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Update on sediment inputs and 2008 High Flow results

GCDAMP AMWG Meeting, Tempe

August 13, 2009

Paul Grams

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

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Flux monitoring for managing sediment and sandbars

- **Flux monitoring:**
  - **Tracks tributary sediment inputs and mainstem transport at five locations to track status of the sediment “bank account.”**
  - **Provides the information needed to time high flows for building sandbars to follow periods of sand accumulation.**

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USGS Sediment Flux Monitoring Program in Grand Canyon

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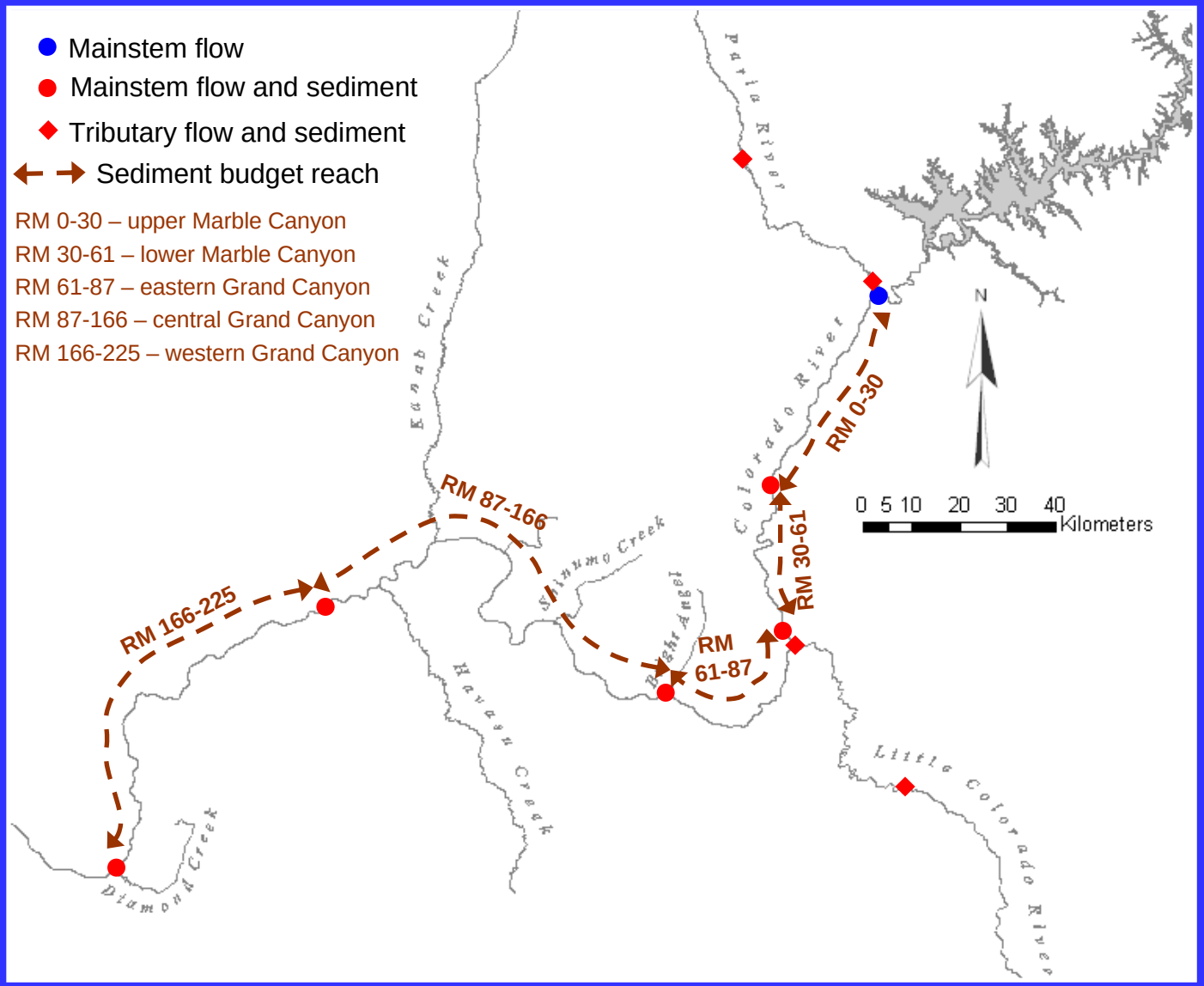

Outline and summary of update

- **Sand budget from post-2004 high flow through 2008 high flow.**
  - ***Sand accumulated in all reaches.***
- **Tributary sand inputs in 2009.**
  - ***As of August 10, tributary inputs have been minimal.***
- **Sand budget from post-2008 high flow to present.**
  - ***Slight sand depletion or indeterminate in four out of five reaches.***

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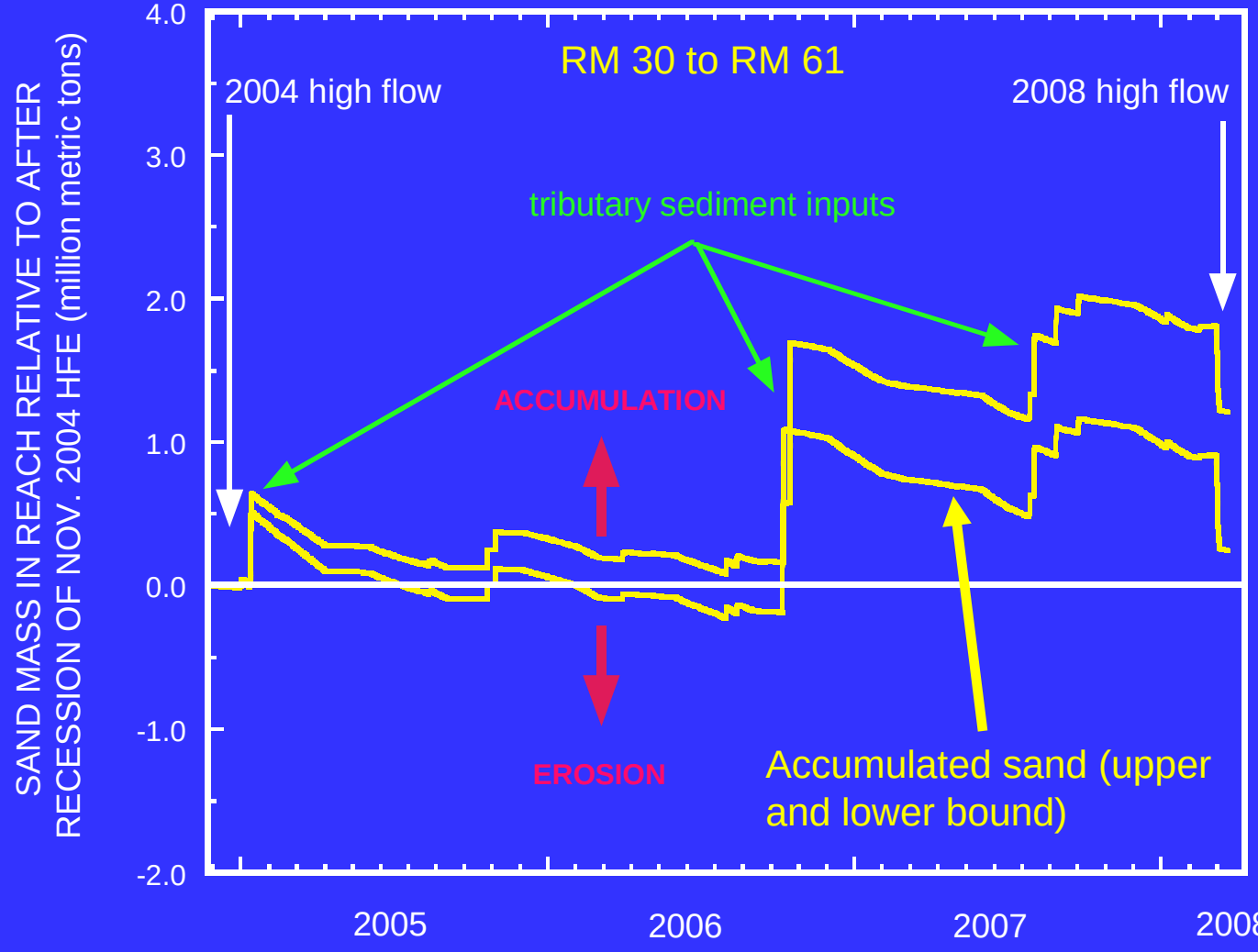
Preliminary results – subject to review and revision

Sediment budget leading up to the 2008 high flow was positive in all reaches and was still positive following the high flow



USGS

Preliminary results – subject to review and revision

Sediment budget leading up to the 2008 high flow was positive in all reaches and was still positive following the high flow

Period	0 – 30 mi	30 – 61 mi	61 – 87 mi	87 – 166 mi	166 – 225 mi
Post-HFE 2004 to pre-HFE 2008	+	+	+	+	+
Post-HFE 2004 to post-HFE 2008	+	+?	+?	+	+

\+ Budget indicates significant accumulation for period.

+? Budget indicates accumulation is likely for period.

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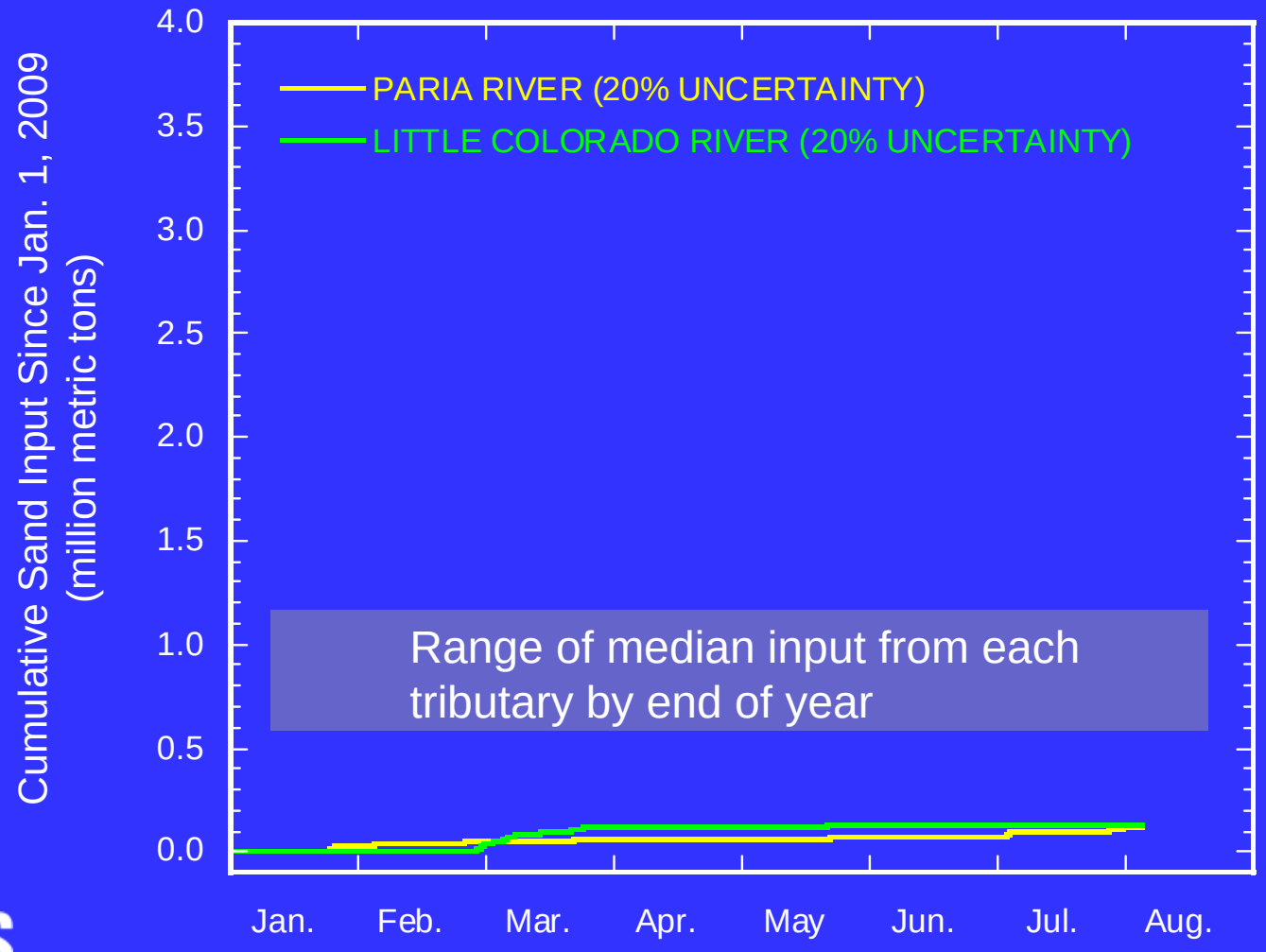
Preliminary results – subject to review and revision

Paria and Little Colorado River inputs since January 1, 2009 have been minimal



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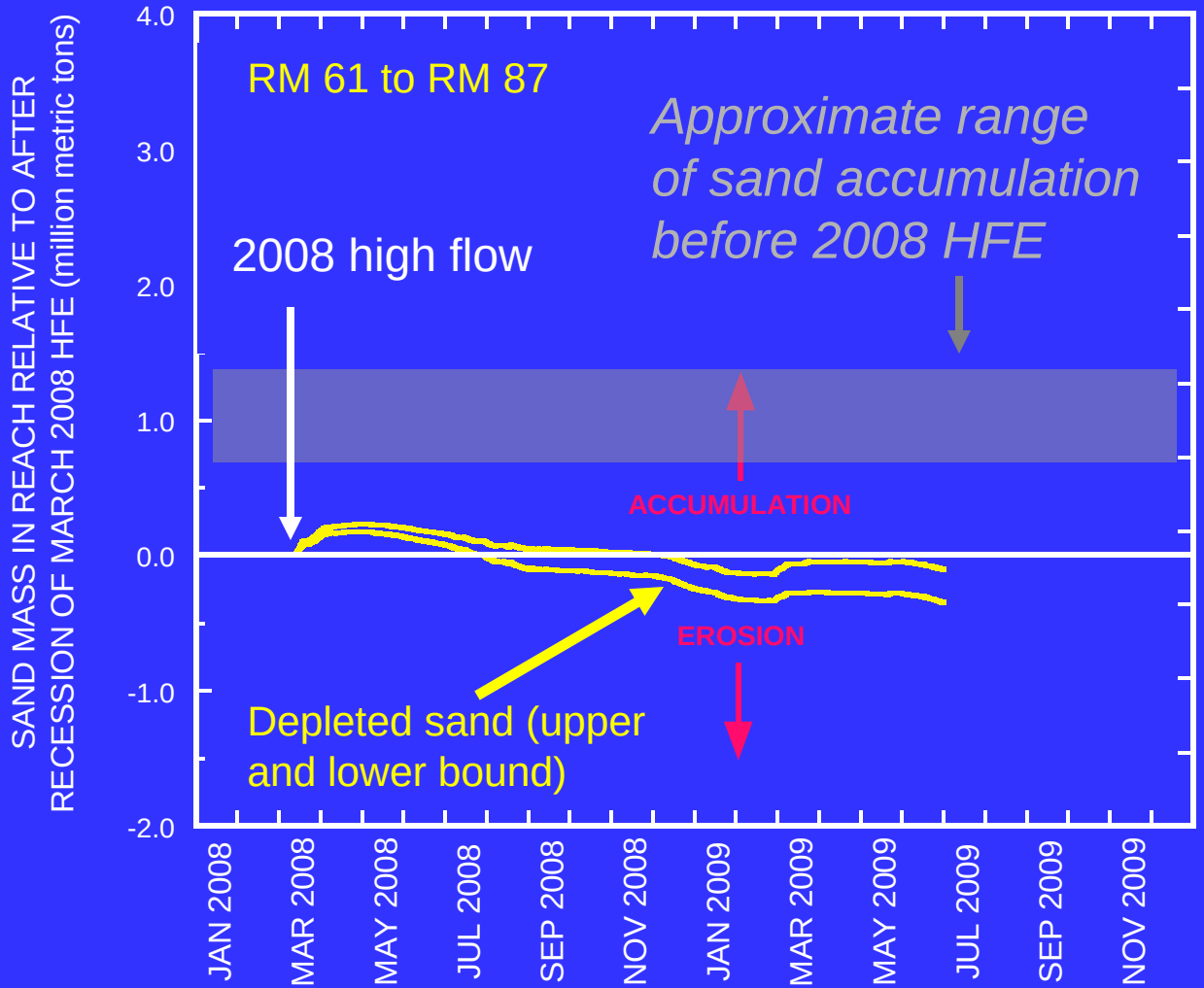
Preliminary results – subject to review and revision

Sediment budget from April 2008 to present is negative in four out of five reaches



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Preliminary results – subject to review and revision

Sediment budget from April 2008 to present is negative in four out of five reaches

Period	0 – 30 mi	30 – 61 mi	61 – 87 mi	87 – 166 mi	166 – 225 mi
Post-HFE 2008 to present	-	-	-	-?	+?

- Budget indicates significant erosion for period.

-? Budget indicates erosion is likely for period.

+? Budget indicates accumulation is likely for period.

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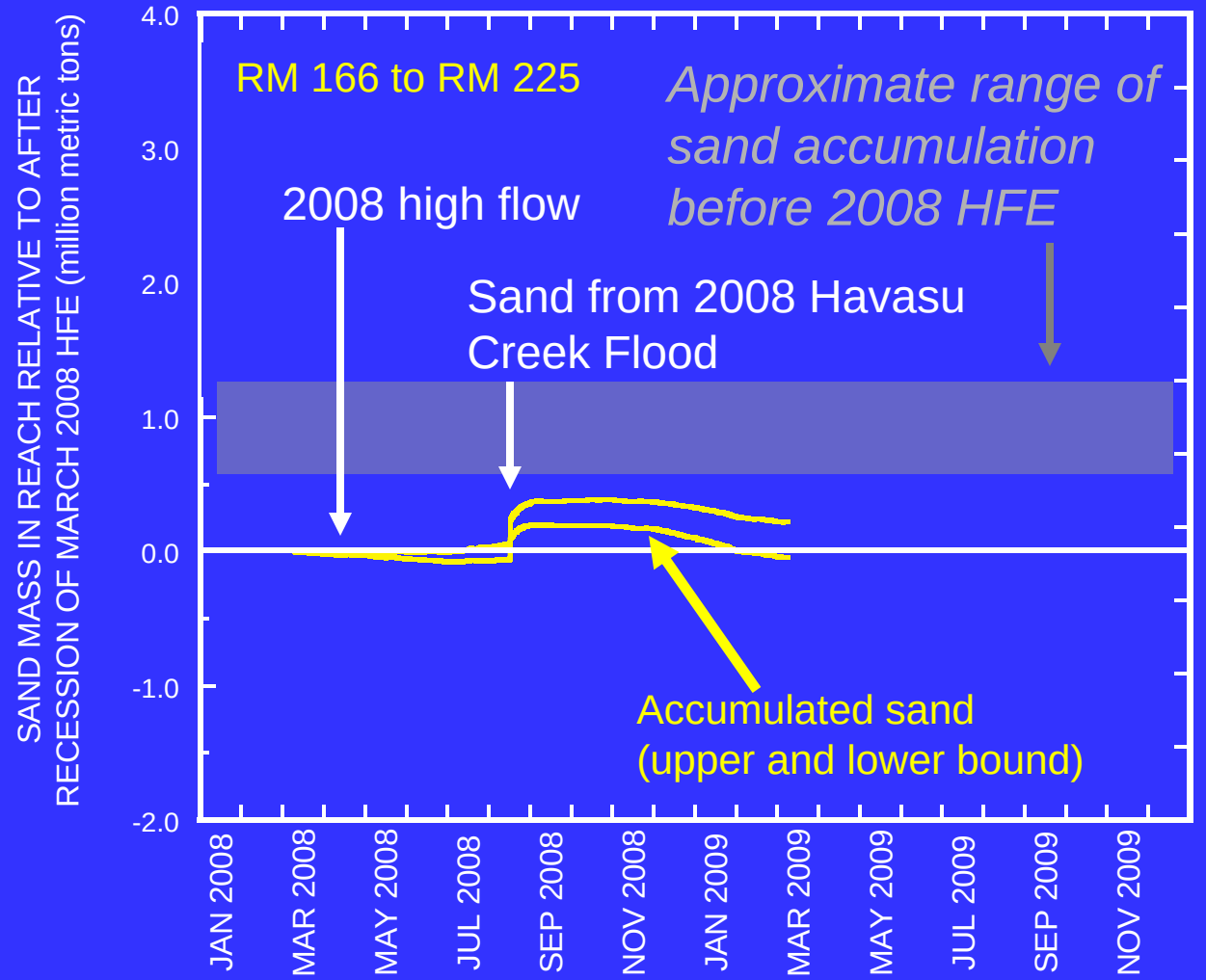
Preliminary results – subject to review and revision

Sediment budget from April 2008 to present is negative in four out of five reaches

- Positive budget in one reach resulted from Havasu Creek flood and dam-failure



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Preliminary results – subject to review and revision

Conclusions

- **Sand budget leading up to and through the 2008 high flow.**
  - ***There was significant sand accumulation in all reaches between the 2004 and 2008 high flow.***
  - ***Compared to 2004, there was more sand in 2008 and it was more evenly distributed throughout all reaches.***
  - ***Although the high flow resulted in sediment export, less sand was exported than had accumulated leading up to the high flow.***

- **Post-2008 high flow sediment budget and tributary sediment inputs in 2009.**
  - ***So far this year, inputs have been minimal and have only resulted in net sand accumulation in the downstream reach that was affected by the highly unusual 2008 Havasu Creek flood.***

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Preliminary results – subject to review and revision