



# Update on Sand Mass Balance with Modeling

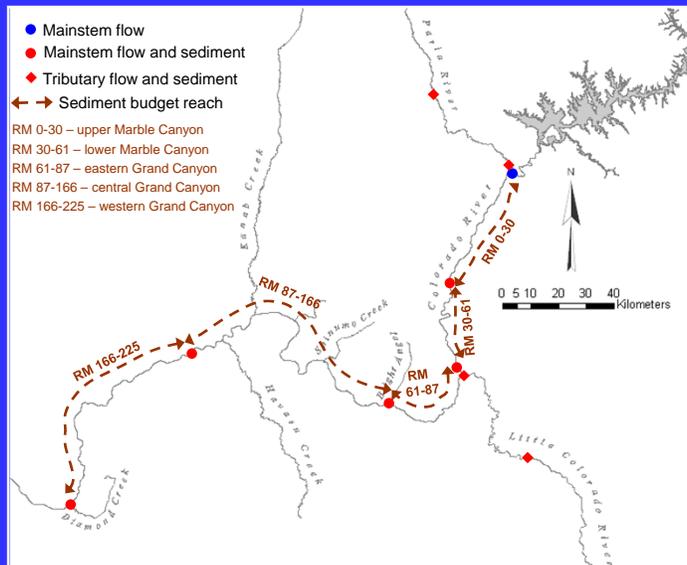
GCDAMP TWG Meeting  
June 29, 2011

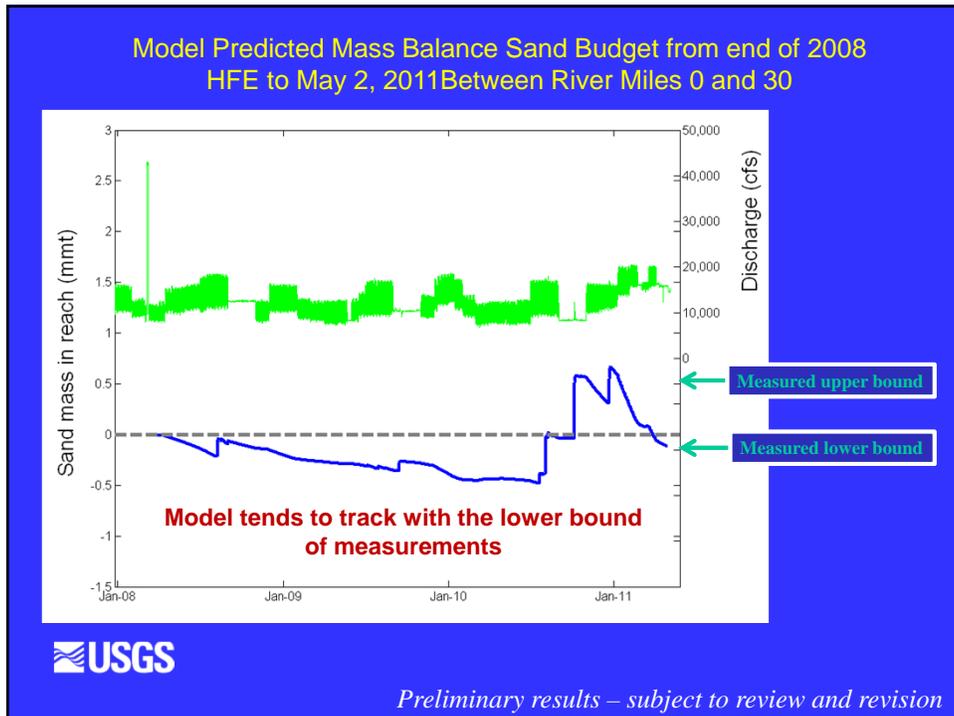
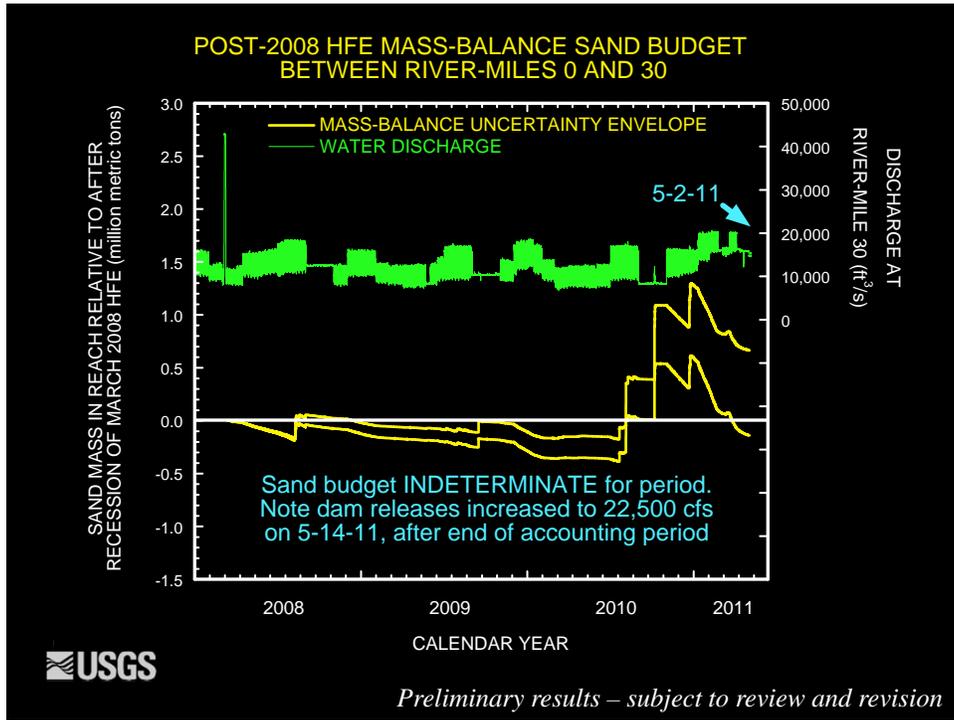
Paul Grams, David Topping, Scott Wright

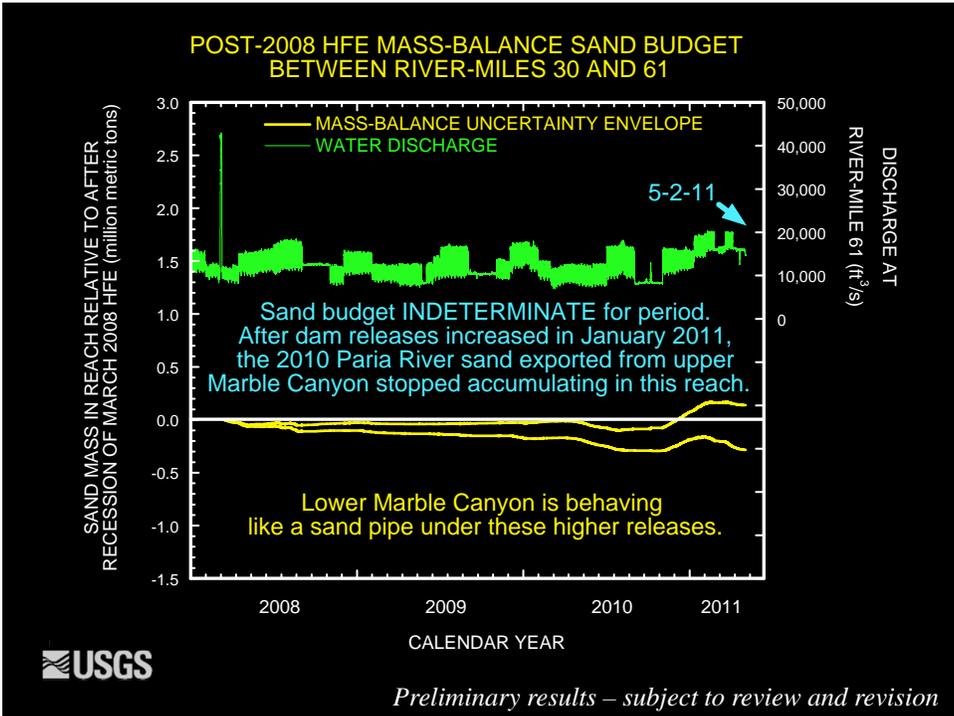
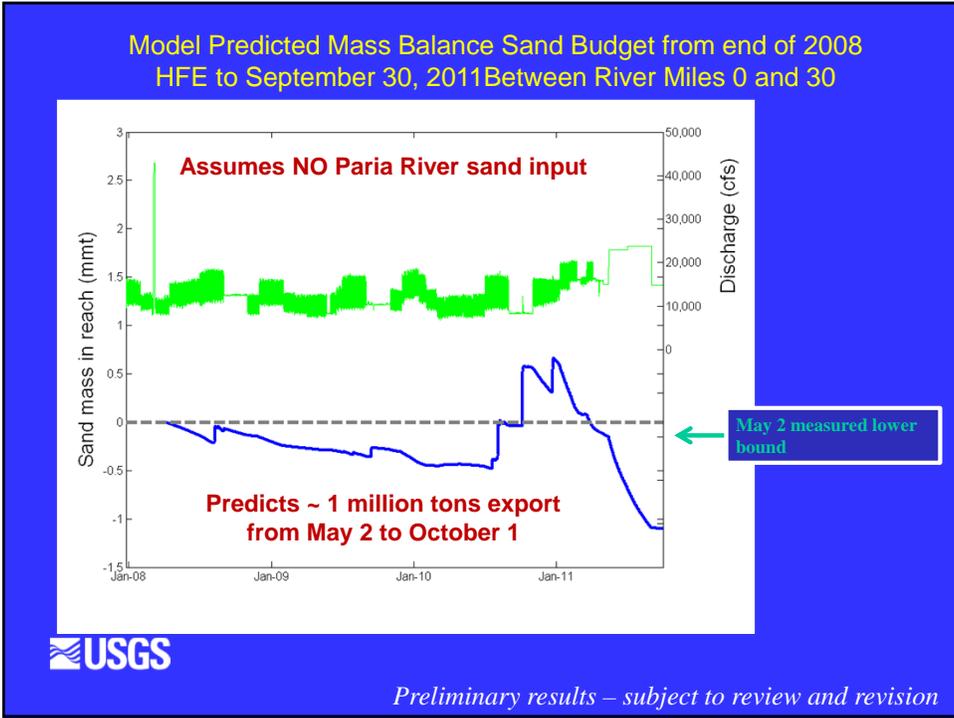
U.S. Department of the Interior  
U.S. Geological Survey

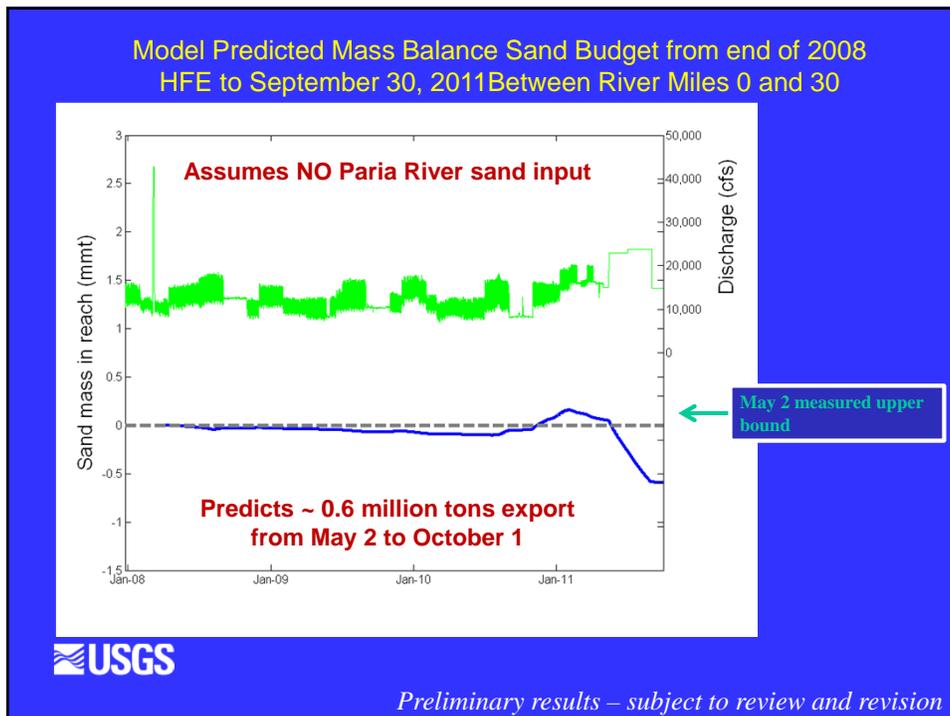
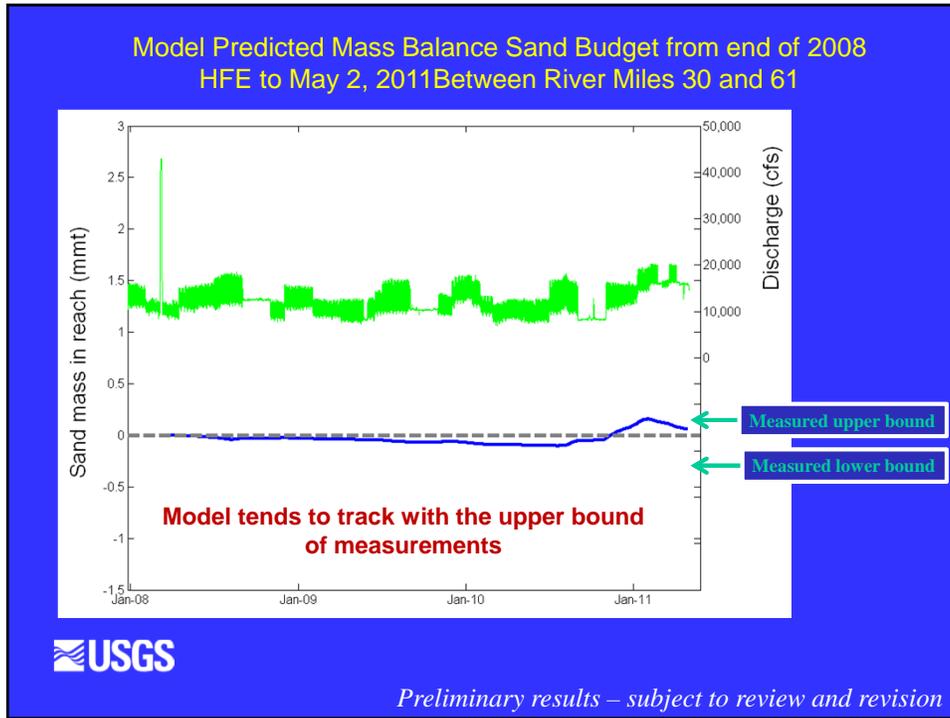
## USGS Sediment Flux Monitoring Program in Grand Canyon

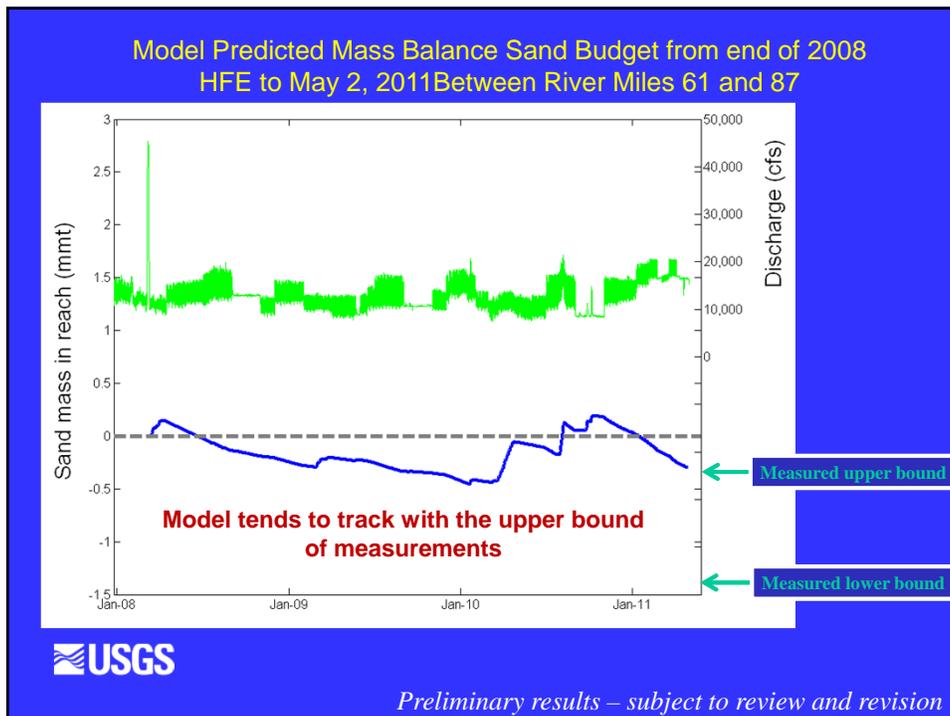
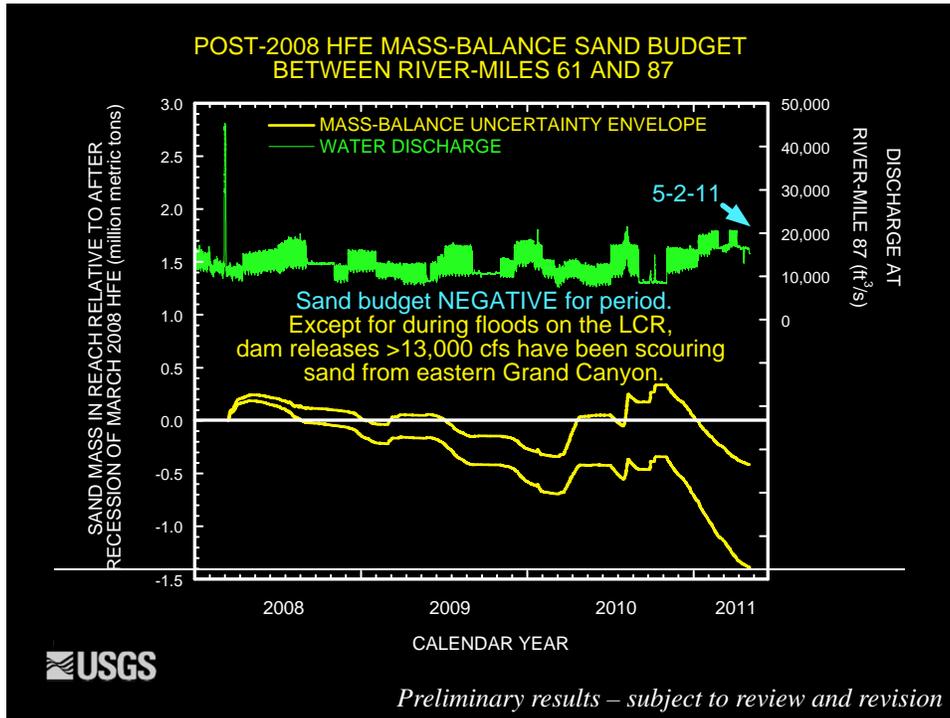
David Topping  
Ronald Griffiths  
Thomas Sabol  
Nicholas Volchick  
Karen Vanaman

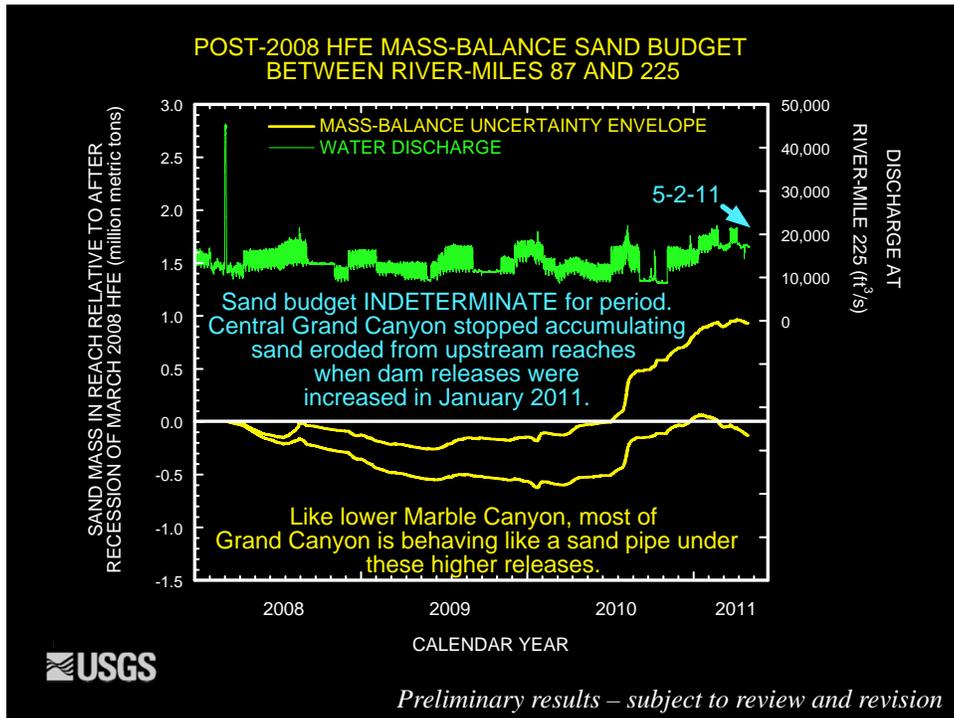
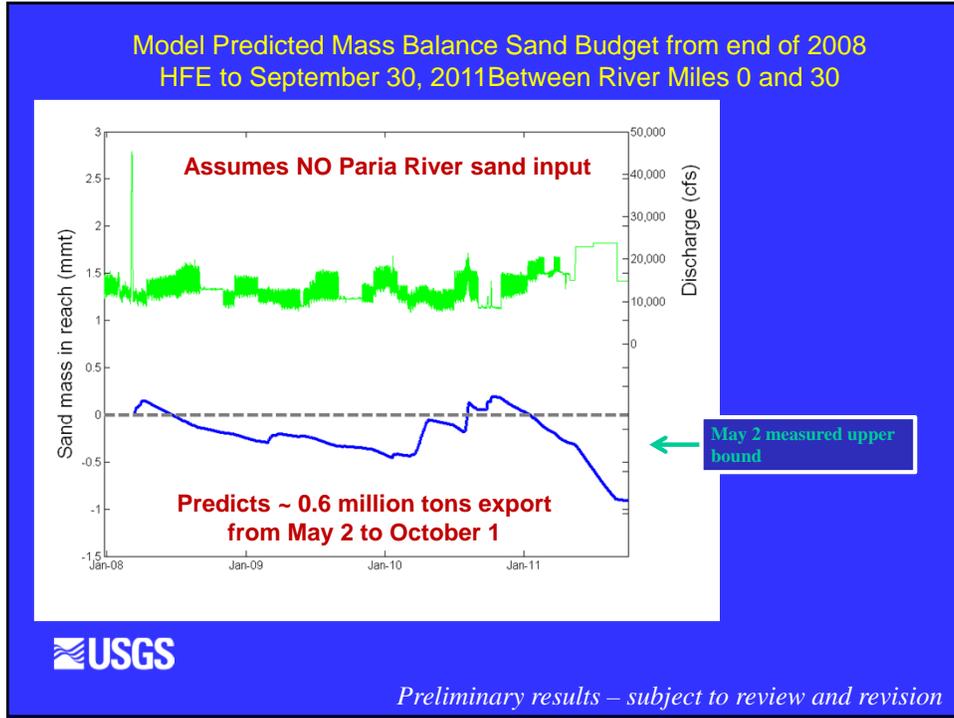






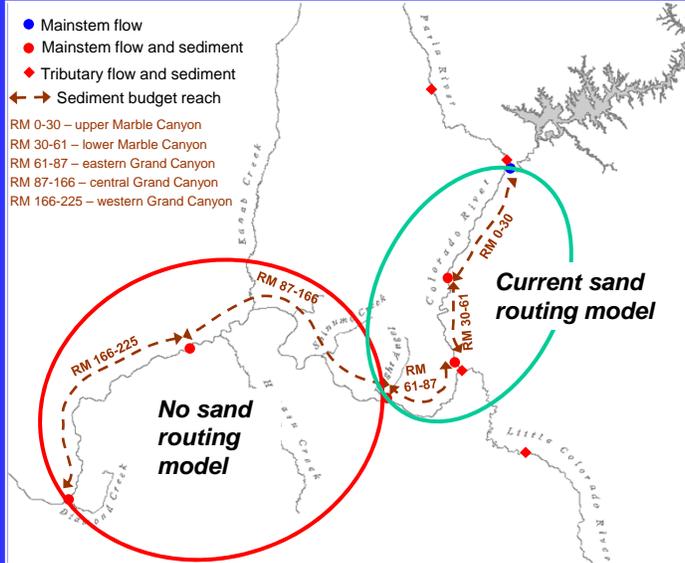






# USGS Sediment Flux Monitoring Program in Grand Canyon

Sand routing model not yet developed for segments downstream from Grand Canyon gage (RM 87)



## Comparison of May 2011 status with status leading up to 2004 and 2008 high flows (review of information presented at May AMWG meeting)

Reach	July 1, 2004 to start of 2004 HFE	End of 2004 HFE to start of 2008 HFE	End of 2008 HFE to Jan. 7, 2011	End of 2008 HFE to May 2, 2011
RM 0 to 30	0.4 ± 0.1	1.2 ± 0.6	1.4 ± 0.4	+0.25 ± 0.35
RM 30 to 61	0.1 ± 0.05	0.5 ± 0.3	-0.05 ± 0.15	-0.10 ± 0.10
RM 61 to 87	0.0 ± 0.05	0.8 ± 0.7	-0.35 ± 0.35	-0.90 ± 0.50
RM 87 to 225	0.2 ± 0.1	0.9 ± 0.4	0.35 ± 0.35	+0.40 ± 0.50

Green = definitely positive      Yellow = indeterminate, maybe negative  
 Orange = indeterminate, maybe positive      Red = definitely negative

All values in million metric tons.



Preliminary results – subject to review and revision

## Summary

- The relatively high volume dam releases of winter-spring-summer 2011 (~ 17,000 → 24,000 cfs) do not permit sand retention
- **Measured sand export from January 1, 2011 to May 2, 2011:**
  - ~0.7 million tons loss from upper Marble Canyon (RM 0 to 30)
  - ~0.15 million tons loss from lower Marble Canyon (RM 30 to 61)
  - ~1.05 million tons loss from eastern Grand Canyon (RM 61 to 87)
  - ~0.2 million tons loss from central and western Grand Canyon (RM 87 to 225)
- **Model-predicted sand export from May 2, 2011 to October 1, 2011:**
  - ~1.0 million tons loss from upper Marble Canyon (RM 0 to 30)
  - ~0.6 million tons loss from lower Marble Canyon (RM 30 to 61)
  - ~0.6 million tons loss from eastern Grand Canyon (RM 61 to 87)
  - No model prediction for central and western Grand Canyon (RM 87 to 225)
- **Sand is moving out of upper Marble Canyon by deflation (the “new” pile of sand delivered by Paria in Fall 2010, is shrinking and being transported through the downstream reaches in suspension, not moving downstream as a “wave” on the bed)**



*Preliminary results – subject to review and revision*