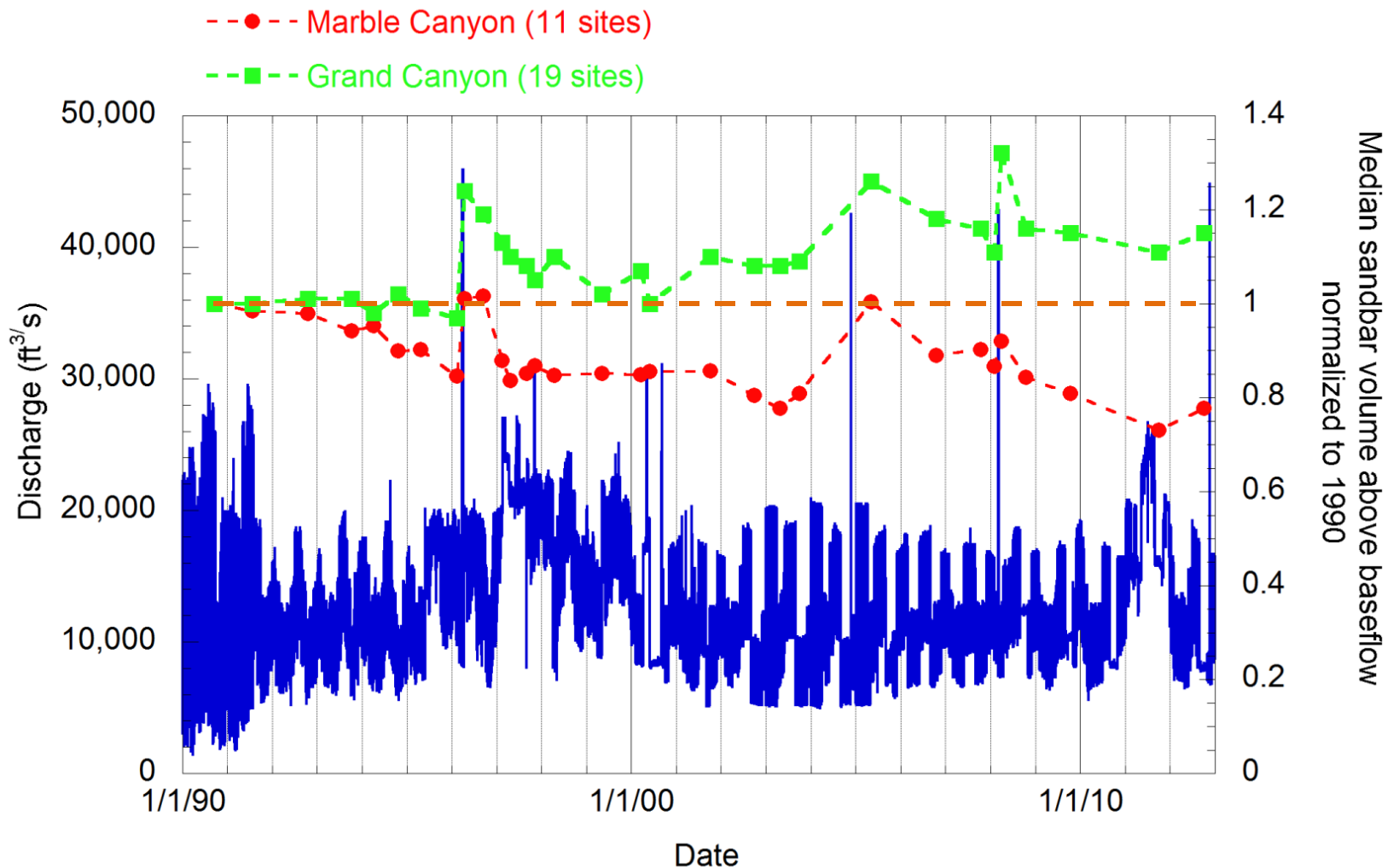


GCMRC Update – status of resources and sediment conditions

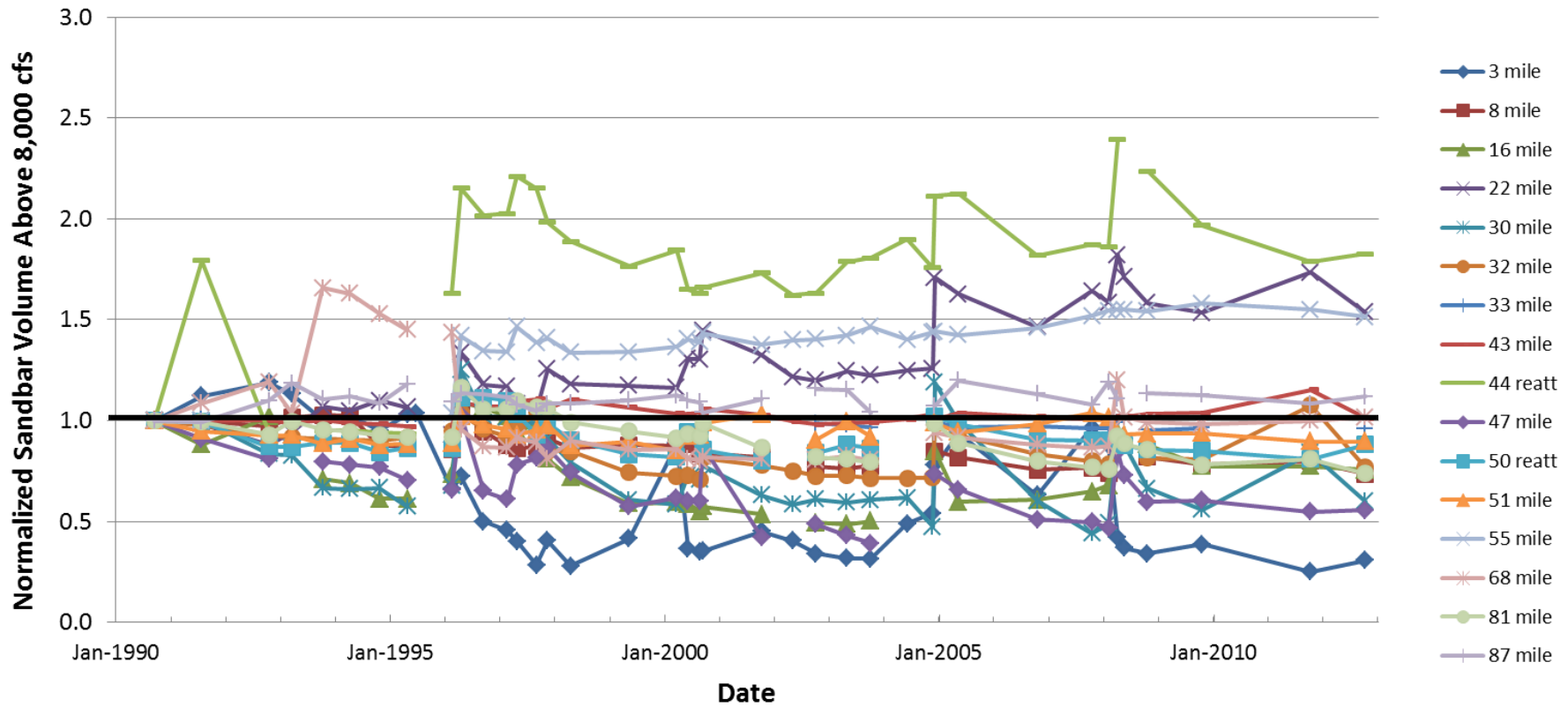
Jack Schmidt and Scott VanderKooi

Southwest Biological Science Center
Grand Canyon Monitoring and Research Center

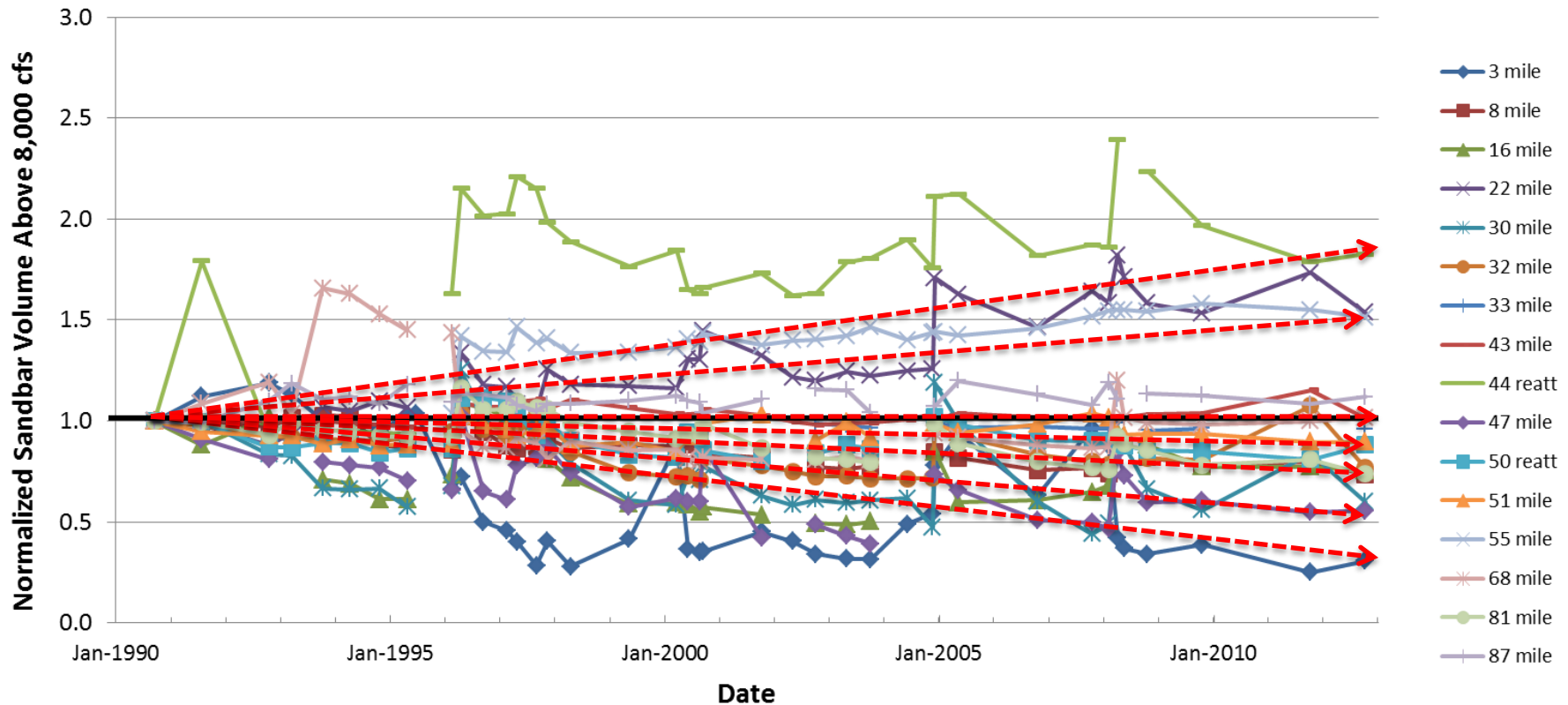
Immediately before the 2012 HFE, sand bars in Marble Canyon were as small as they had been since monitoring began in 1990; bars were larger in Grand Canyon



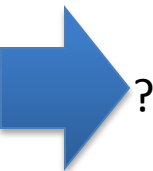
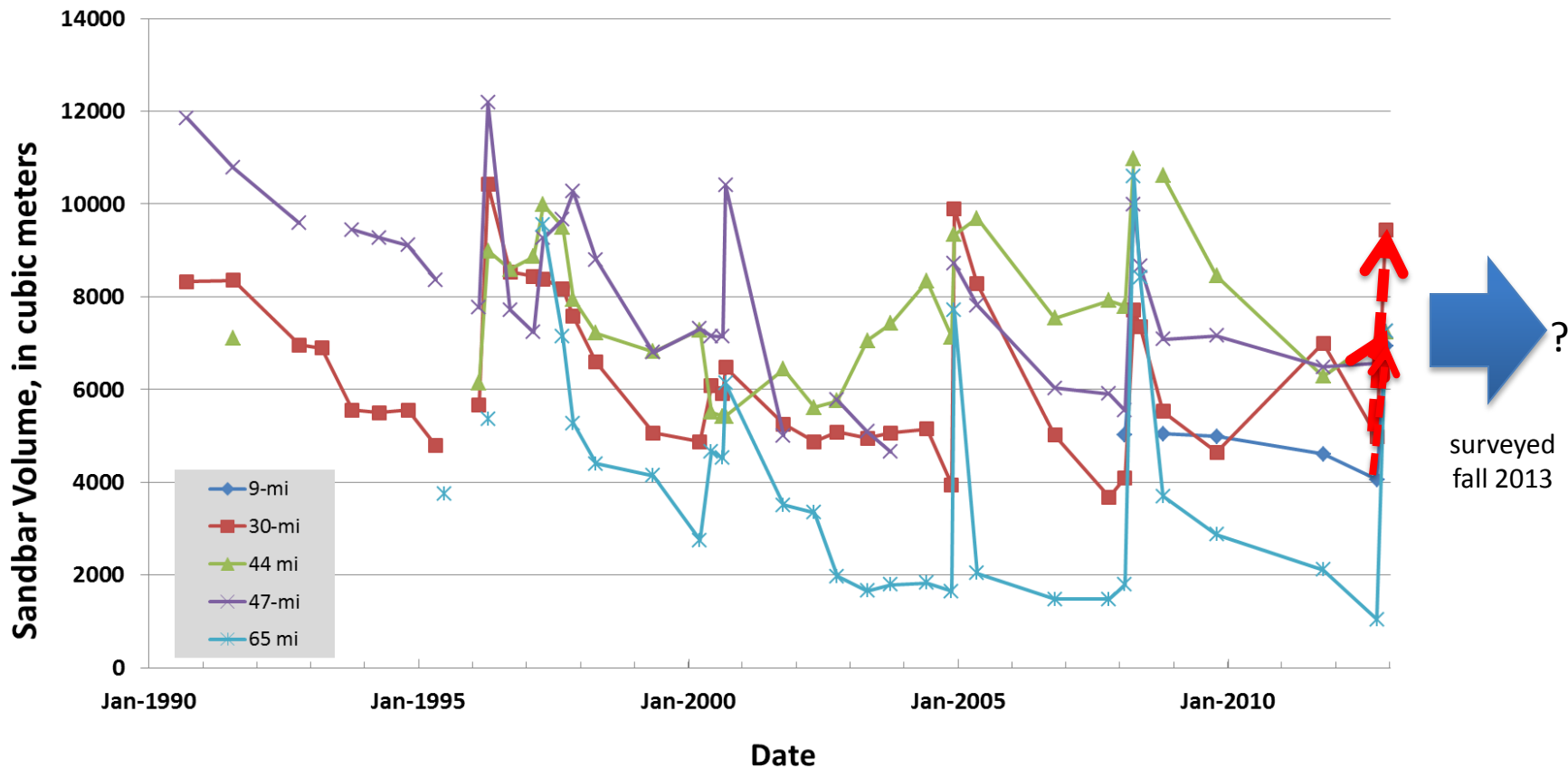
Although the median trend in Marble Canyon is negative, there are sites that have increased since 1990



Although the median trend in Marble Canyon is negative, there are sites that have increased since 1990

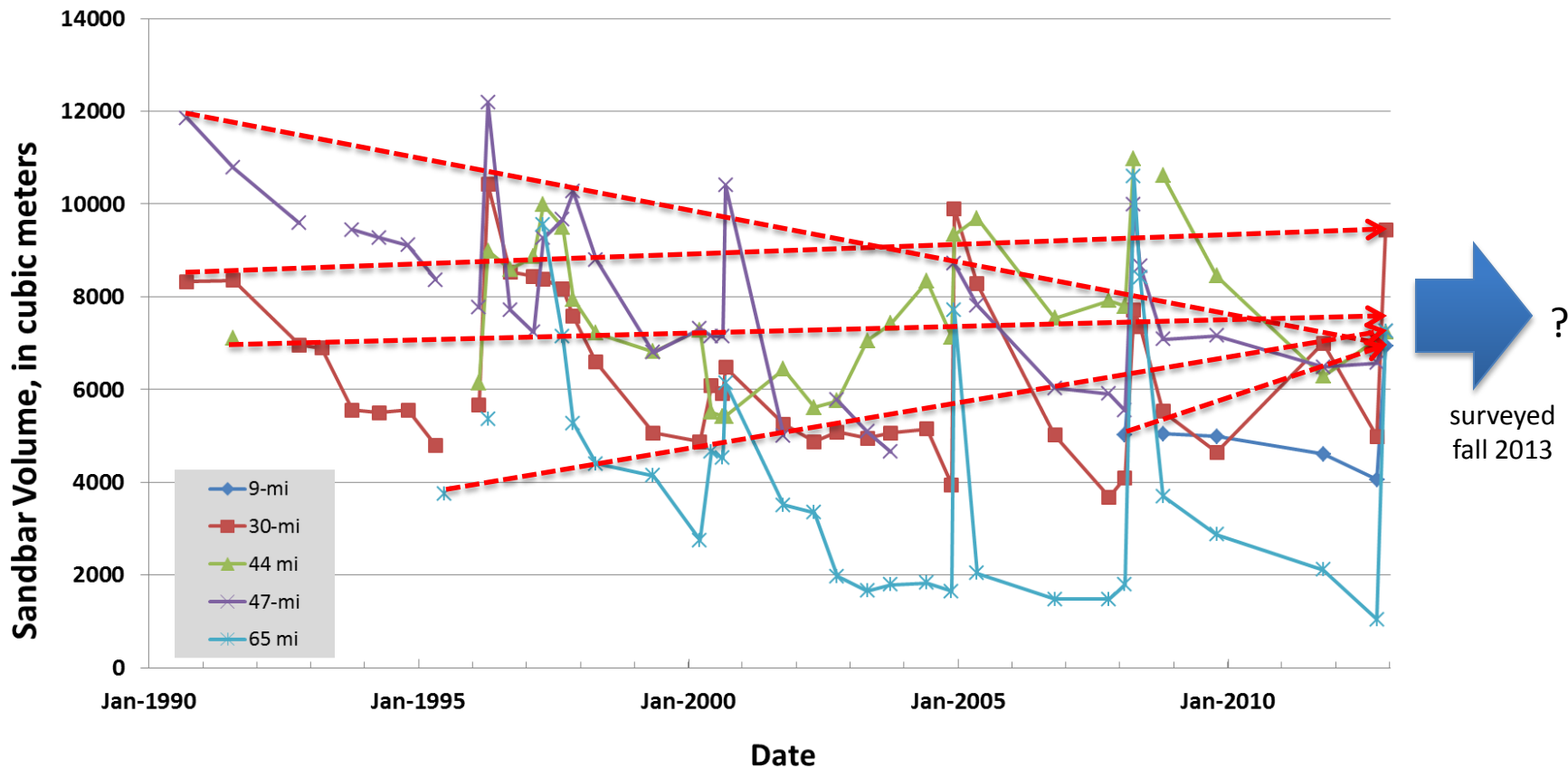


5 sandbars surveyed immediately after the 2012 HFE all increased in volume



surveyed
fall 2013

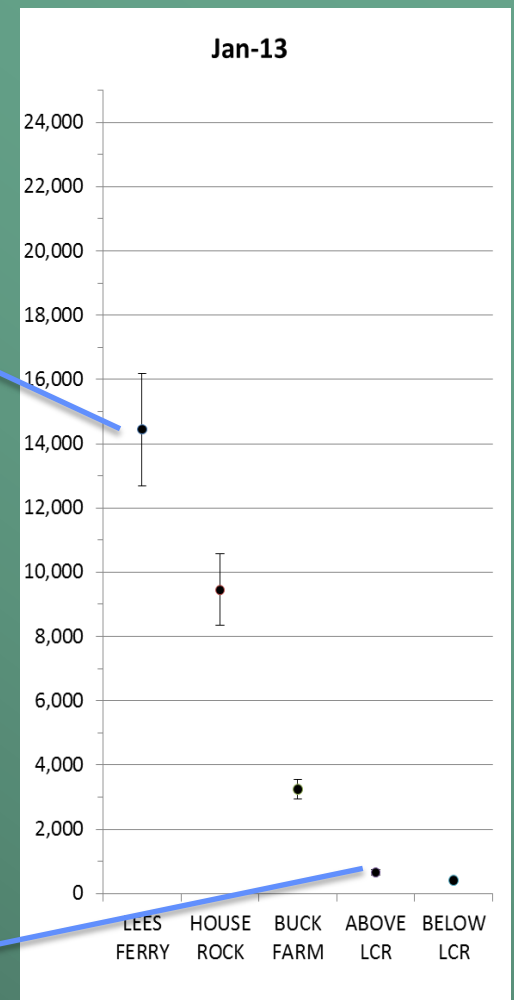
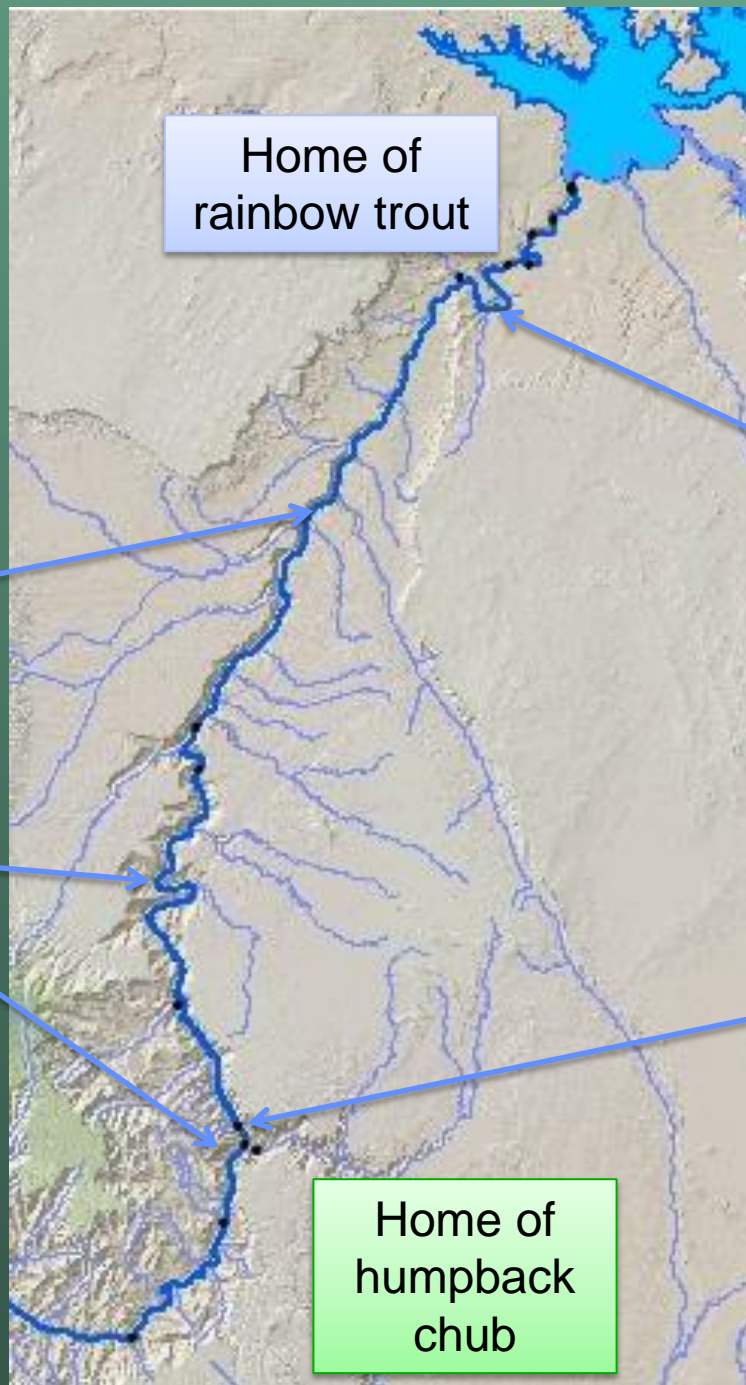
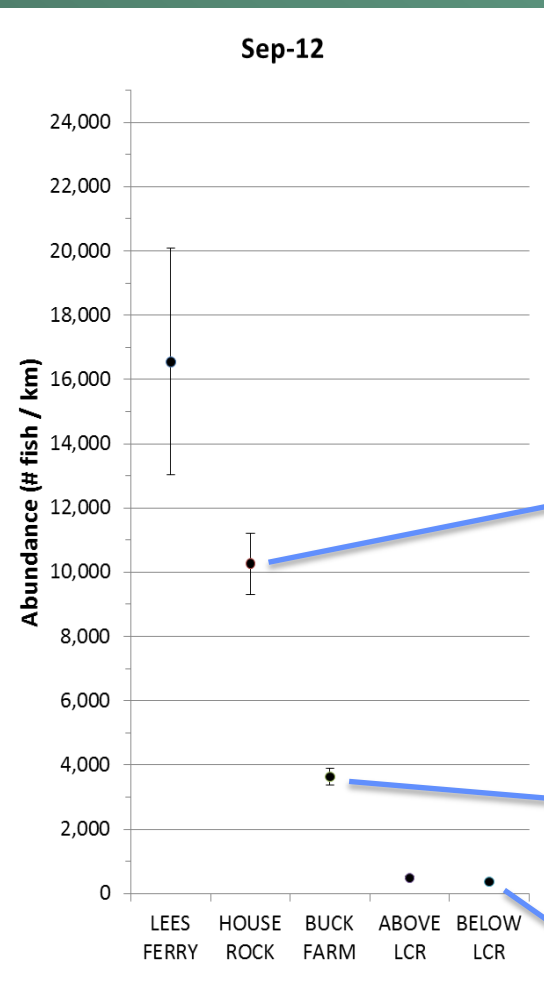
5 sandbars surveyed immediately after the 2012 HFE all increased in volume



surveyed
fall 2013

Most sandbars constructed by the 2012 HFE were subsequently eroded

- **Response immediately after HFE**
 - **Substantial Gain (deposition): 18 sandbars (55% of sites)**
 - No substantial change: 12 sandbars (36% of sites)
 - Substantial Loss (erosion): 3 sandbars (9% of sites)
- **Sandbar condition in May 2013 (before summer fluctuations peaking at 18,000 ft³/s)**
 - Still somewhat larger (8 sites)
 - **About the same as pre-HFE size (14 sites)**
 - Smaller than pre-HFE (7 sites)



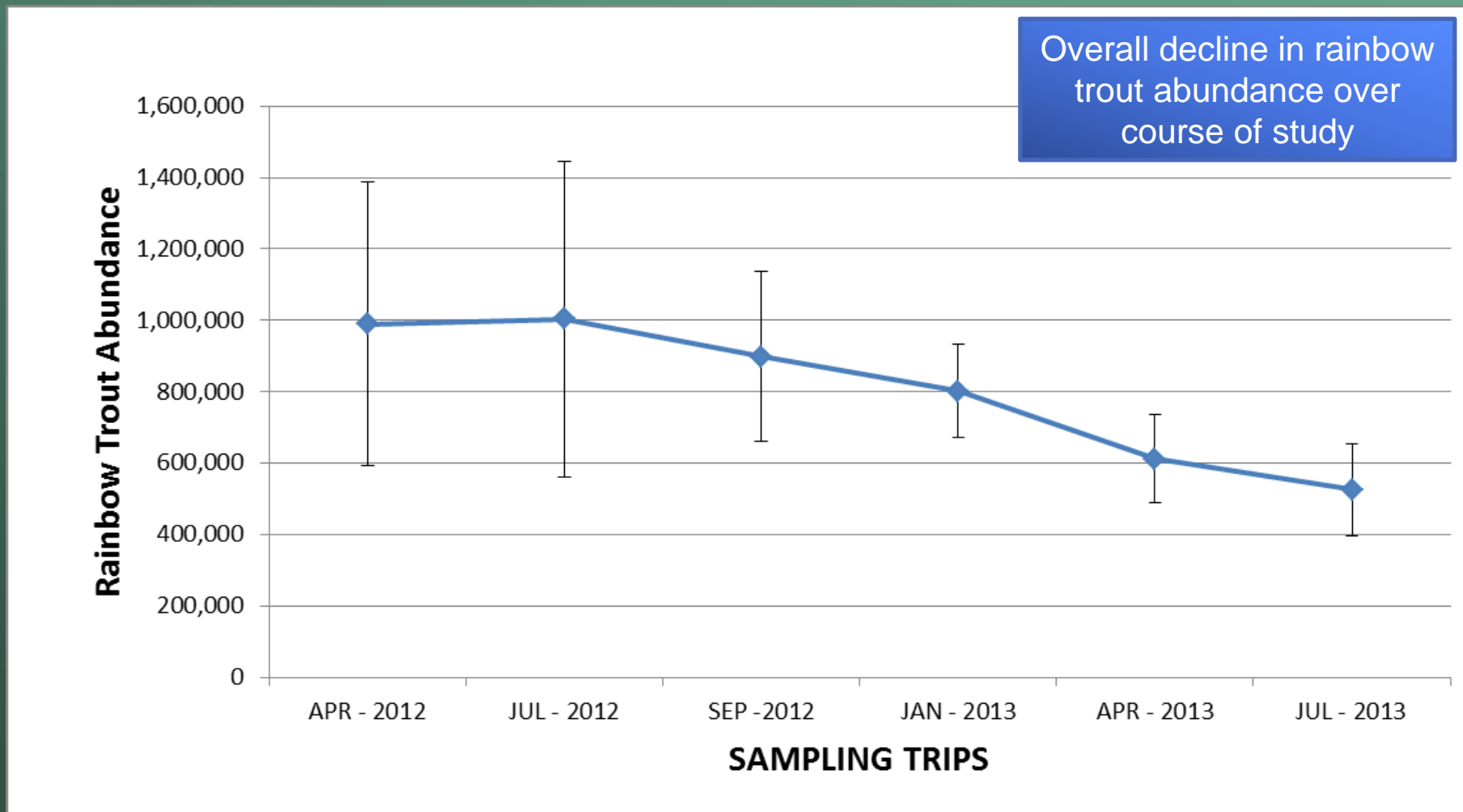
(Preliminary Data from Korman and Yard 2013. Do Not Cite.)



Home of humpback chub

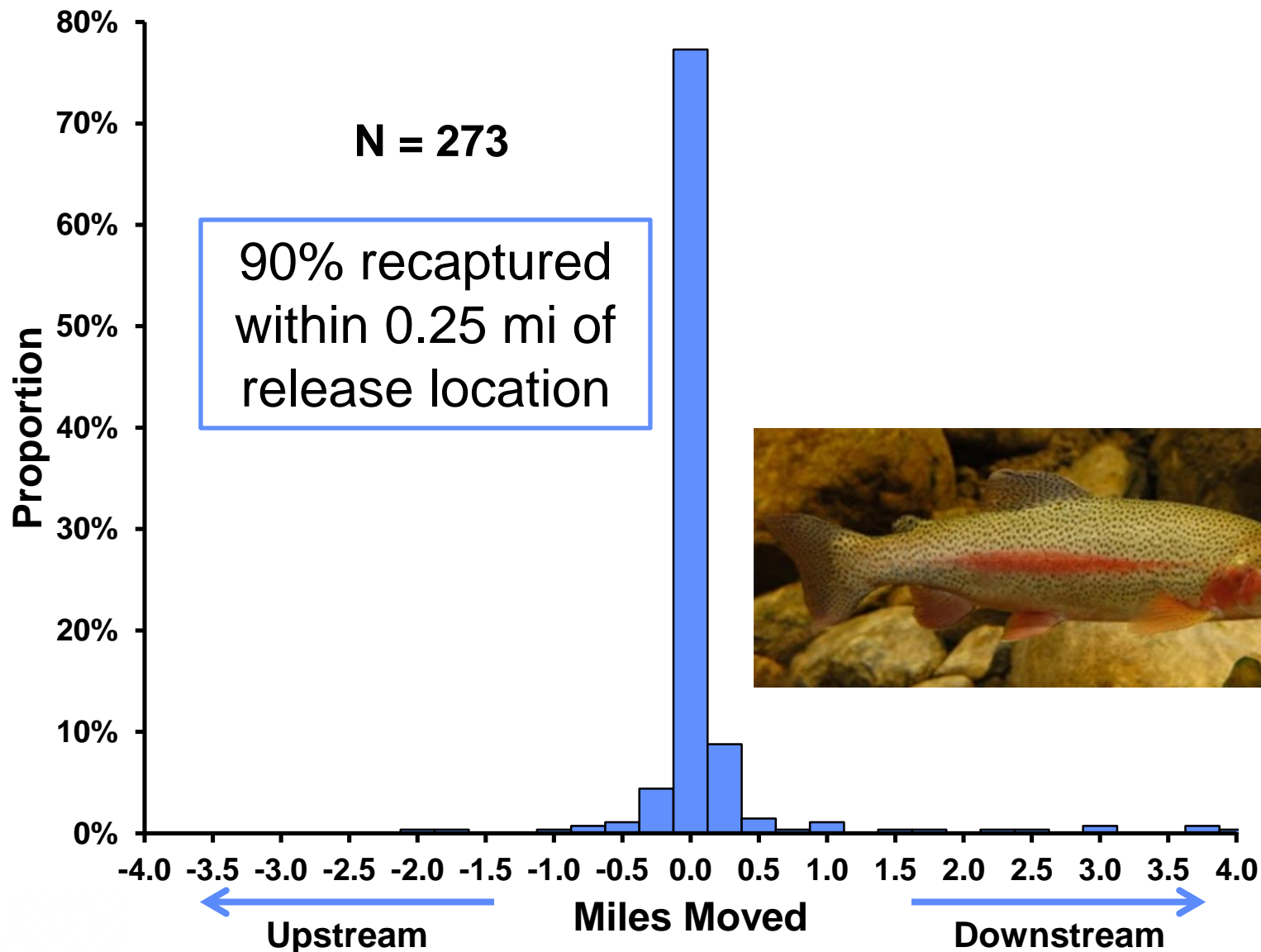
Pre & Post HFE: Rainbow trout populations very high in the upstream third of Marble Canyon, but very low where humpback chub live

Rainbow Trout Abundance Estimates: Glen Canyon Dam – Below LCR



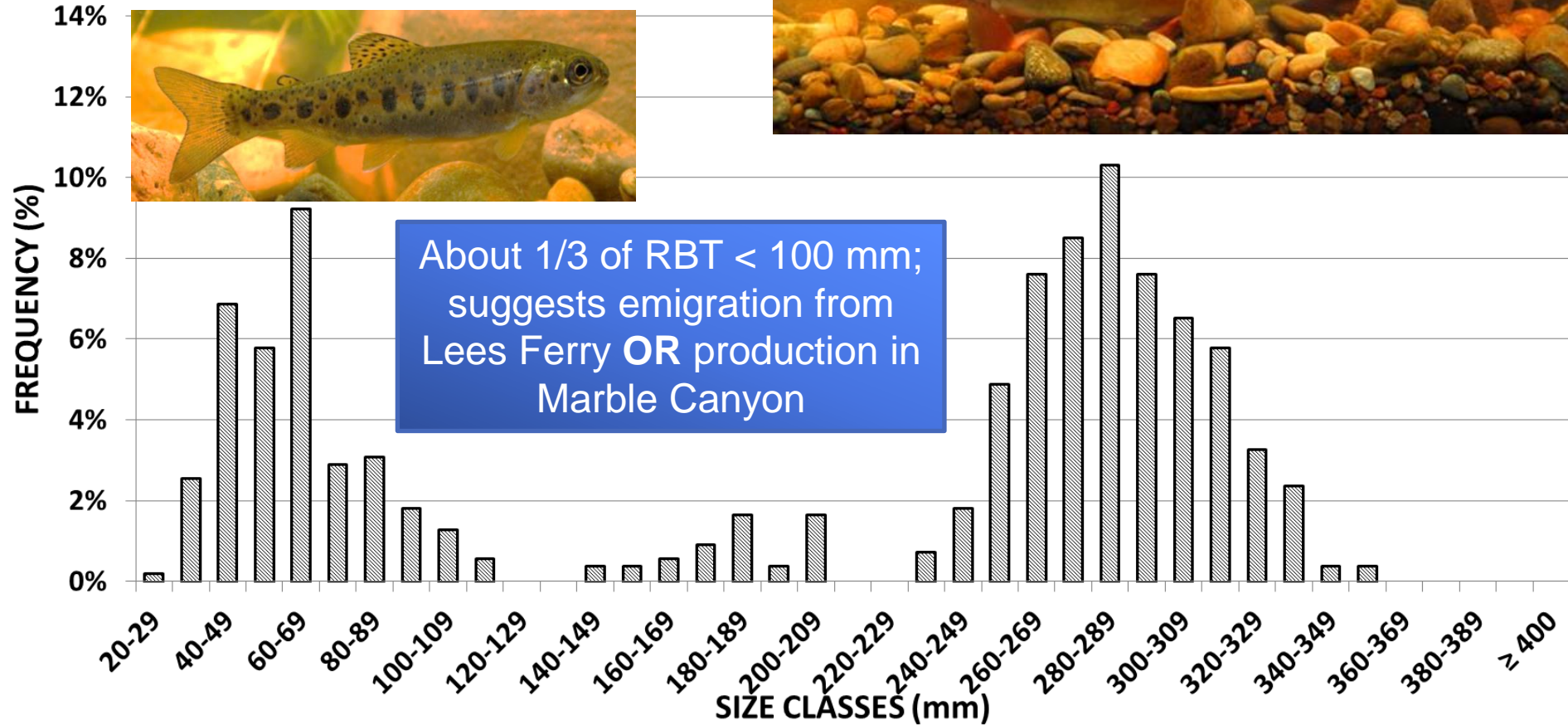
(Preliminary Data from Korman and Yard 2013, Do Not Cite)

Age-0 Rainbow Trout Movement in Glen Canyon: October to December 2012



Rainbow Trout Length Frequency :

Below Little Colorado River Reach - July 2013

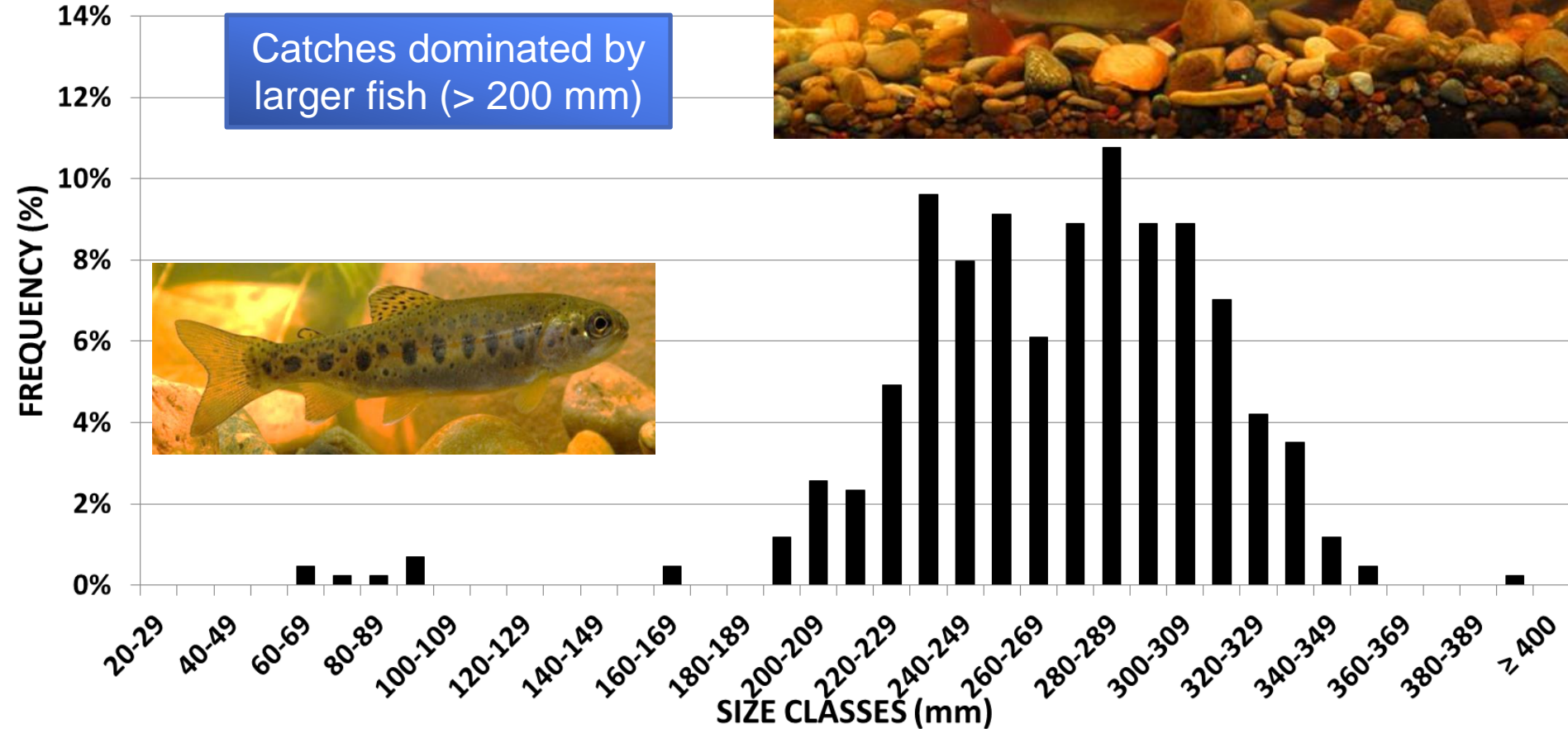


Rainbow Trout Length Frequency :

Below Little Colorado River Reach - July 2012

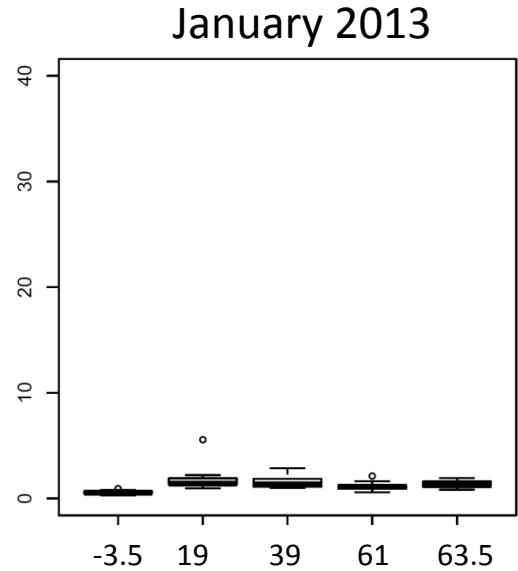
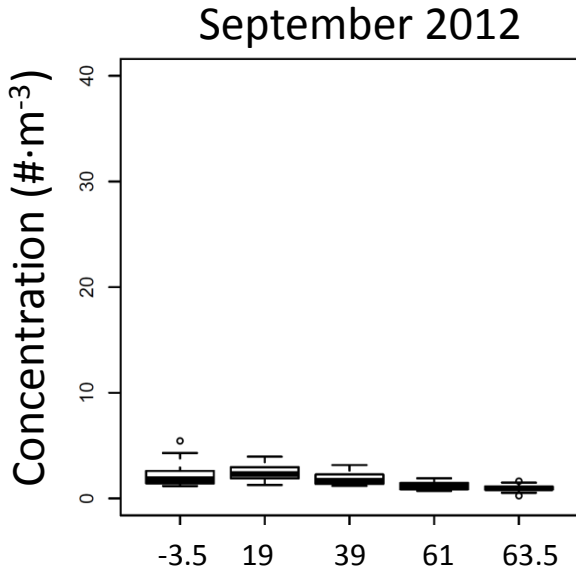
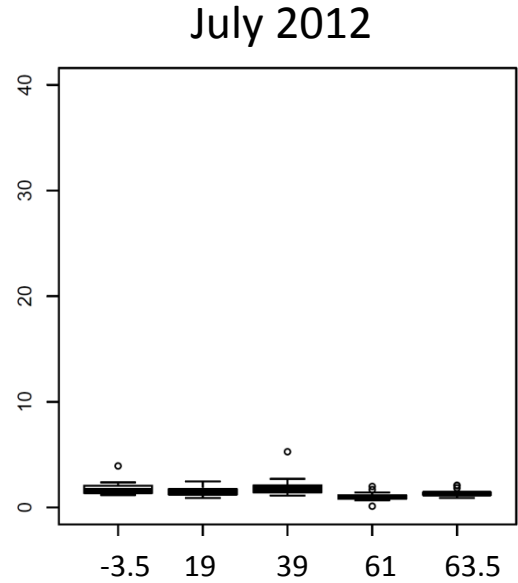
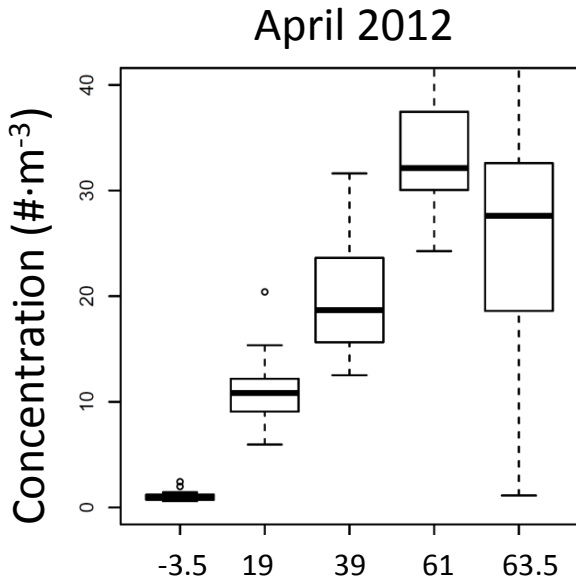


Catches dominated by larger fish (> 200 mm)



Midge Drift

No difference in midge concentrations in the drift pre & post HFE:



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TROUTNUT.COM

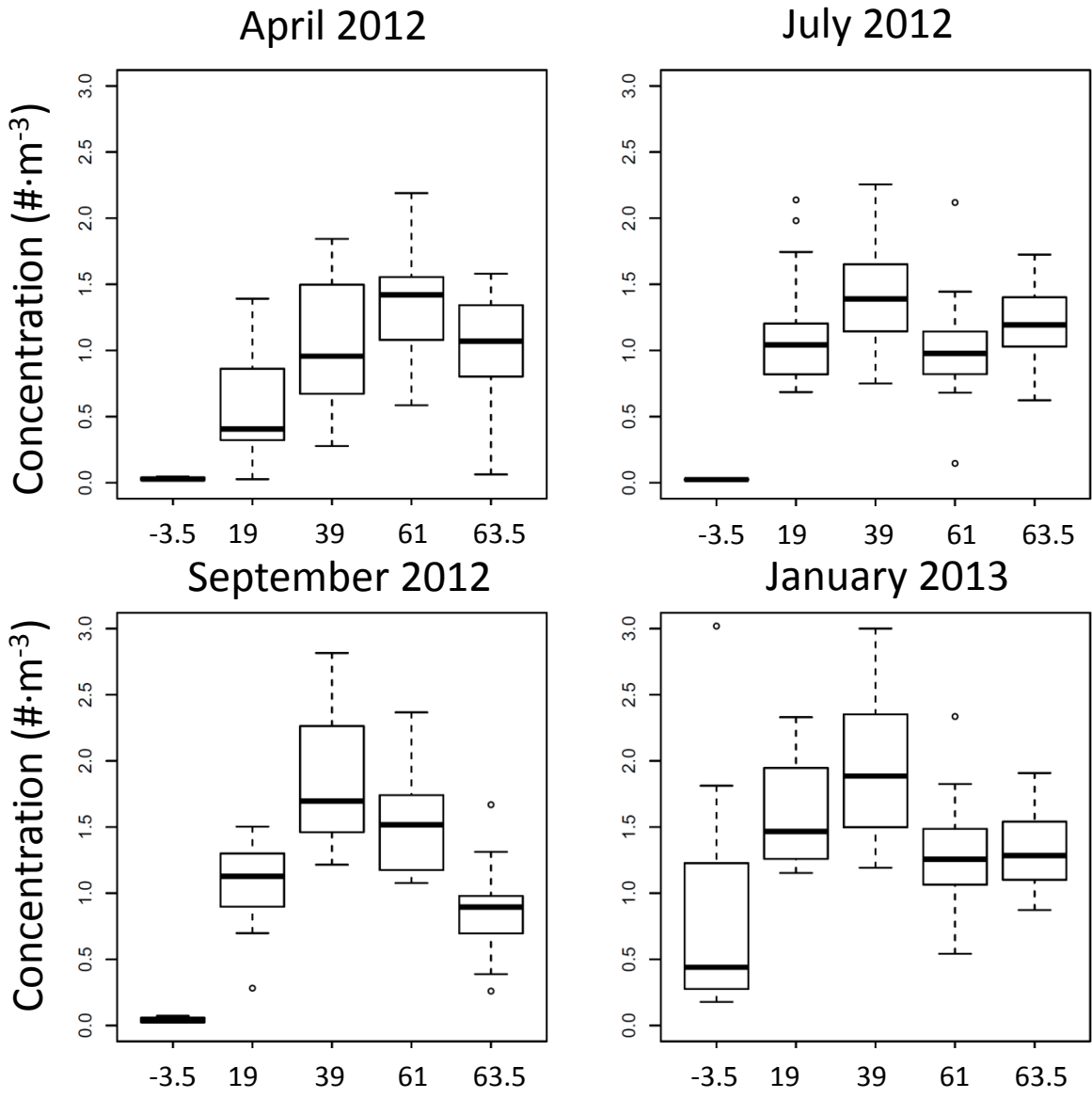


River Mile

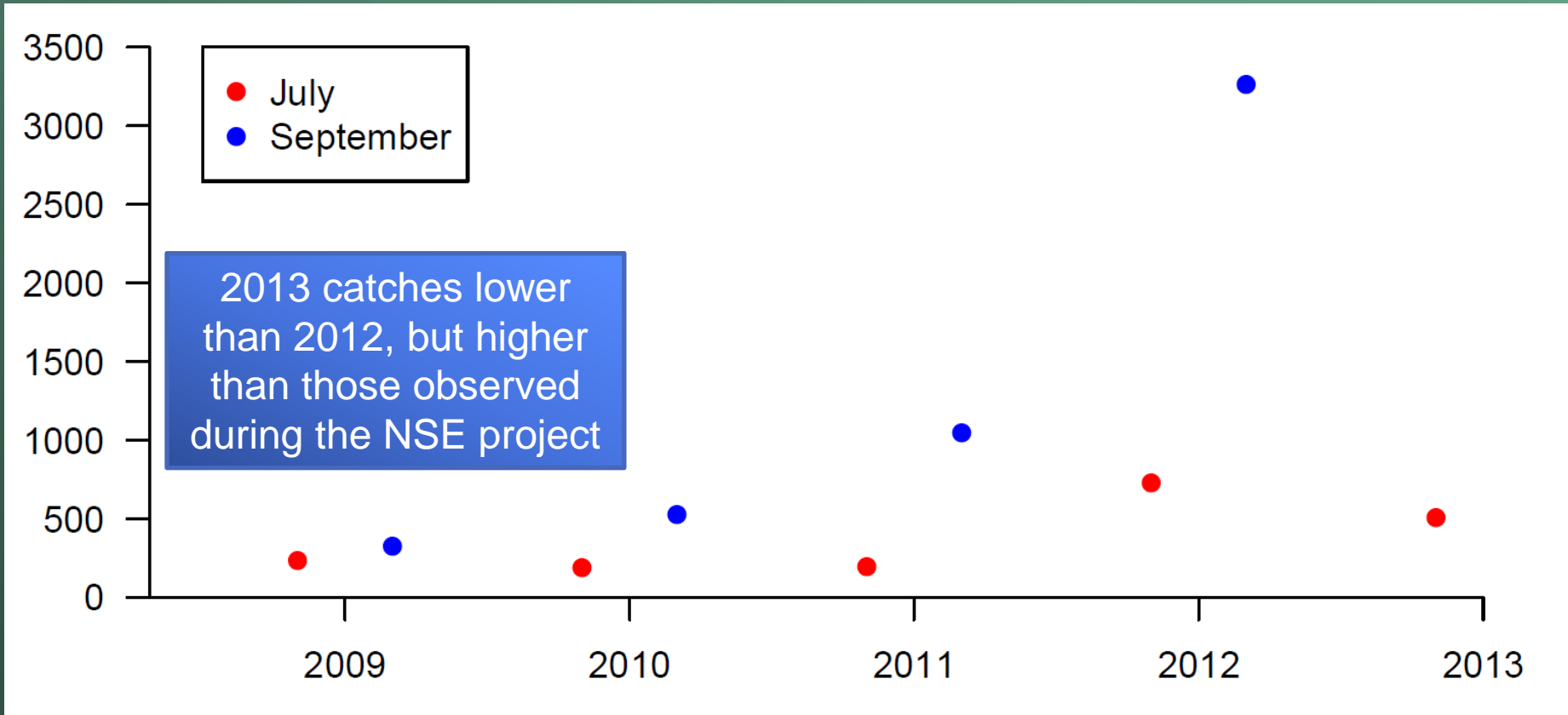
(Preliminary Data from Kennedy 2013, Do Not Cite)

Blackfly Drift

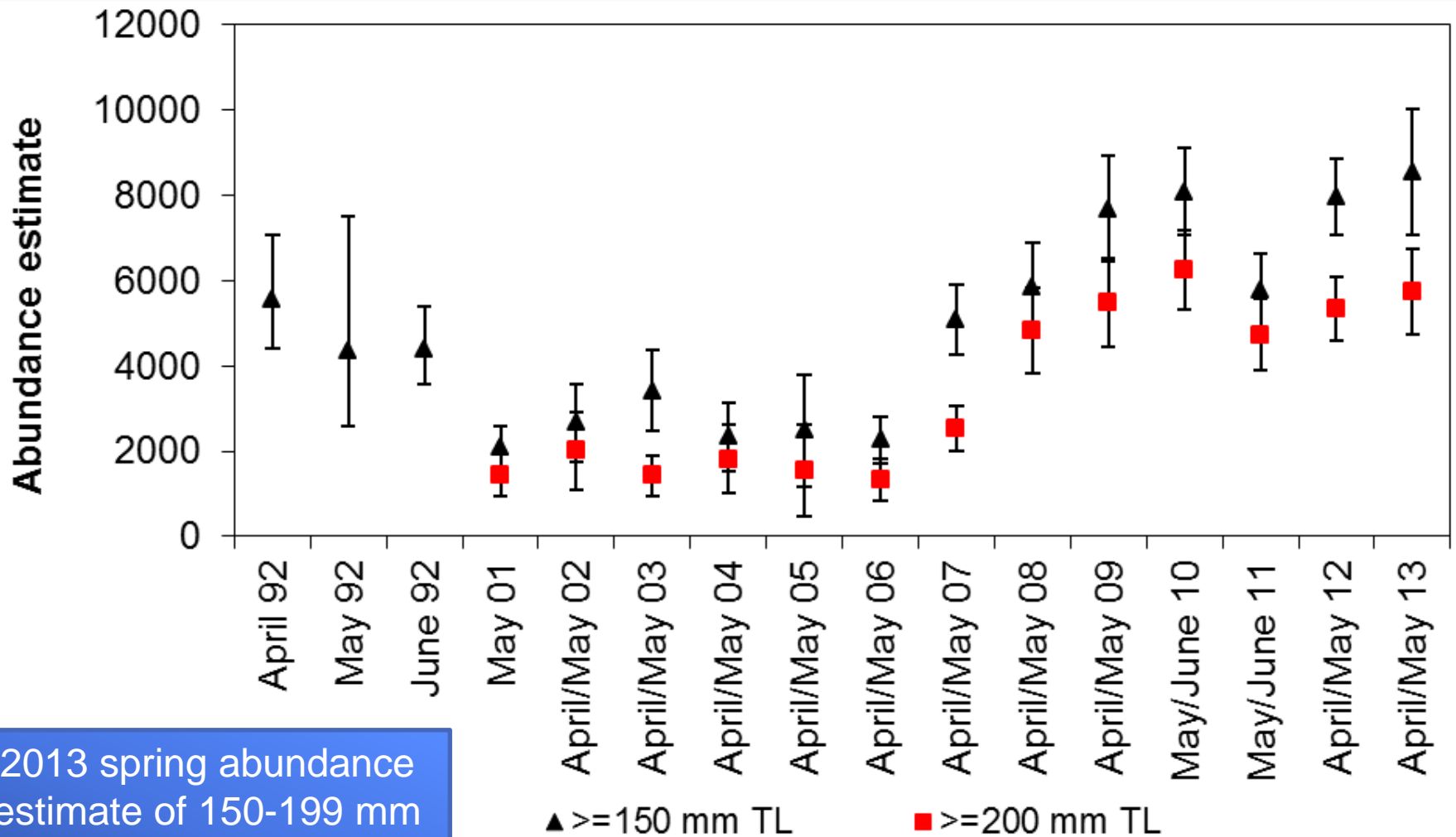
Increase in blackfly concentrations in the drift in Glen Canyon post HFE:



Juvenile Chub Monitoring: Total Catch of Humpback Chub (40 - 100 mm)

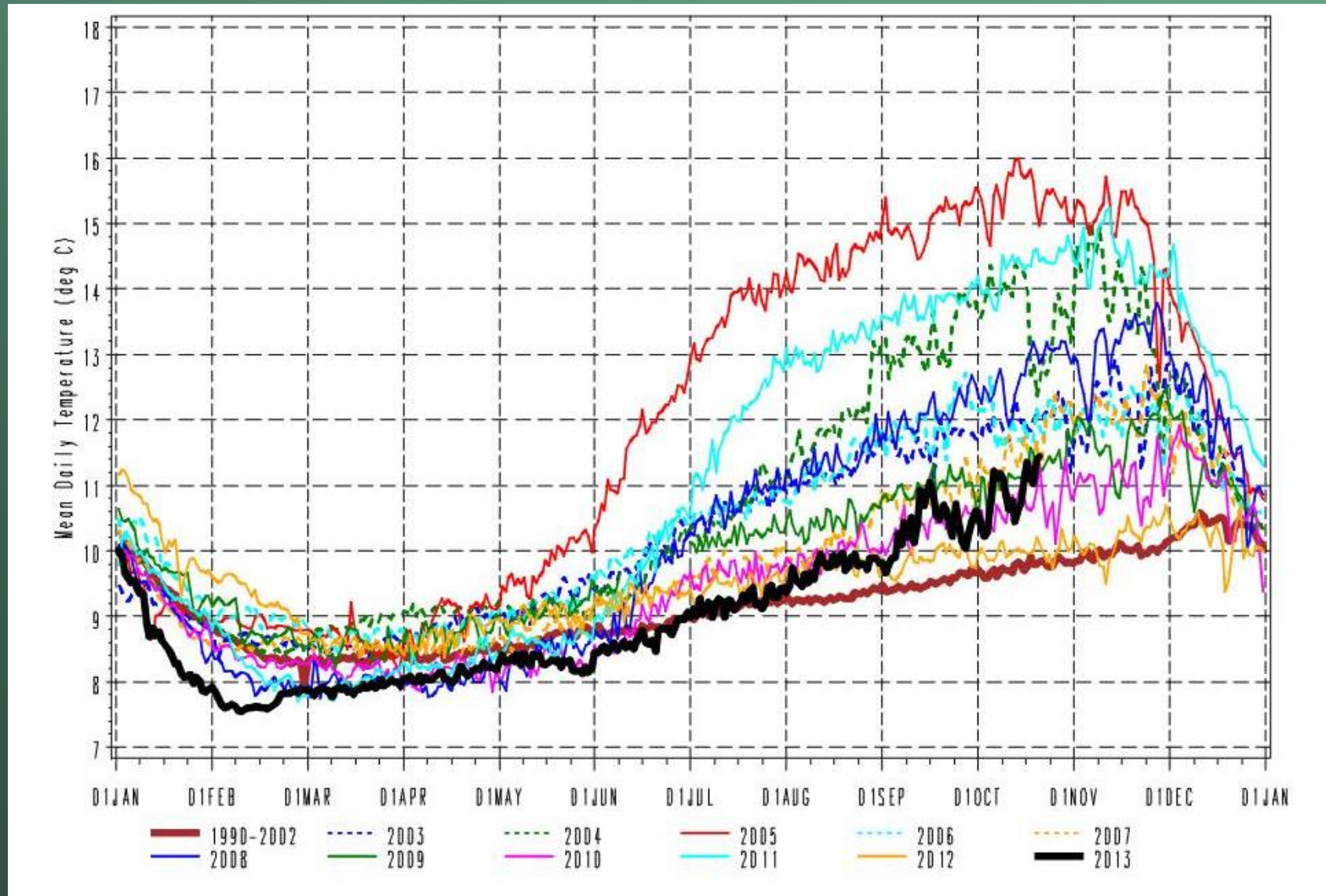


Spring abundance estimates of humpback chub in the Little Colorado River remain well above the Biological Opinion trigger



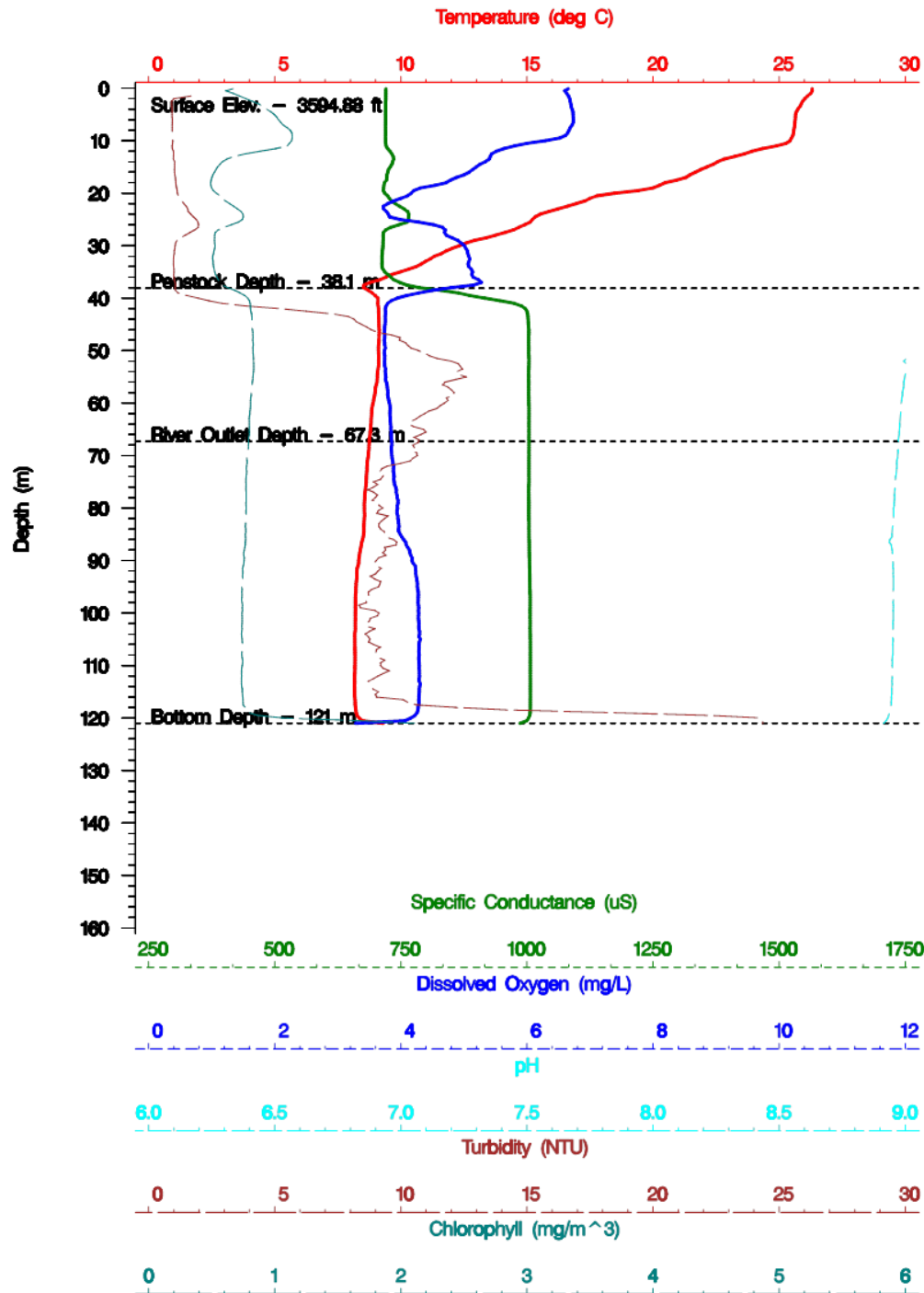
2013 spring abundance estimate of 150-199 mm HBC = 1583 (95% CI: 1234-1933)

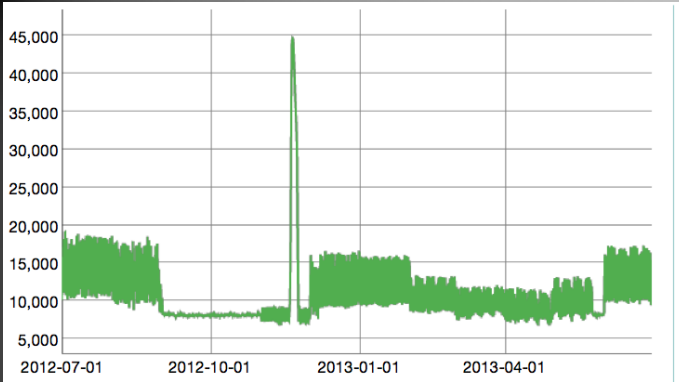
Temperature of HFE release will be ~11.5C
Release temperatures have increased greatly since August



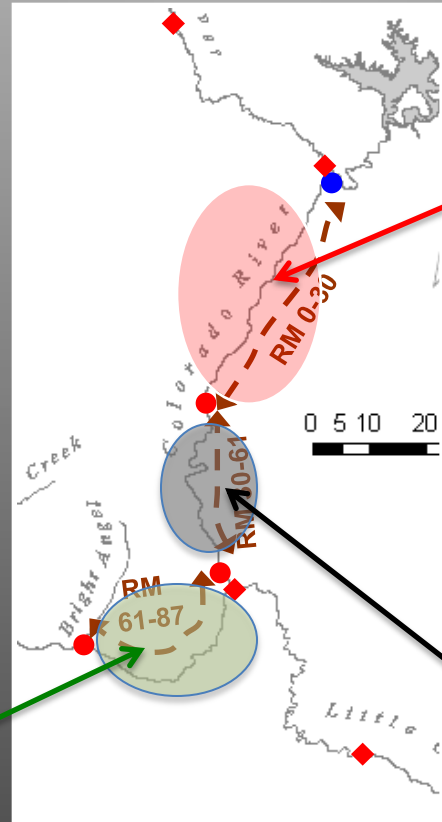
Glen Canyon Dam Forebay Water Quality Conditions: Sept. 16, 2013

(Preliminary Data from Vernieu 2013, Do Not Cite)

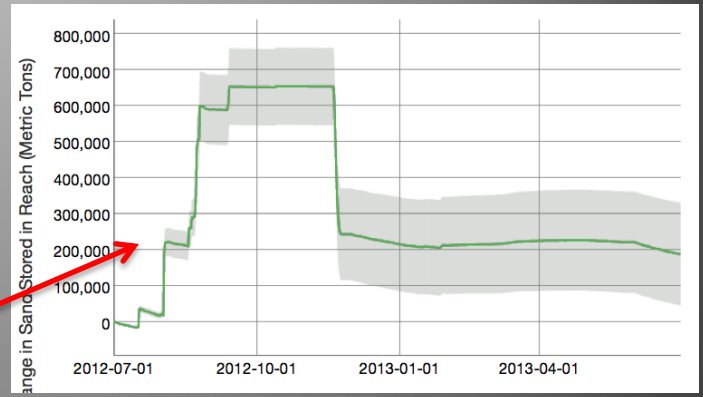




A small amount of the sand delivered to the Colorado River during the 2012 fall sediment accounting season remained in Marble Canyon at the beginning of the 2013 accounting season

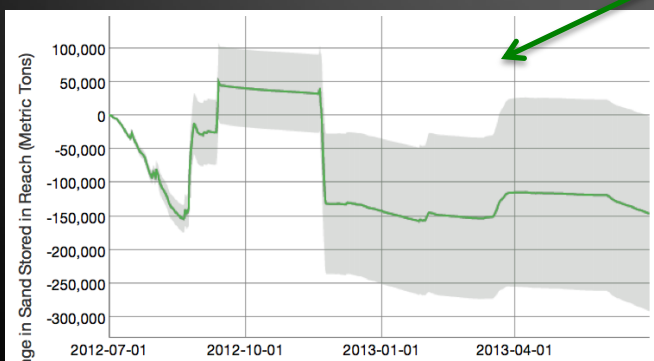


+ 190,000 mt

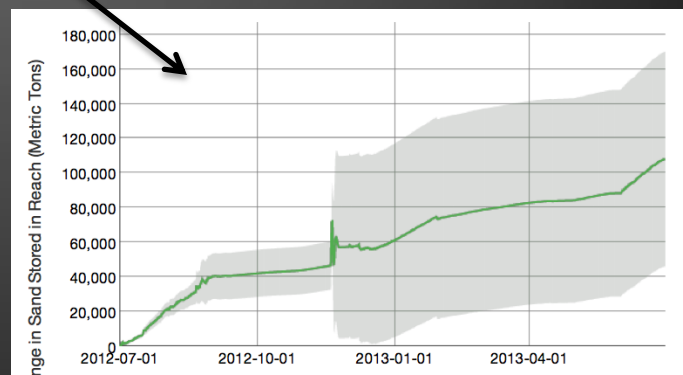


Sand mass balance
July 1, 2012, to June 30, 2013

- 150,000 mt

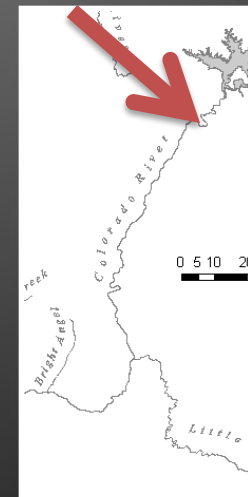
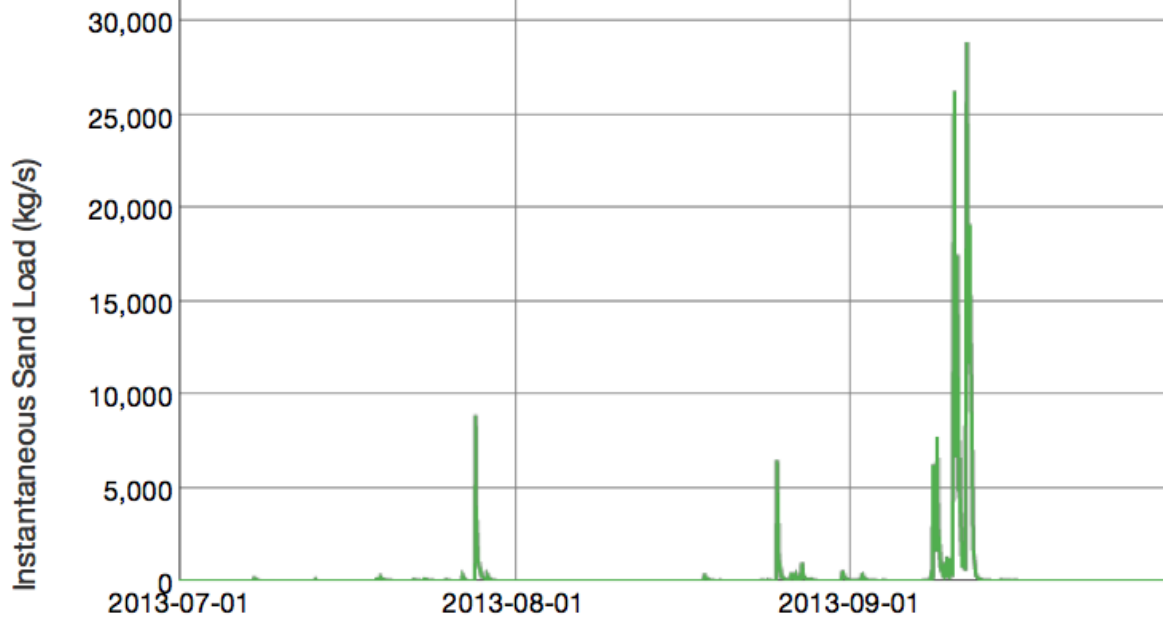
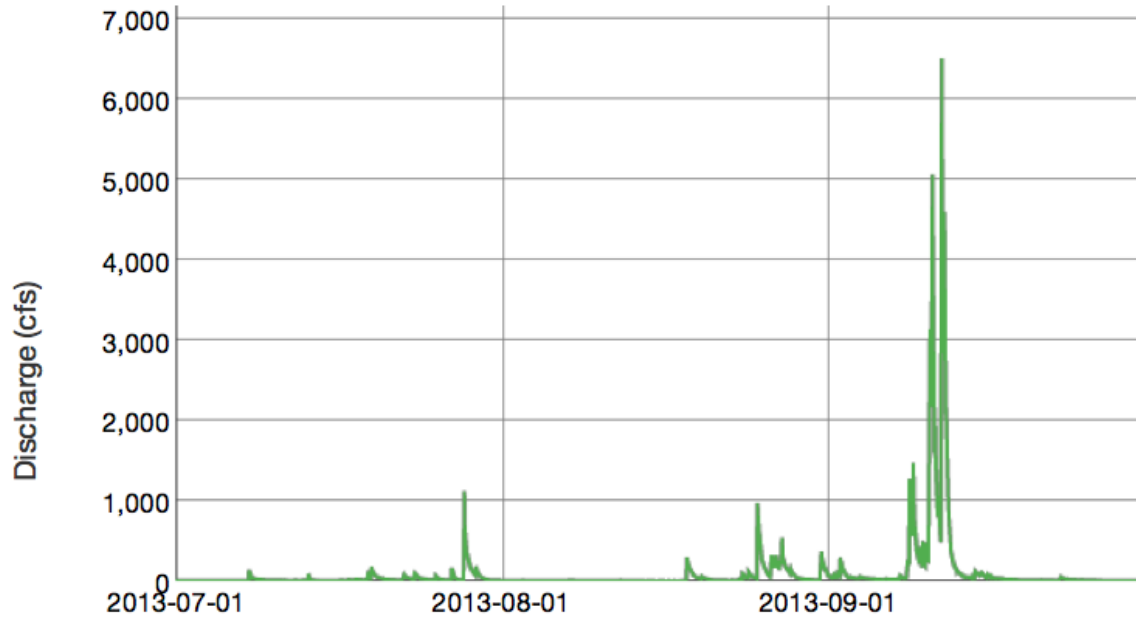


+ 110,000 mt

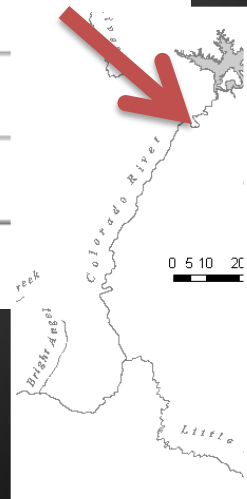
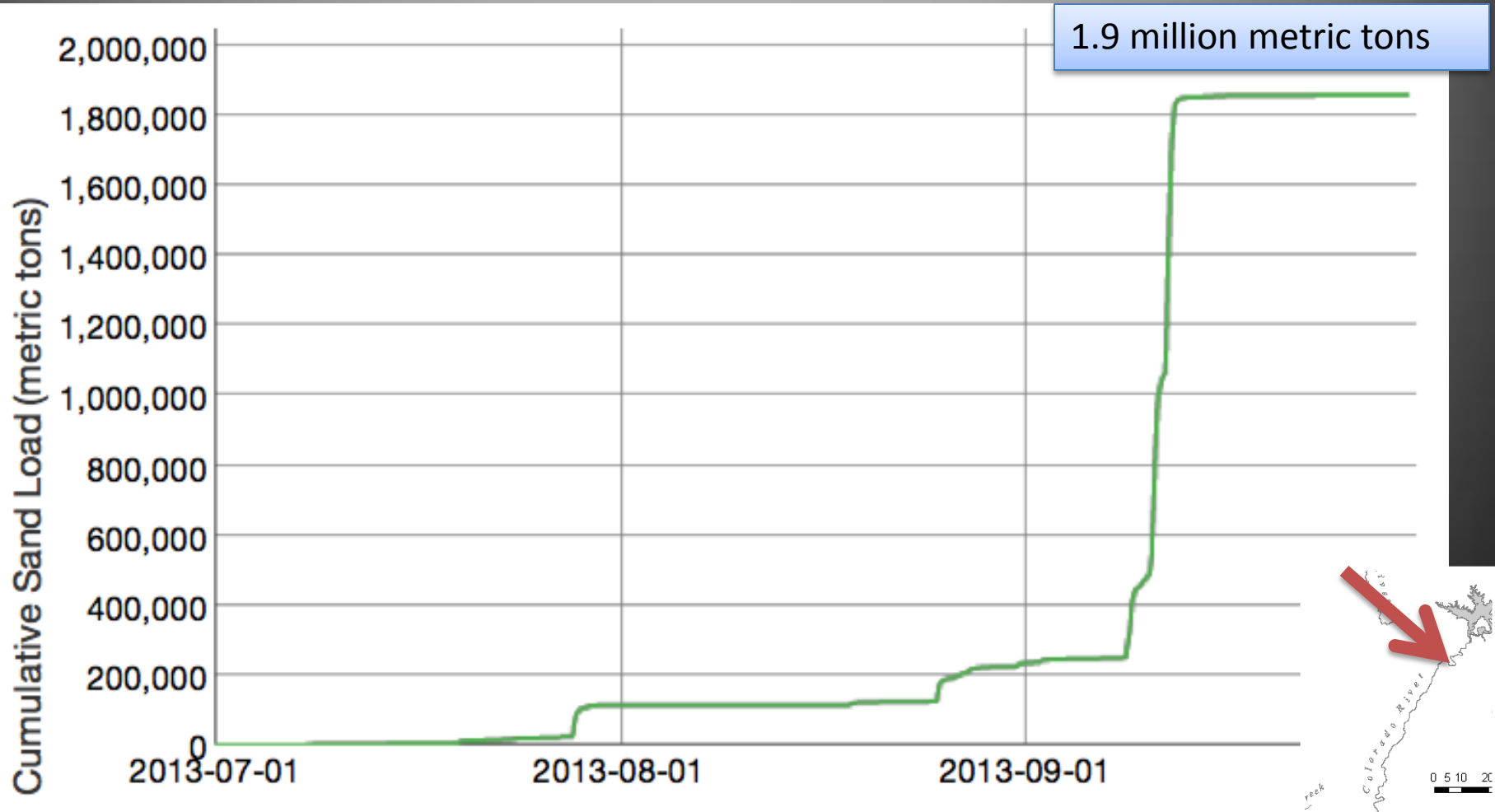


Paria inputs

July 1 – September 30, 2013



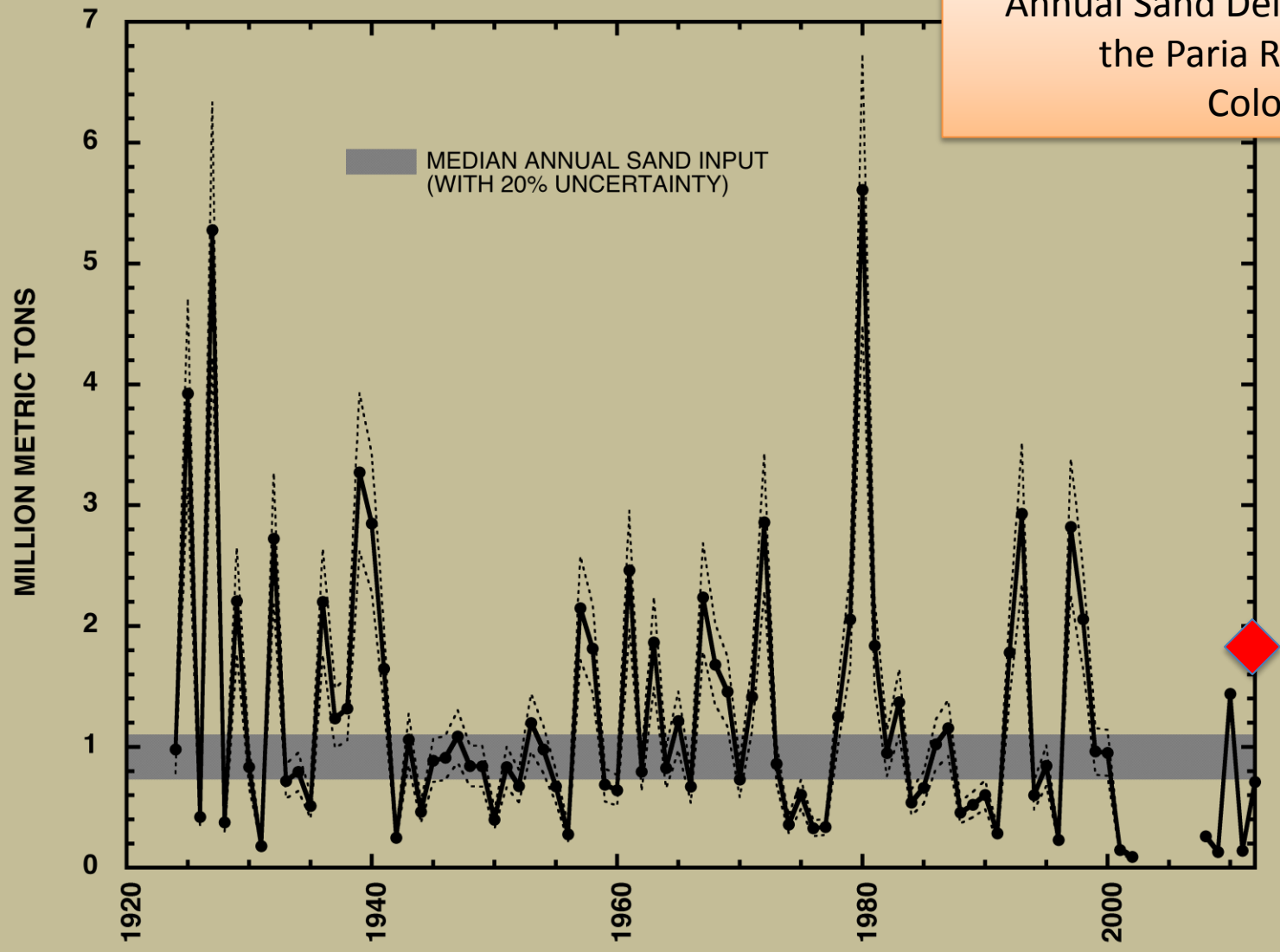
Paria inputs



July 1 – September 30, 2013

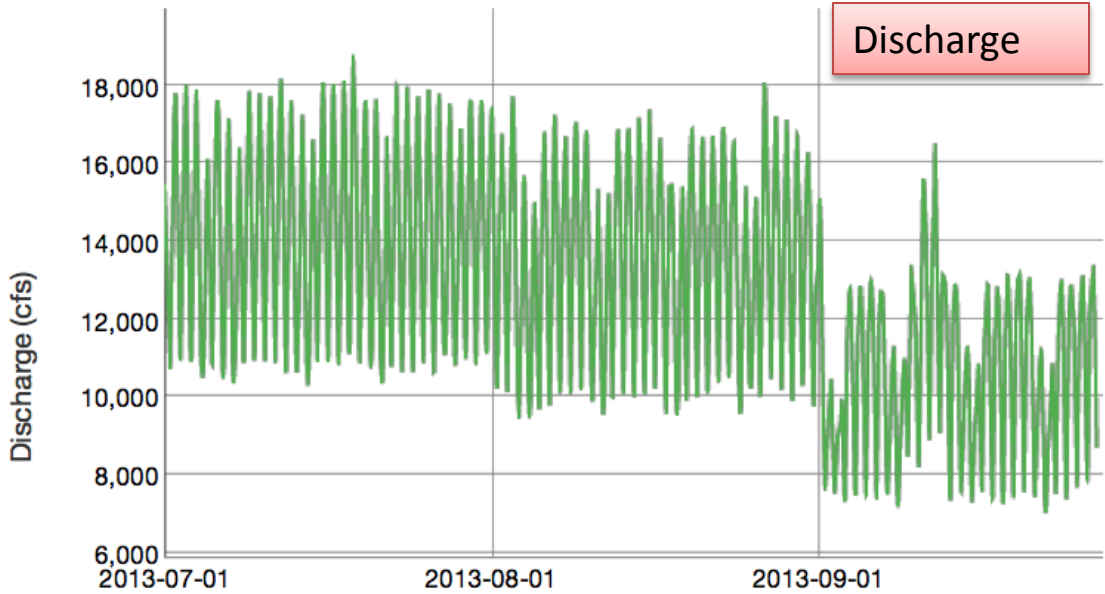
Annual Sand Delivery from the Paria River to the Colorado River

sand(million Mg)

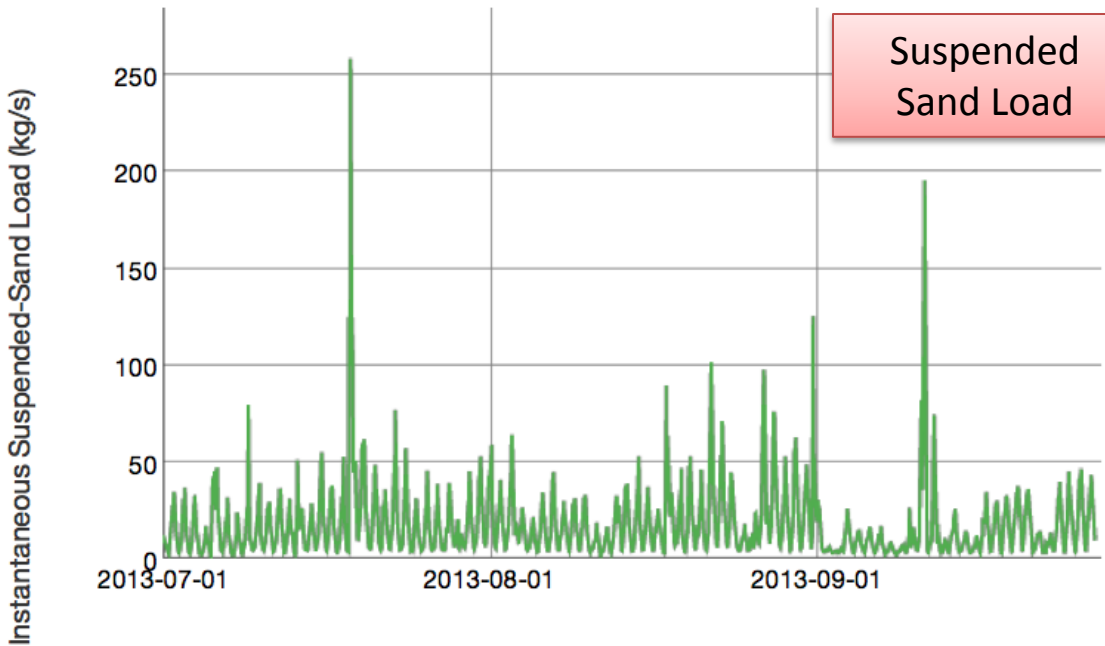


The amount of sand supplied in late summer and fall 2013 is a large amount in relation to the long-term median sand delivery

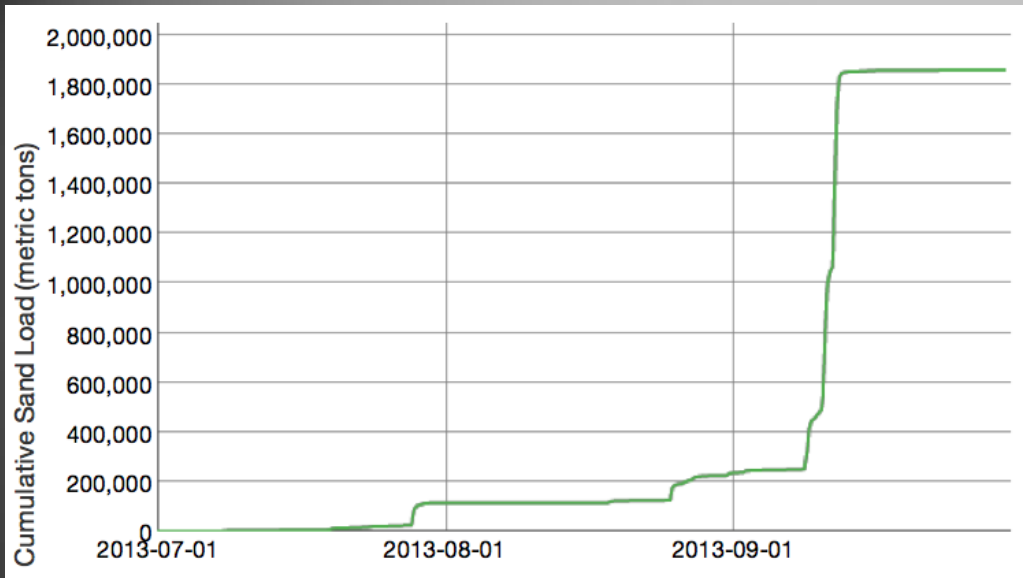




Colorado River at River
Mile 30



July 1 – September 27, 2013

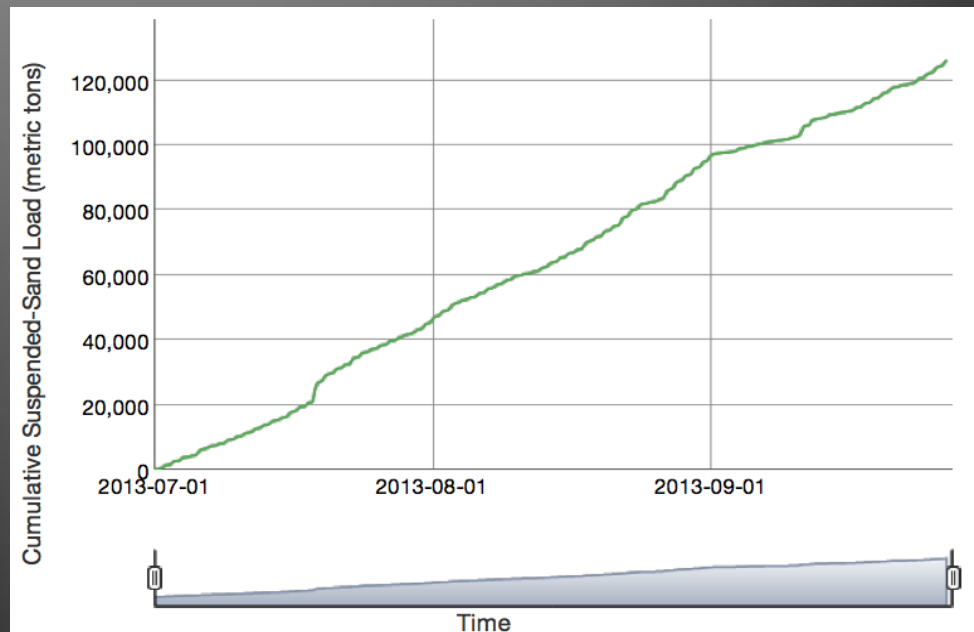


What came in
(Paria River)

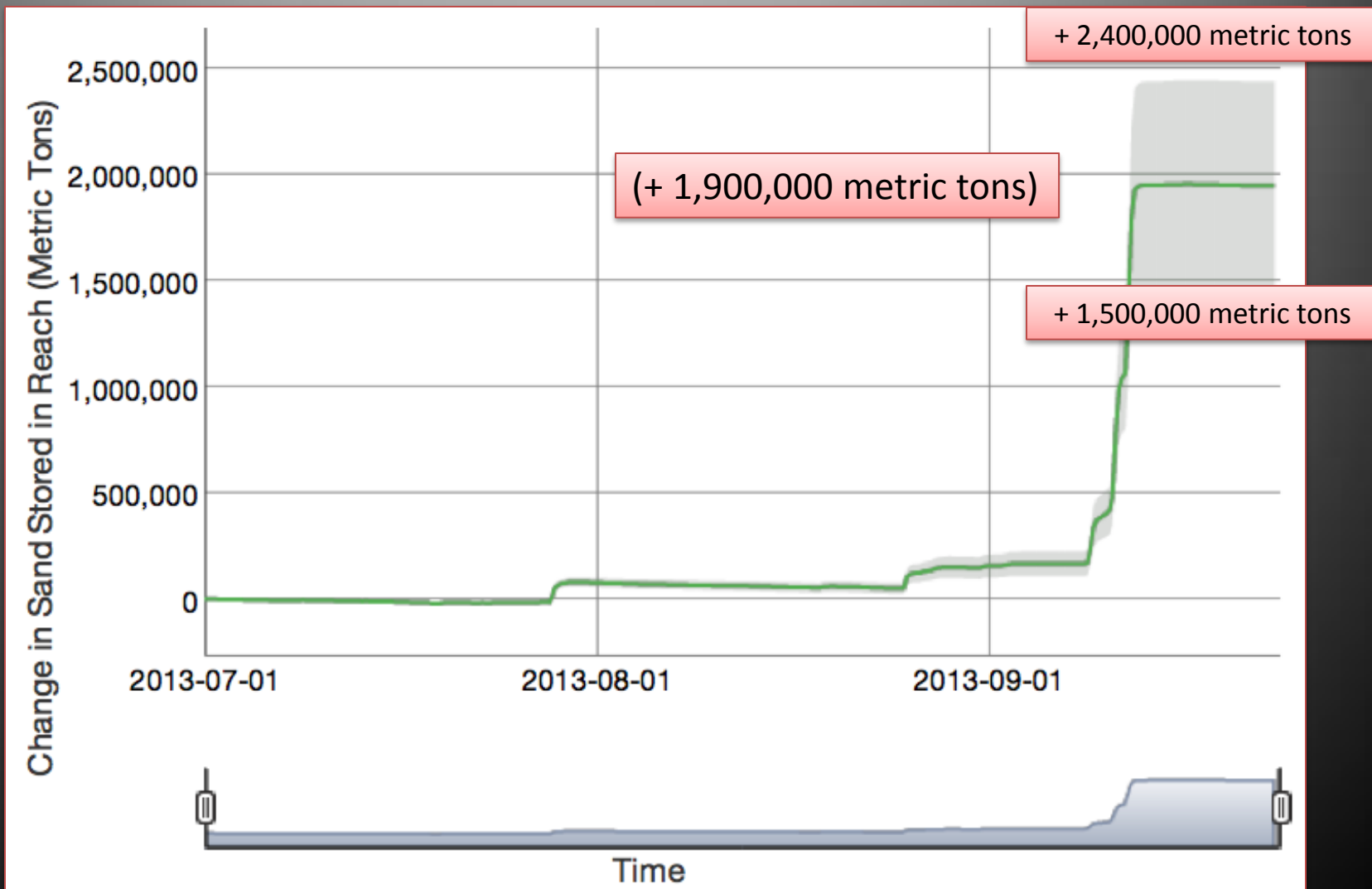
1.9 million metric tons

What went out
River Mile 30

0.13 million metric tons



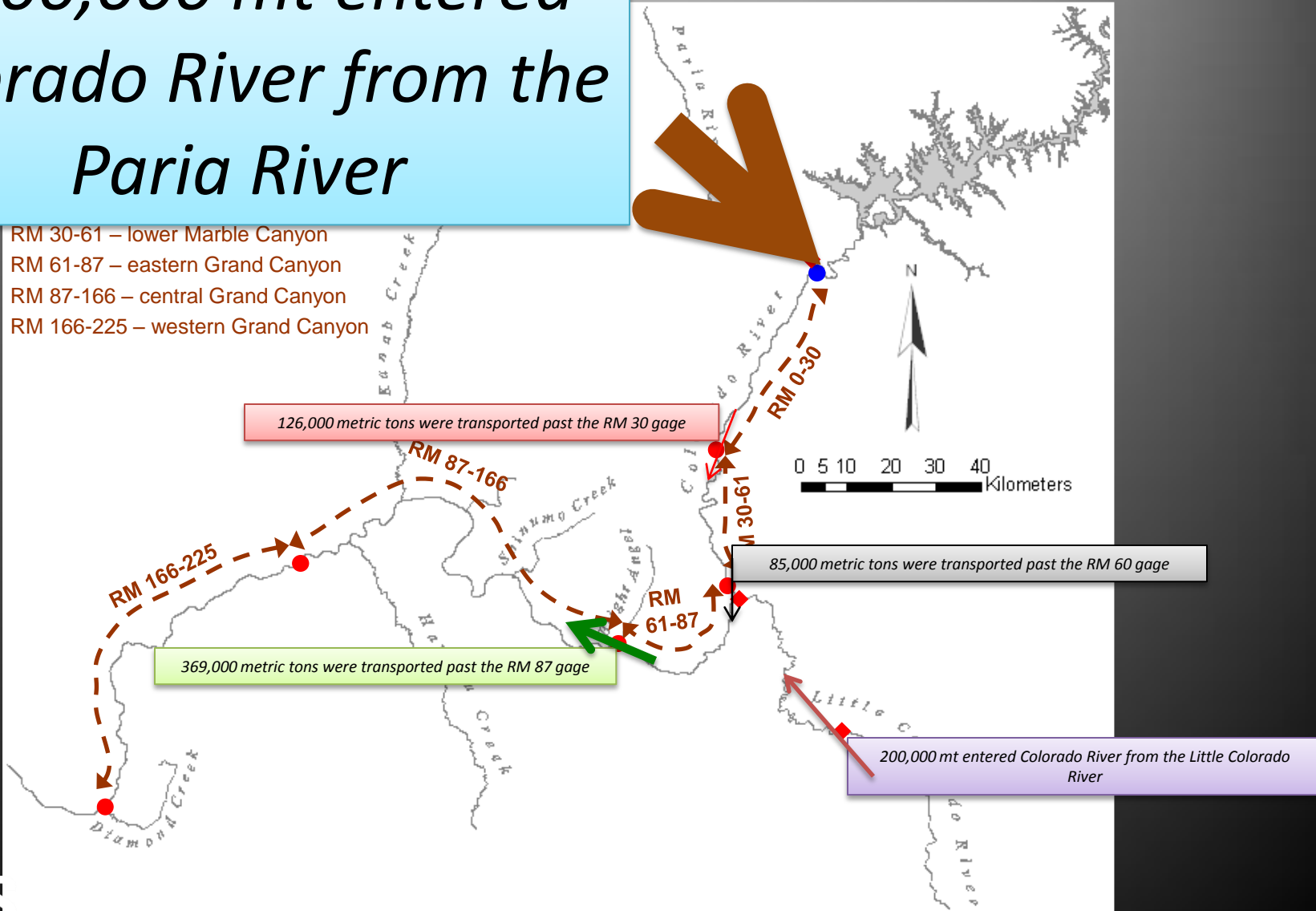
Upper Marble Canyon (July 1 to September 23)



Between July 1 and September 27, 2013, ...

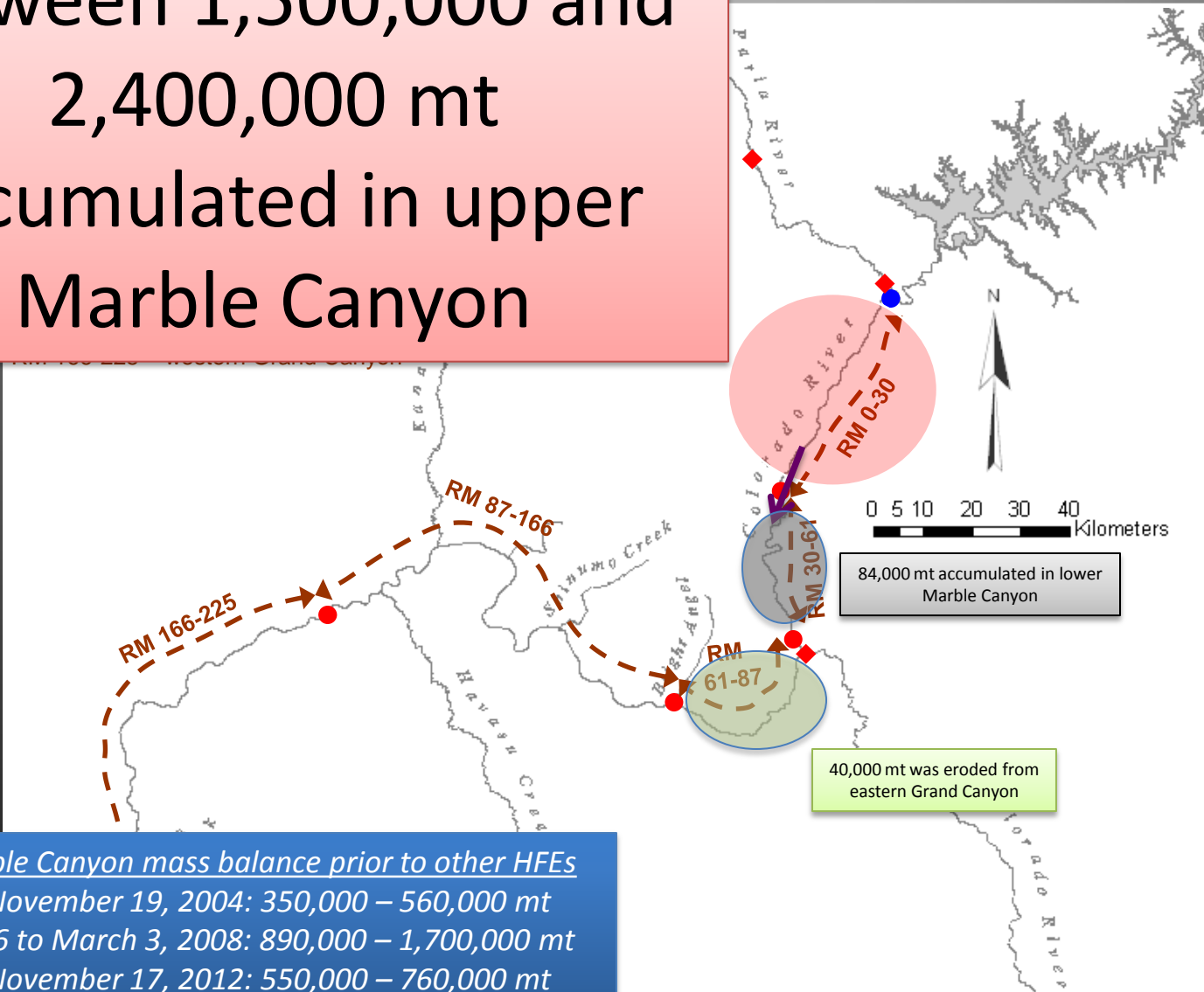
1,900,000 mt entered Colorado River from the Paria River

- RM 30-61 – lower Marble Canyon
- RM 61-87 – eastern Grand Canyon
- RM 87-166 – central Grand Canyon
- RM 166-225 – western Grand Canyon



Between July 1 and September 27, 2013, ...

Between 1,500,000 and
2,400,000 mt
accumulated in upper
Marble Canyon



Upper Marble Canyon mass balance prior to other HFES

July 1 to November 19, 2004: 350,000 – 560,000 mt

July 1, 2006 to March 3, 2008: 890,000 – 1,700,000 mt

July 1 to November 17, 2012: 550,000 – 760,000 mt