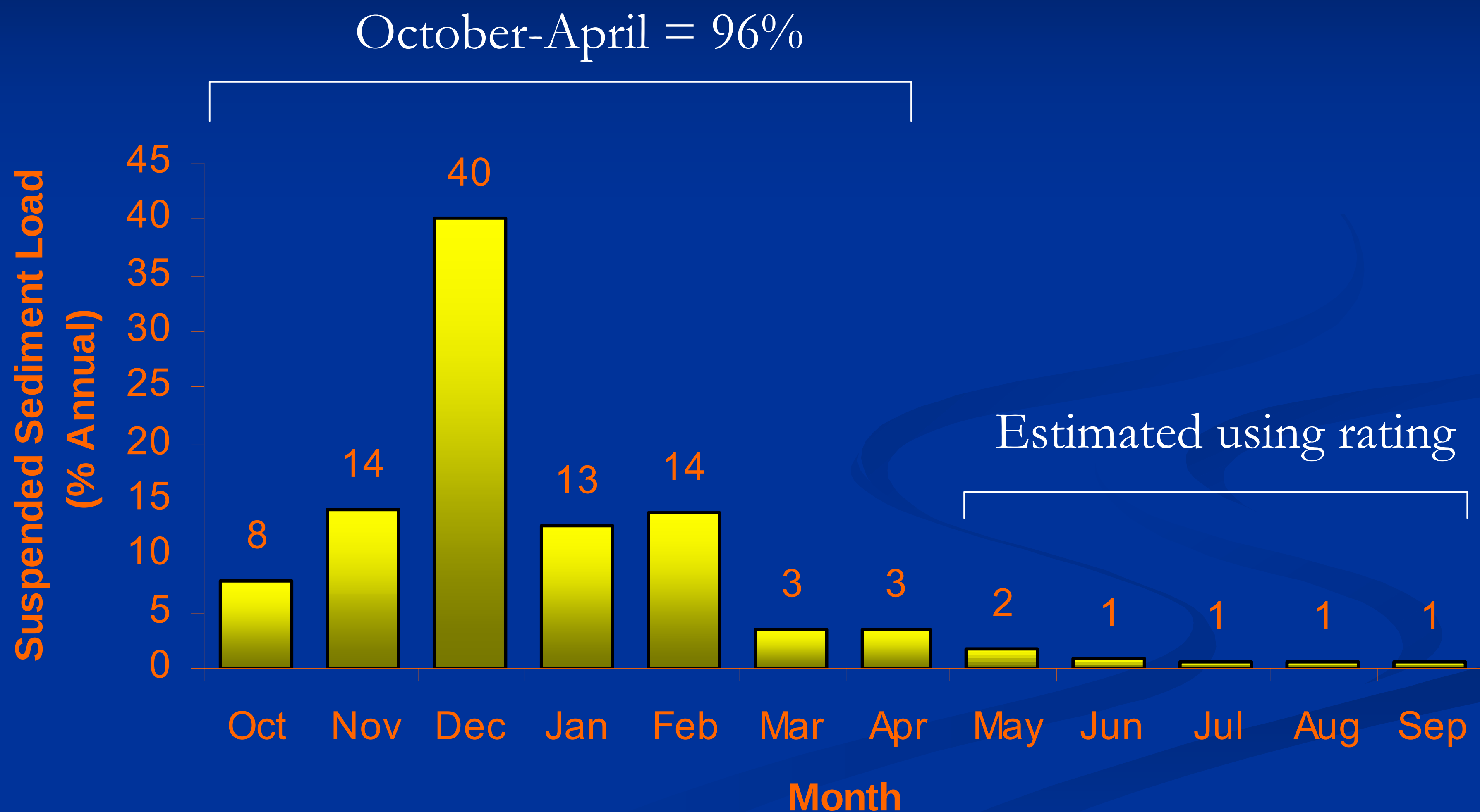
Turbidity v SSC Regression



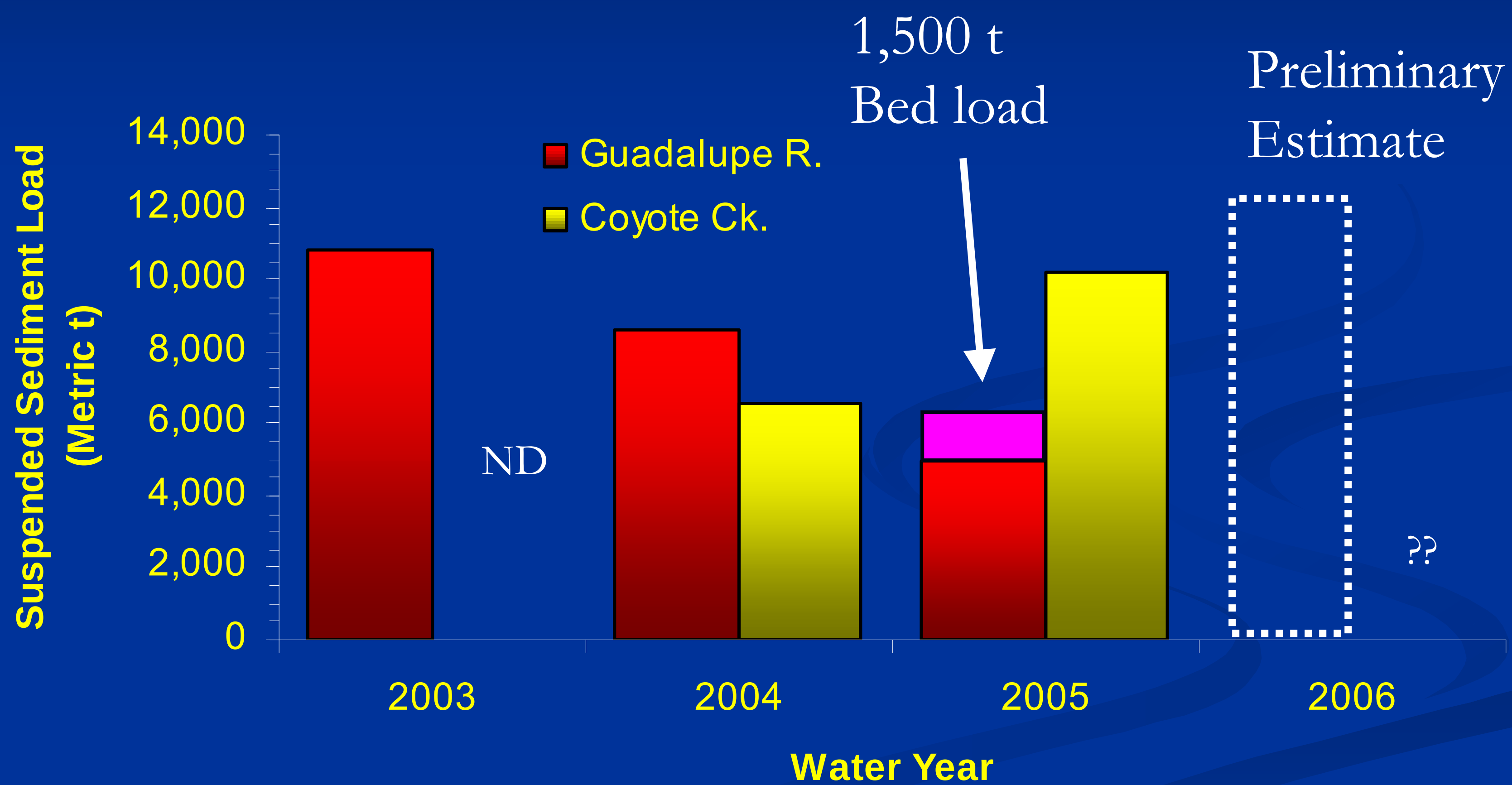
Suspended Sediment Concentration



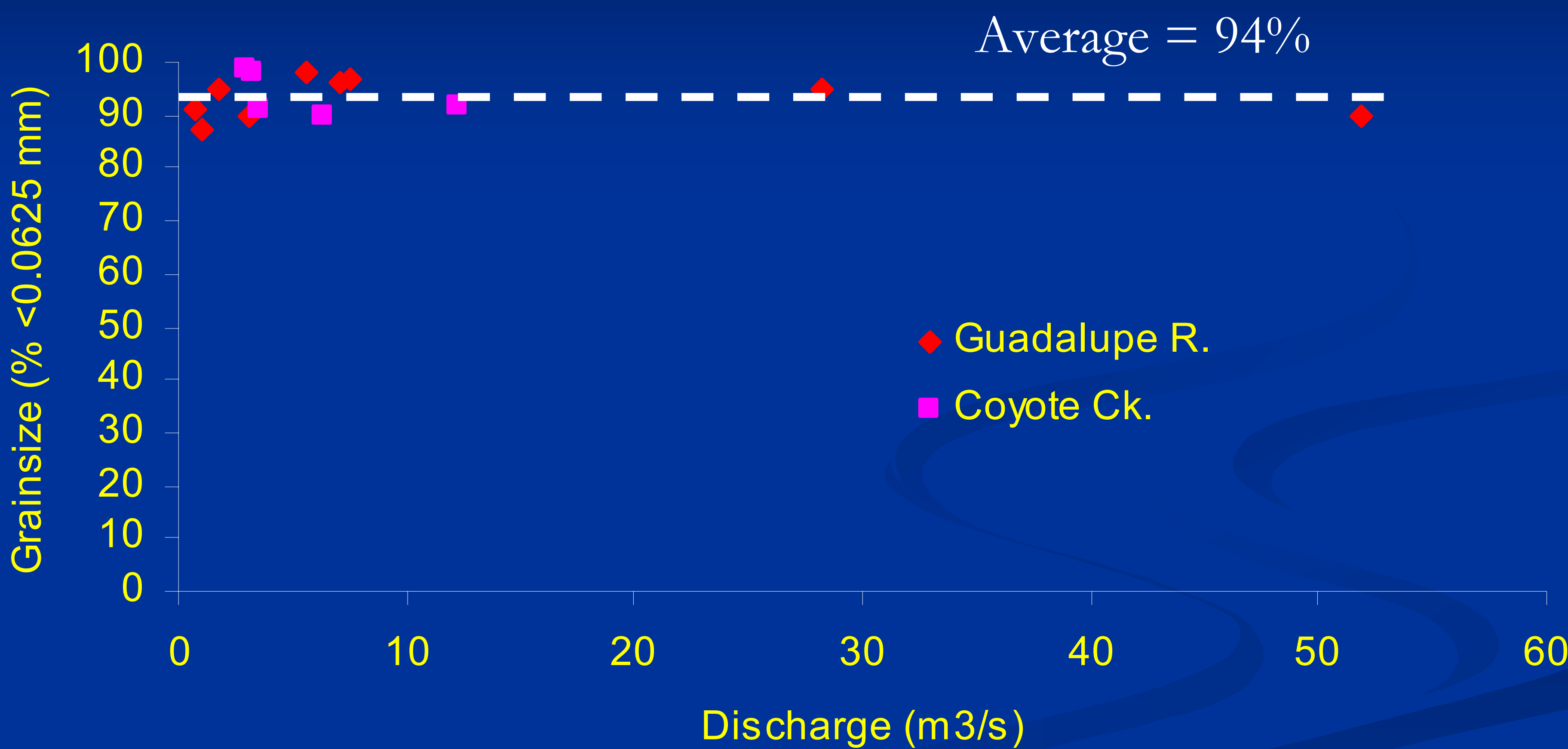
Monthly Suspended Sediment Load (e.g. Guadalupe)



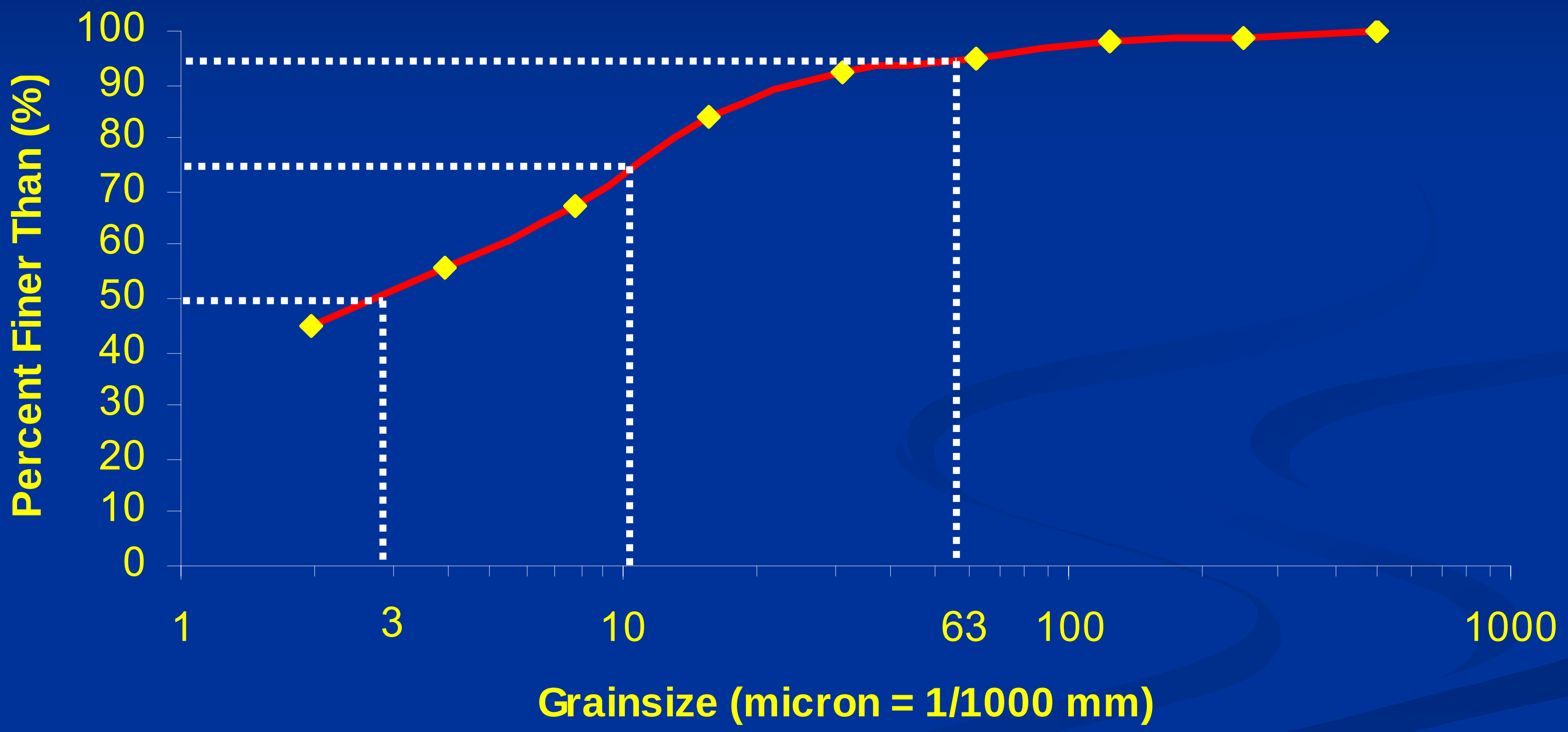
Wet Season Sediment Loads



Sediment Grainsize

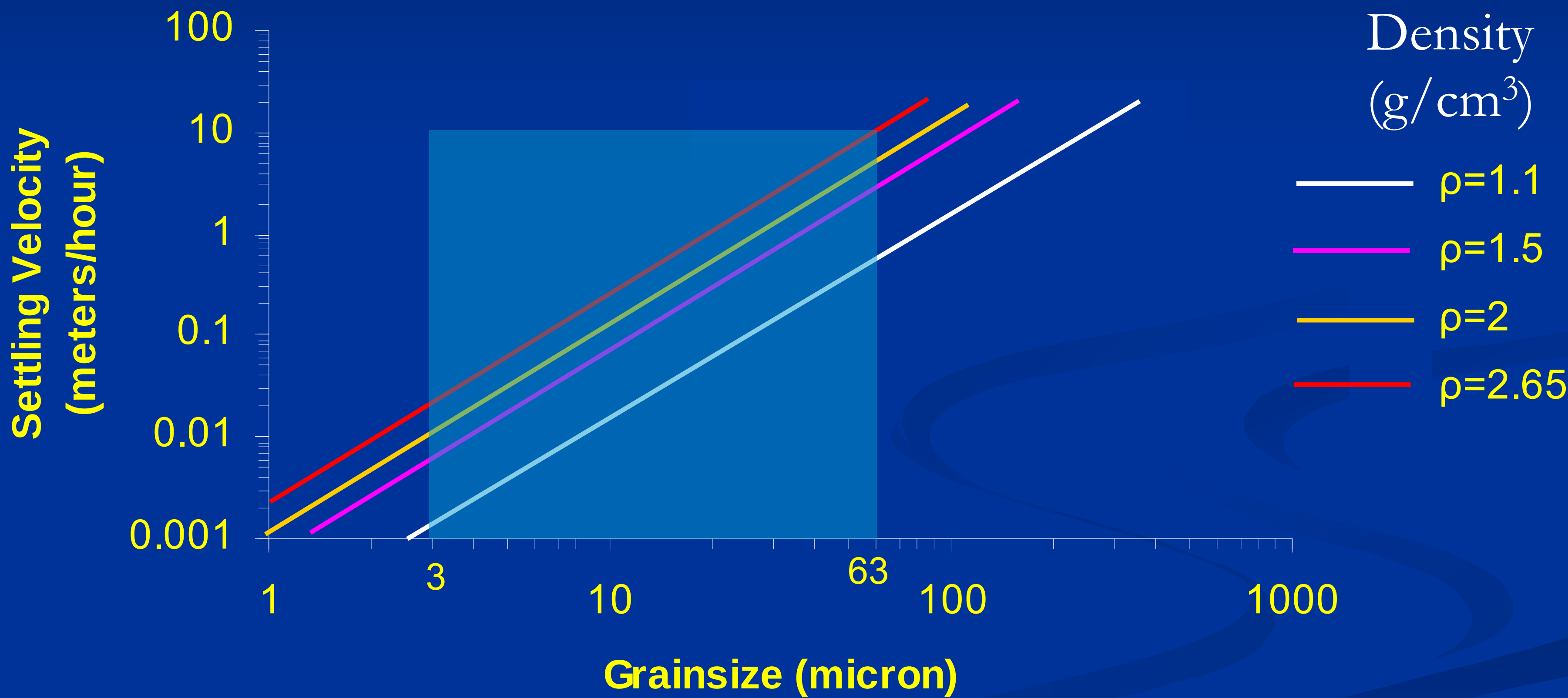


Guadalupe Sediment Grainsize (Detail)



Settling Velocities

(USEPA design settling velocities assuming Stokes Law settling (Driscoll 1986))



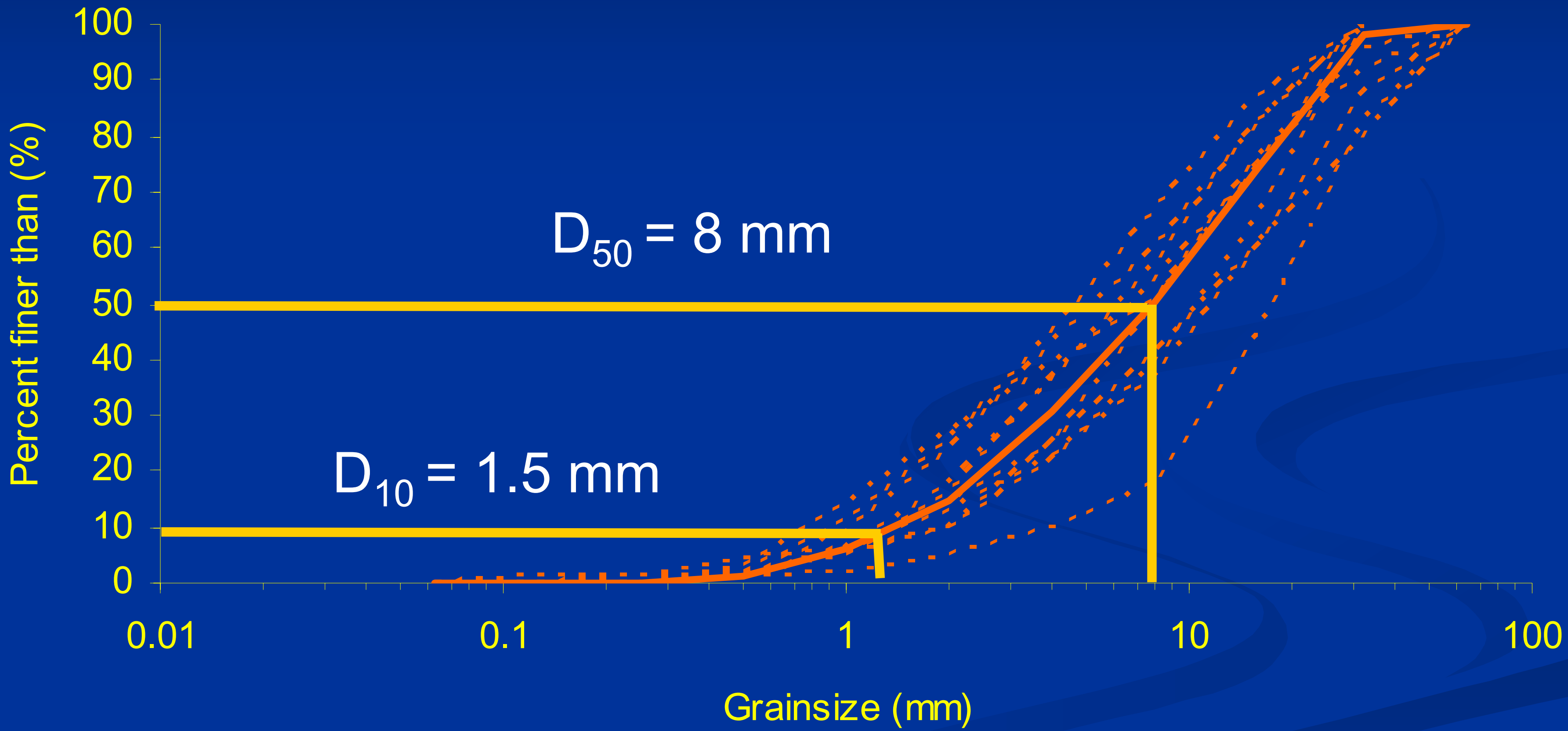
Thought Experiment

- Assume:
  - 10 km from Hwy 101 to a Salt Pond
  - Velocities are 3 m/s at peak flow for a flood 3 m depth
- Then:
  - It will take 1 hour for water to travel

- Assume:
  - All sediment remains in suspension on the rising stage and 80% of sediment is transported on the rising stage
  - Water column is only 1 m depth in Alviso Slough
  - Particle density of 2 g/cm^3
- Then:
  - Particles < 20 micron will never settle in the channel during a flood
  - 80% of the particles are less than 20 micron
  - >90% of all suspended sediment is flushed through the system

Bed Load

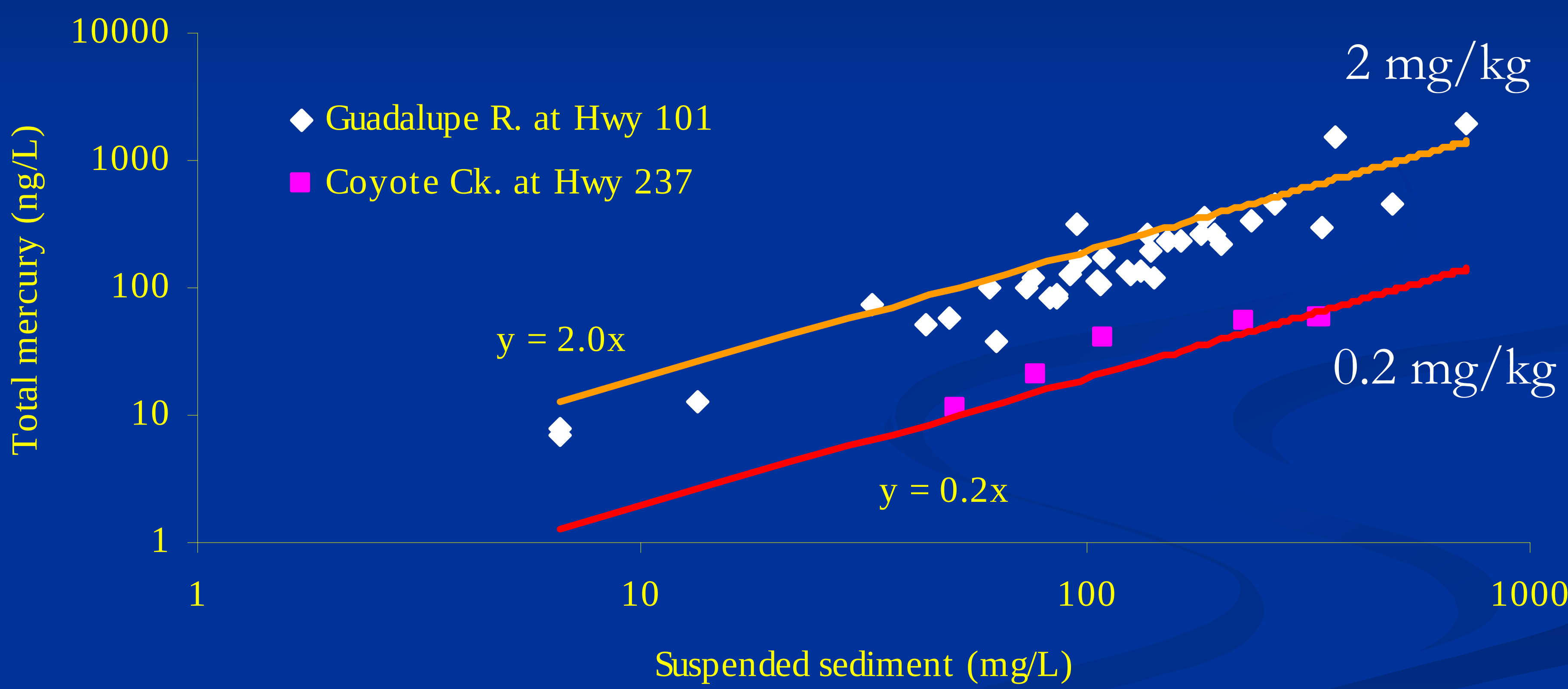
Bed Load Sediment Grainsize



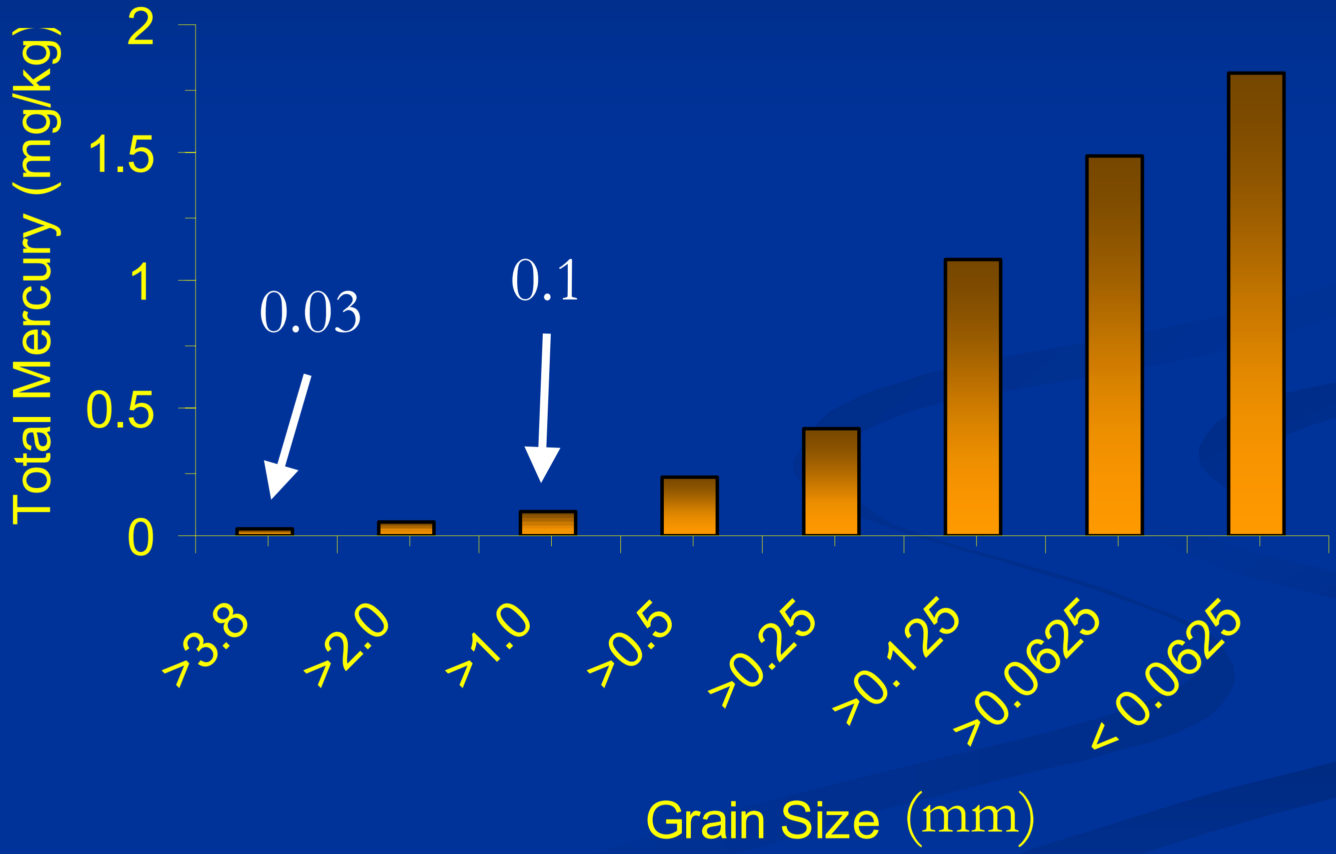
Fate of Bed Sediment

- WY 2005 transported 1,500 t
- Assume 1.5 g/cm^3 then 1,000 m^3
- SCVWD removed 56,000 yd^3 (43,000 m^3) downstream from Hwy 101 over 27 years = 1,600 m^3/y
- Maintenance sediment removal easily accounts for all bed load transport if we assume WY 2005 represents a little less than the long term average

Suspended Sediment Quality



Bed Sediment Quality



Comparisons to Zone 6 Line B

Water Year	Guadalupe R. (414 km^2)	Coyote Ck. (830 km^2)	Zone 6 Line B (2.2 km^2)
2000			19,700
2001			8,404
2002			906
2003	10,787		
2004	8,219	6,571	
2005	4,918	10,162	
Total	23,924	16,733	29,010

Conclusions

- Sediment loads have been measured for only a small window of climatic variability
- Suspended sediment is very fine and is unlikely to be trapped in creeks during floods
- Maintenance sediment removal is about the same magnitude as bed load sediment
- Suspended sediments in Guadalupe R. are contaminated with Hg however even in Guadalupe River, the bed sediment is relatively clean
- Suspended sediments in other South Bay watersheds with upland supply are also likely to be clean
- Small watersheds supply a disproportionately large amount of sediment – presently we are underestimating total sediment supply for restoration because we have virtually no information on these small watersheds

Acknowledgements

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