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Update on Water Quality and 2010 Sand Input

GCDAMP TWG Meeting, Phoenix

November 15-16, 2010

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

2010 Water Temperature at Lees Ferry and Diamond Creek (226 mi)

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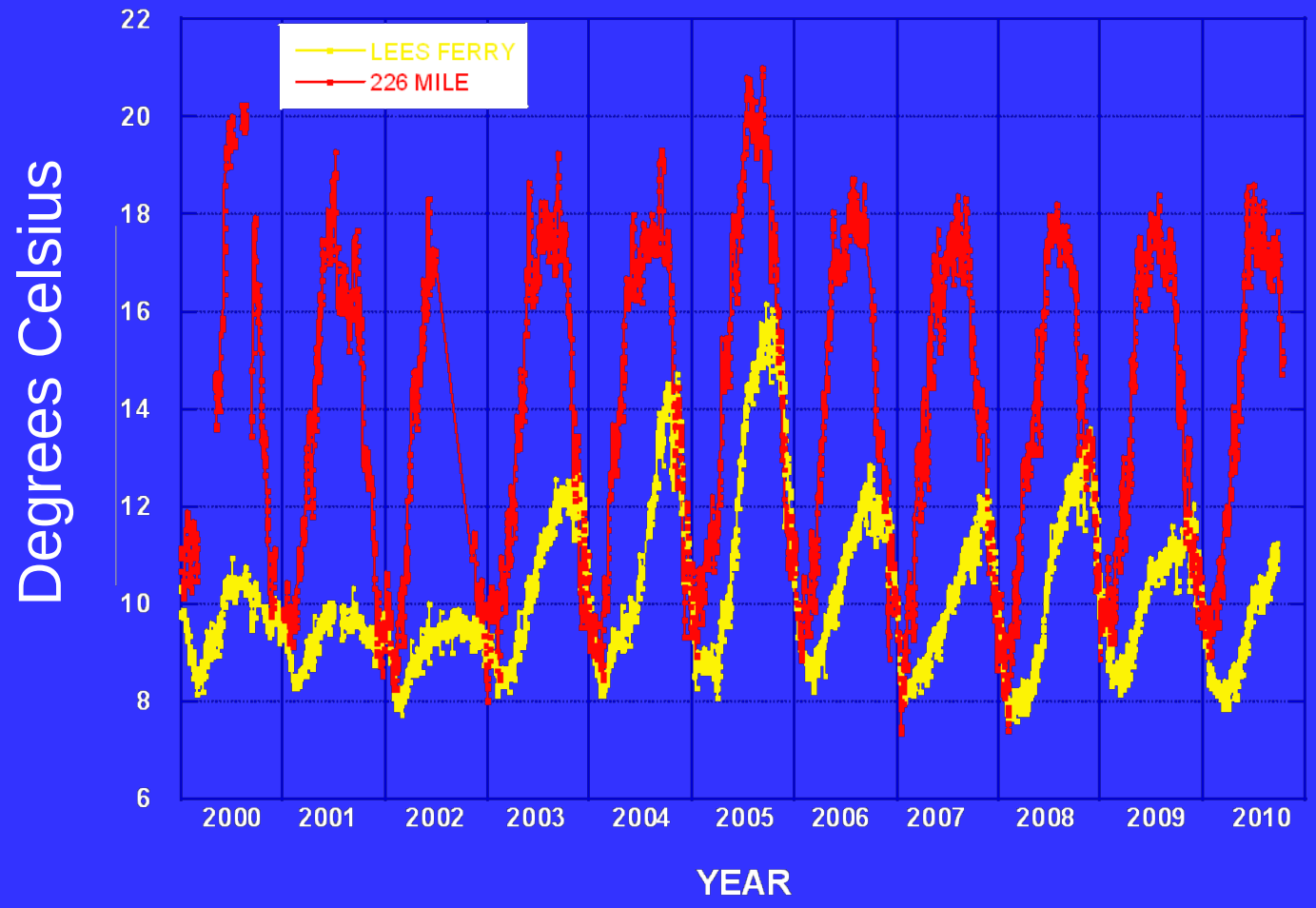
Water Temperature at Lees Ferry and Diamond Creek: 2000 to 2010



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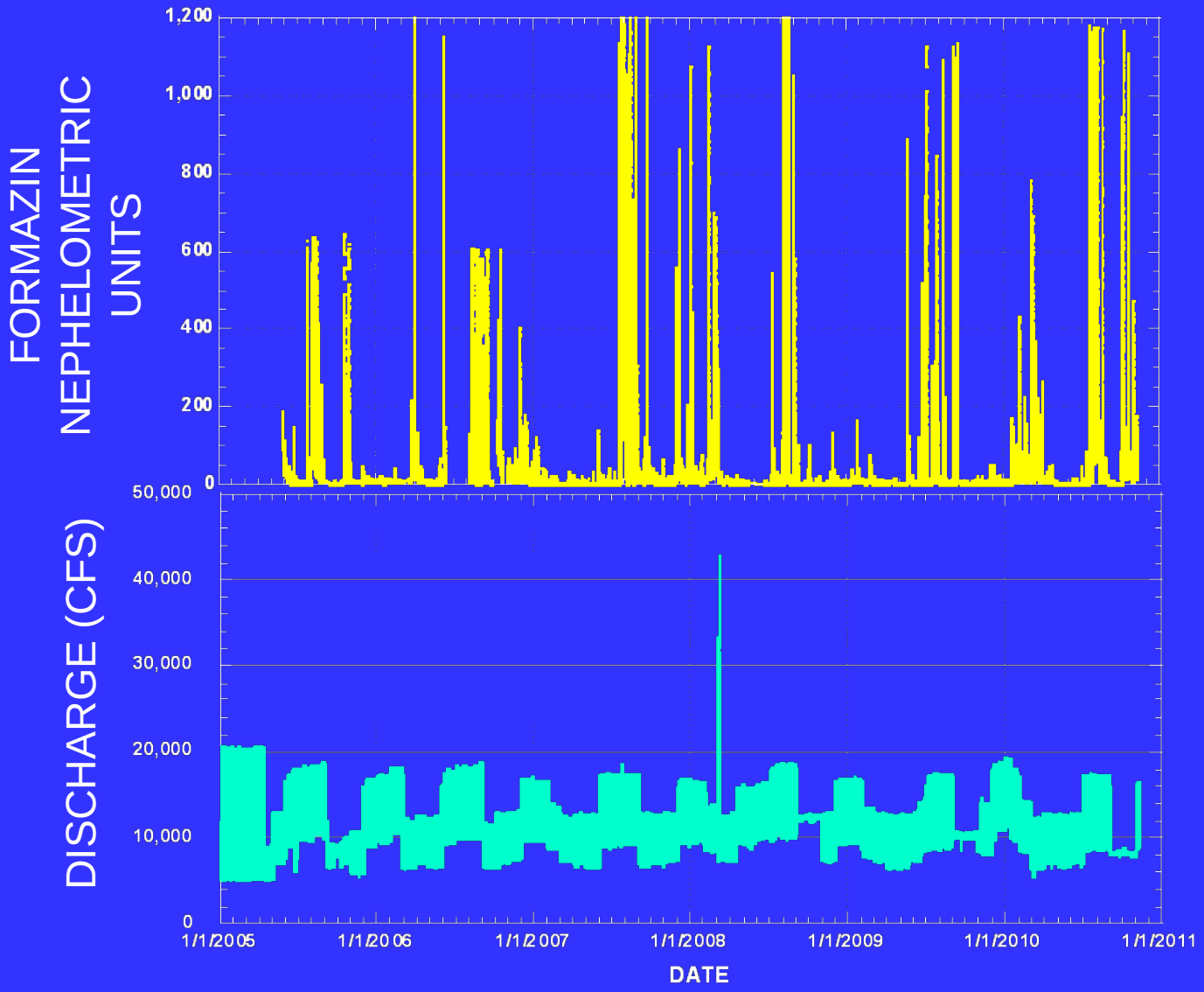
Turbidity at RM 30: 2005 to 2010



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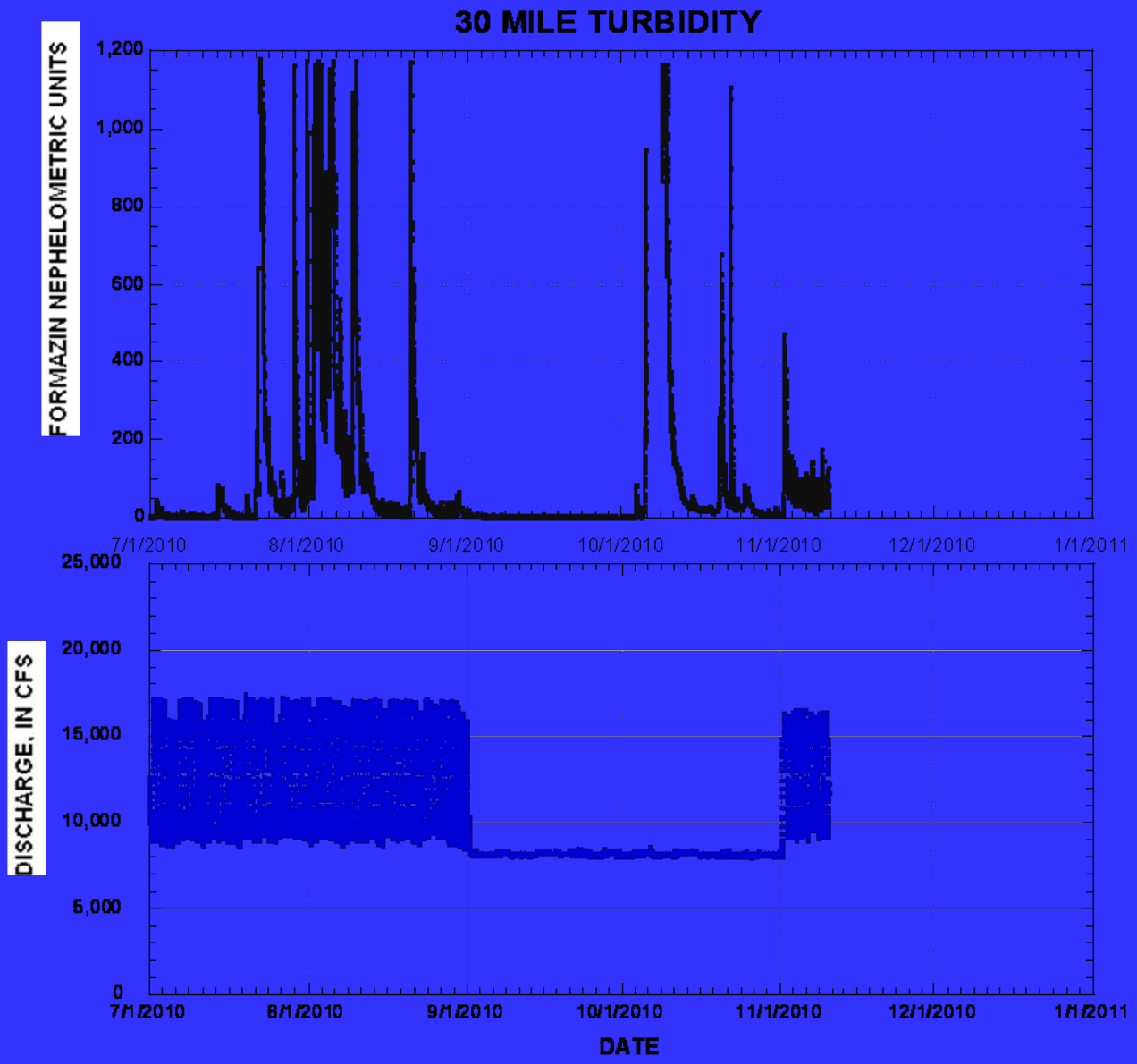
Turbidity at RM 30: fall 2010



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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

David Topping
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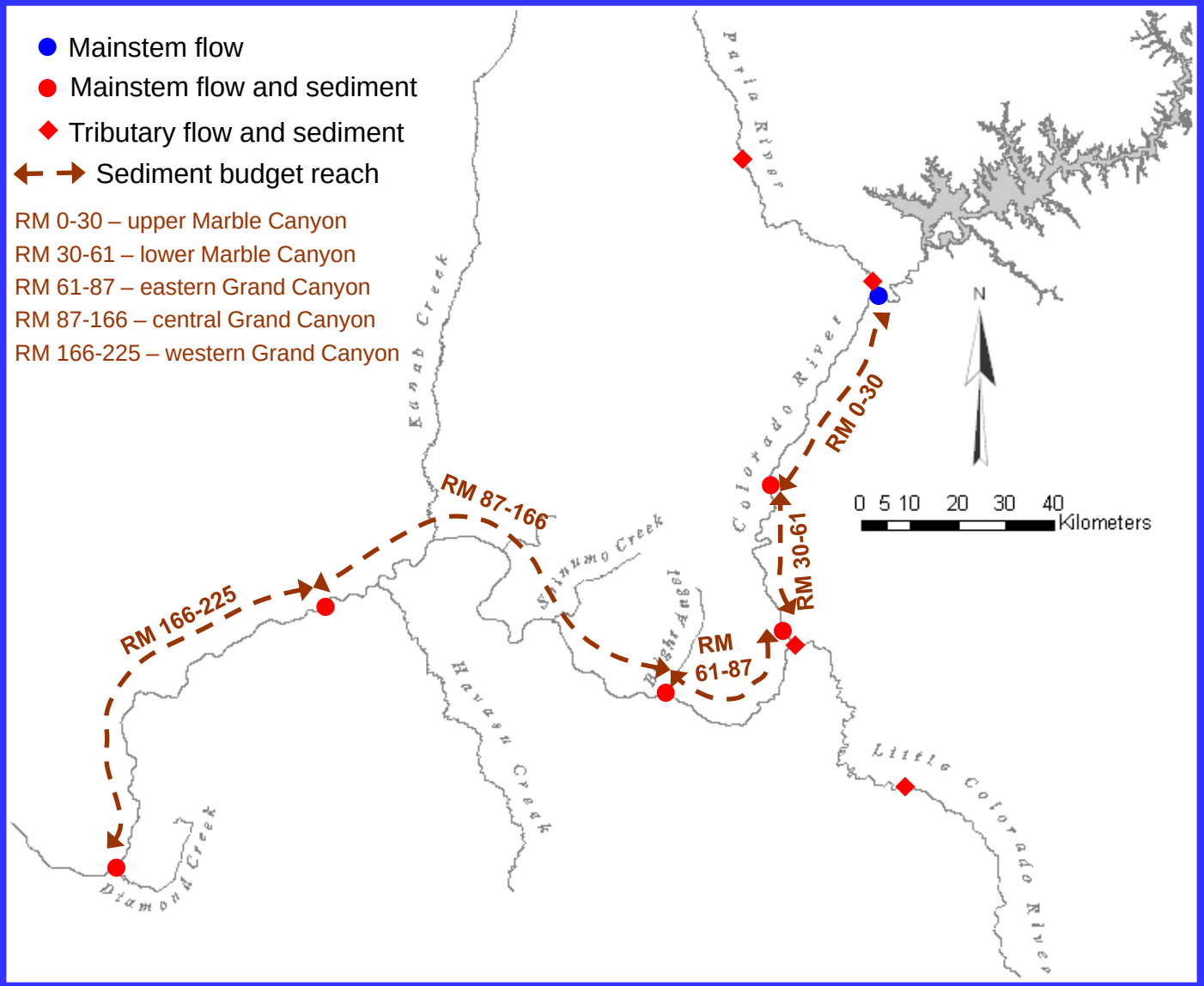
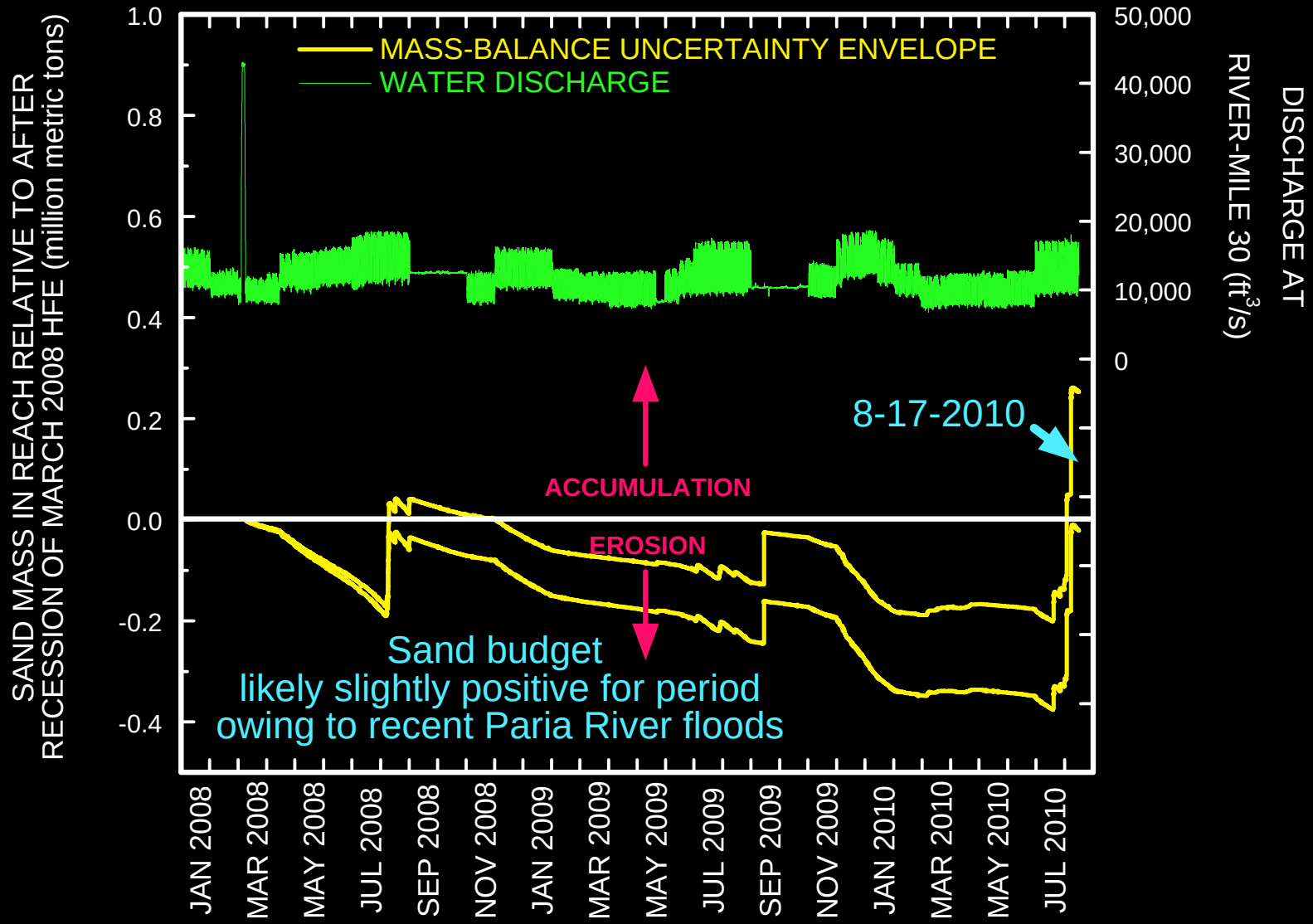


Sand budget from end of 2008 HFE to August 17, 2010



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Preliminary results – subject to review and revision

Sand update: October 15, 2010

- Since July 1, 2010,
  - Between 1.2 and 1.7 million metric tons of sand from the Paria River.
  - Over 500,000 metric tons of sand from the Little Colorado River.

- **The mass balance starting with the end of the 2008 HFE was negative until August 15, 2010 in upper Marble Canyon.**

- The mass balance in upper Marble Canyon was increasingly positive from August 15 to October 15, 2010.

- **All monitoring reaches between Lees Ferry and Diamond Creek had a positive mass balance as of October 15, 2010.**

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Preliminary results – subject to review and revision

Comparison of 2010 sand accumulation with accumulation leading up to 2004 and 2008 high flows

Reach	July 1 2004 to 2004 HFE	End of 2004 HFE to start of 2008 HFE	End of 2008 HFE to Oct. 15, 2010*
RM 0 to 30	0.4 ± 0.1	1.2 ± 0.6	~ 1.0**
RM 30 to 61	0.1 ± 0.05	0.5 ± 0.3	~ 0.1 to 0.5**
RM 61 to 87	0.0 ± 0.05	0.8 ± 0.7	~ 0.5 to 0.8**
RM 87 to 225	0.2 ± 0.1	0.9 ± 0.4	~ 1.0**

All values in million metric tons.

*Budget was negative until August 15, 2010.

** Values are preliminary and uncertainty has not yet been assigned.

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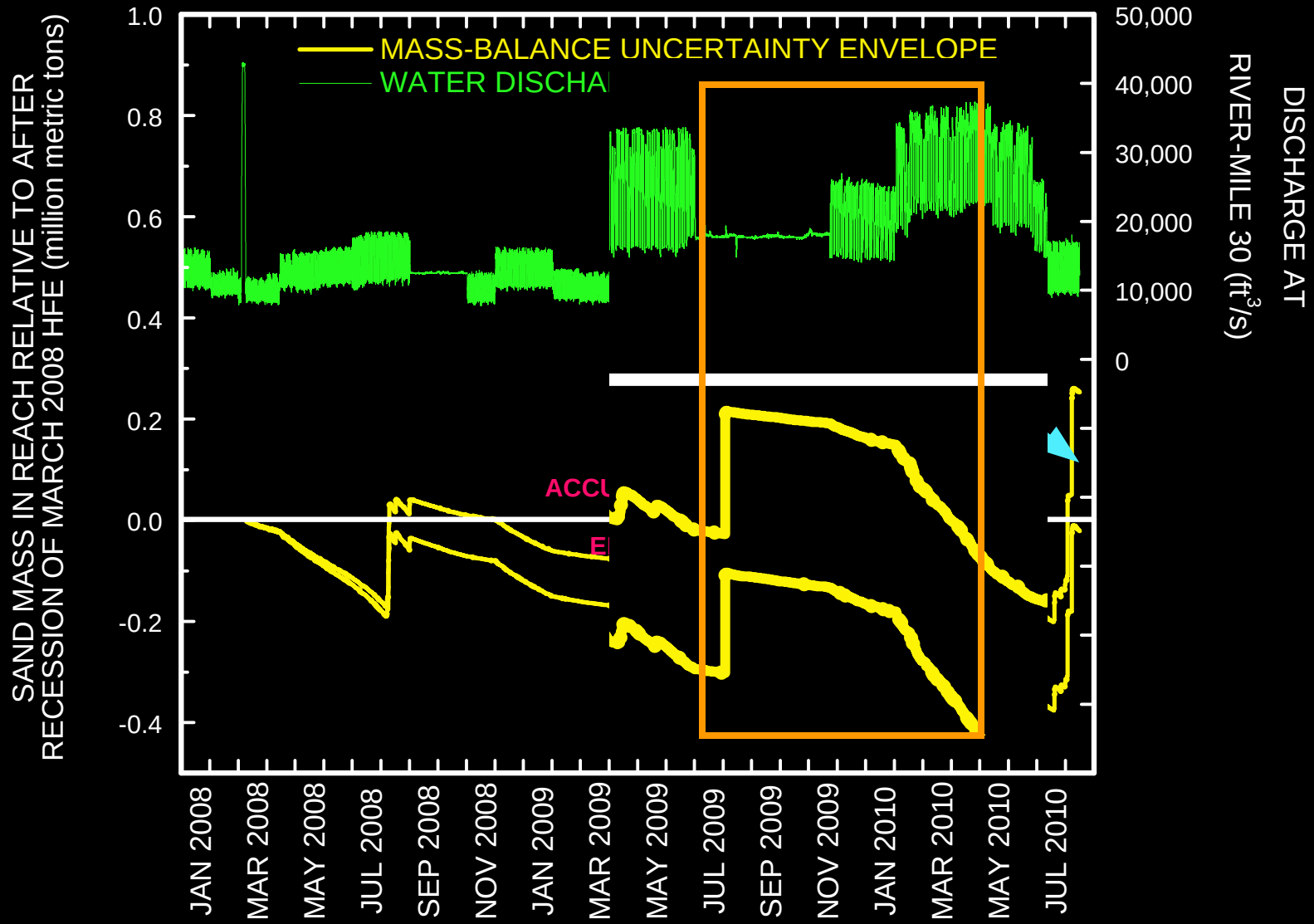
Preliminary results – subject to review and revision

Transition from fall steady to winter fluctuating flows will increase the rate of sand transport



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Preliminary results – subject to review and revision

Summary

- Water temperature at Lees Ferry and Diamond Creek is about average.
- Turbidity in Marble Canyon has been relatively high.
- There has been above average sand input in July through October, with sufficient retention for a high flow in fall 2010 of 45,000 cfs magnitude and 96 hour duration.
- Winter fluctuating flows (currently 9,000 to 16,000 cfs) will export sand.

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Preliminary results – subject to review and revision