

Mobile-P and Internal Nutrient Recycling Rates in Canyon Lake (Update on Task 2.4)

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Introduction

- Measurements of mobile-P, Al-P and internal nutrient recycling rates were conducted to assess progress in sequestering P in sediments of Canyon Lake
- Rates of internal nutrient recycling will be compared to rates measured in the summer of 2001, 2002 and 2006

- Measurements made on sediment grab samples and intact cores from 5 sites on Canyon Lake on 8/14/2014

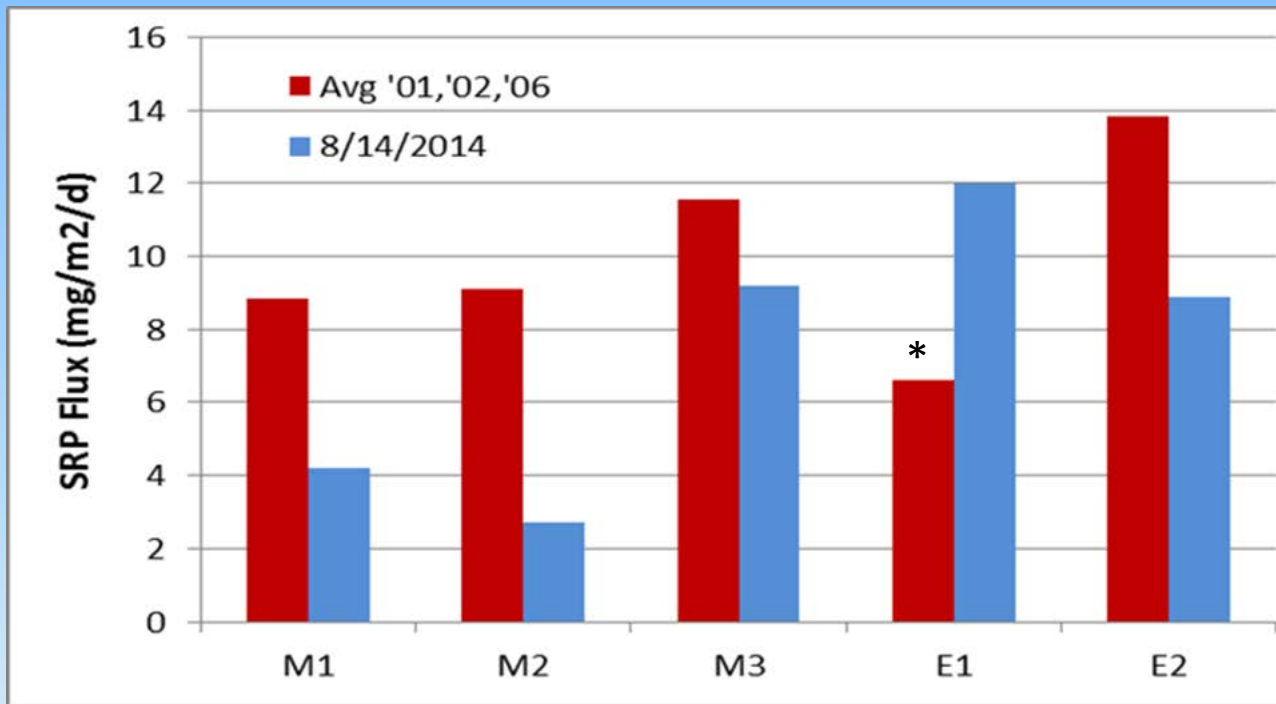


- Internal recycling rates were determined on intact cores incubated at the temperature and DO conditions present at the time of sampling
- Mobile-P and Al-P contents of sediments were determined by sequential extraction following Pilgrim et al. (2007)

Results

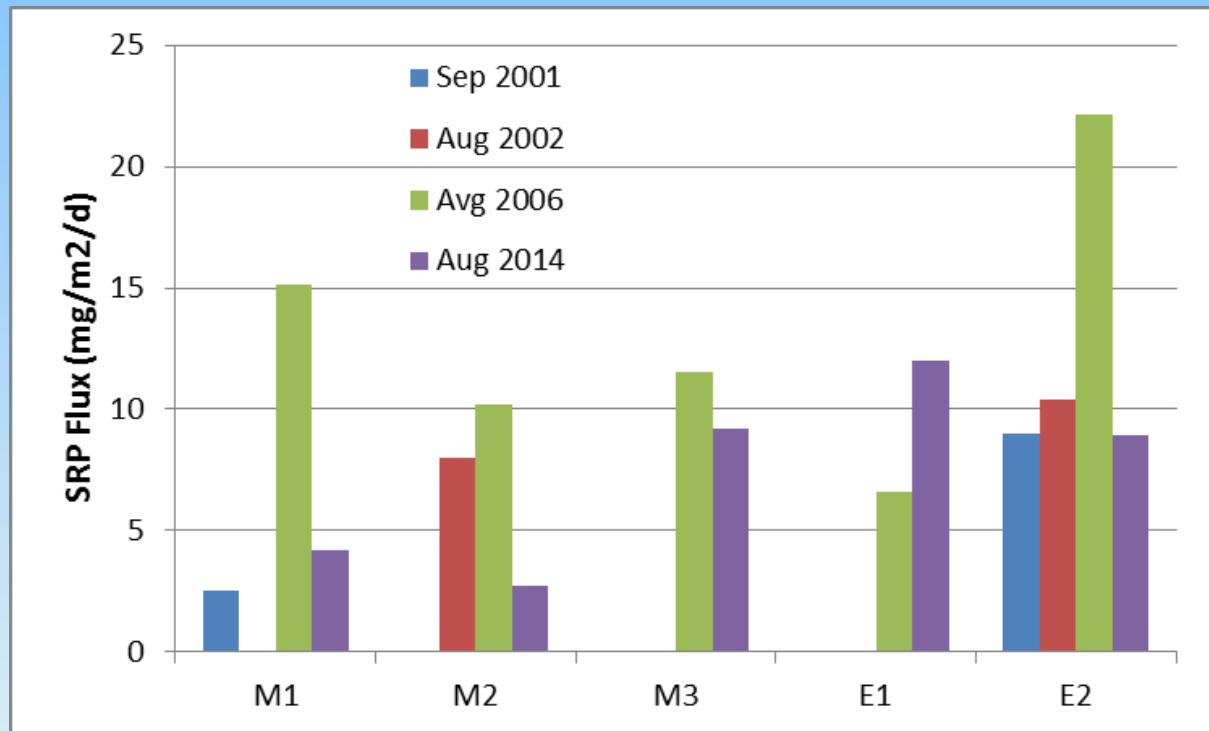
P Internal Recycling Rates

- Flux of $\text{PO}_4\text{-P}$ in Aug 2014 was lower at 4 out of 5 sites compared with average values for 2001, 2002 and 2006



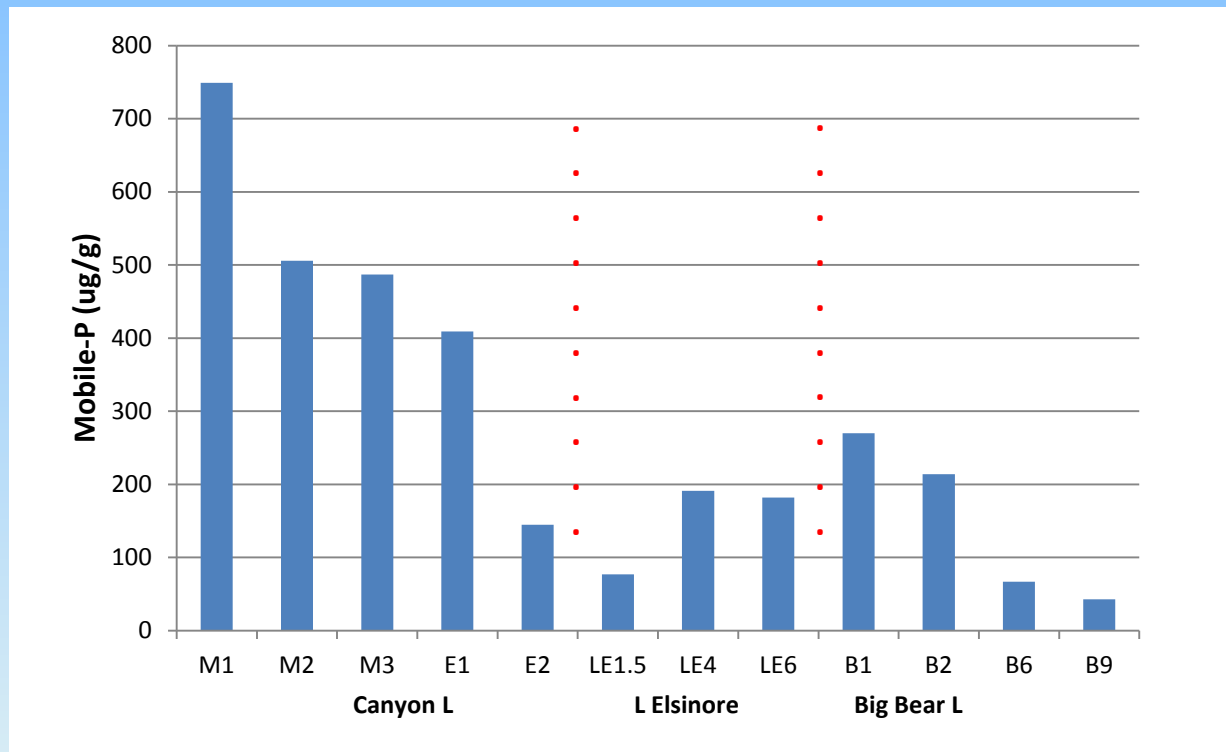
* Data available only for 1 year (2006)

- Average values do obscure strong inter-annual variability
- In particular, the very large runoff events in 2005 increased subsequent $\text{PO}_4\text{-P}$ flux at sites M1 and E2
- If we ignore 2006 data and the impact it has on average values, alum treatments in F'13 and W'14 appear to have more modest and variable impacts on $\text{PO}_4\text{-P}$ flux

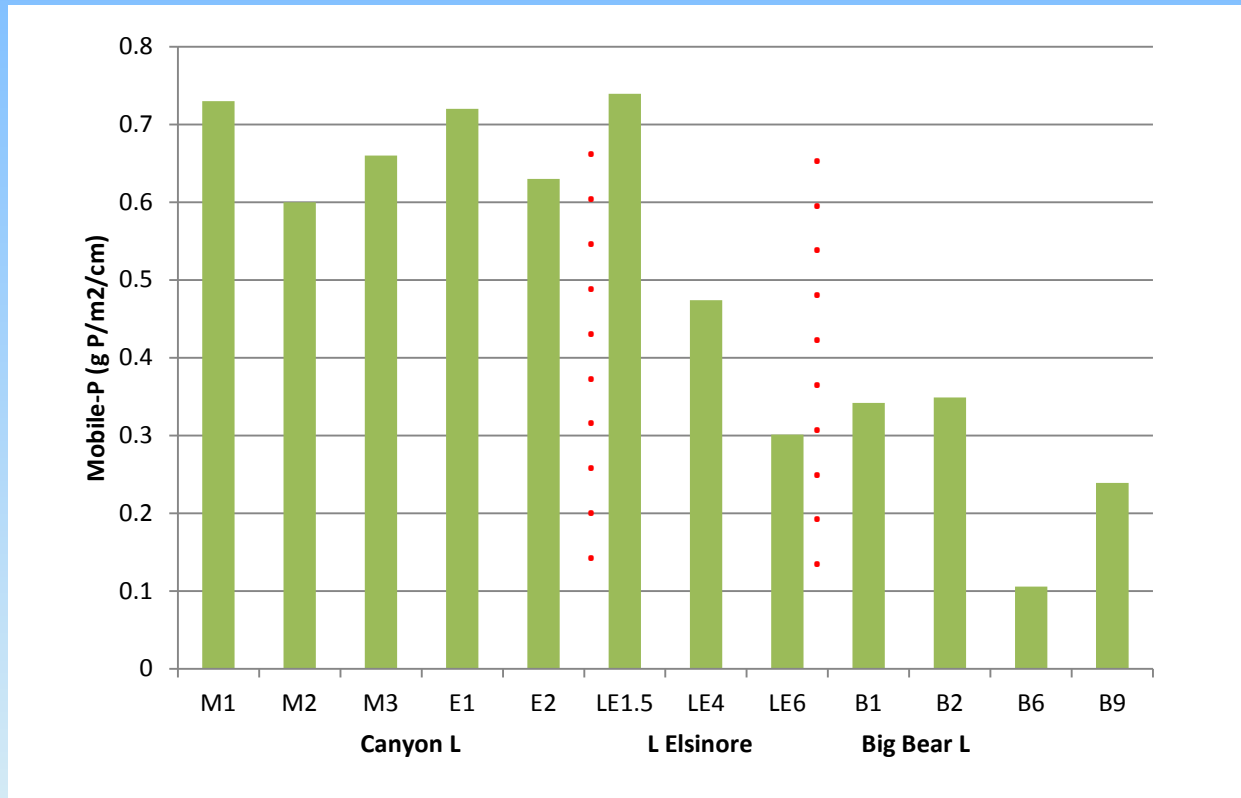


Mobile-P Measurements

- Inter-annual variability in rate of sediment release of PO_4 makes it difficult to draw conclusions at this time
- Mobile-P values may provide more insight
- Canyon L has much higher levels than Elsinore or Big Bear



- Mobile-P is better expressed on an areal basis since it allows for deriving areal alum application rates
- Doing this reduces the range among the 3 lakes, but Canyon L is still consistently the highest



Al Dosage

- Assuming a 10-cm mobile zone (previous researchers have used 4-10 cm), one can calculate the Al dose required to immobilize this pool of P
- Canyon L may require up to 140 g Al/m²
- Current annual additions ~16 and 2 g Al/m² (M & E, resp.)

