

Effects of mercury on the nesting success and return rate of tree swallows



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Objectives 2006

- 1) To continue to assess tree swallow nesting success
- 2) To compare return rate of birds banded in contaminated and reference areas in 2005



Nest box use

2005

- 191 nest boxes
 - 60 South River (C)
 - 89 reference
- # nests
 - 30 South River (C)
 - 62 reference
- Banded 98 adults, 506 nestlings (102 broods)

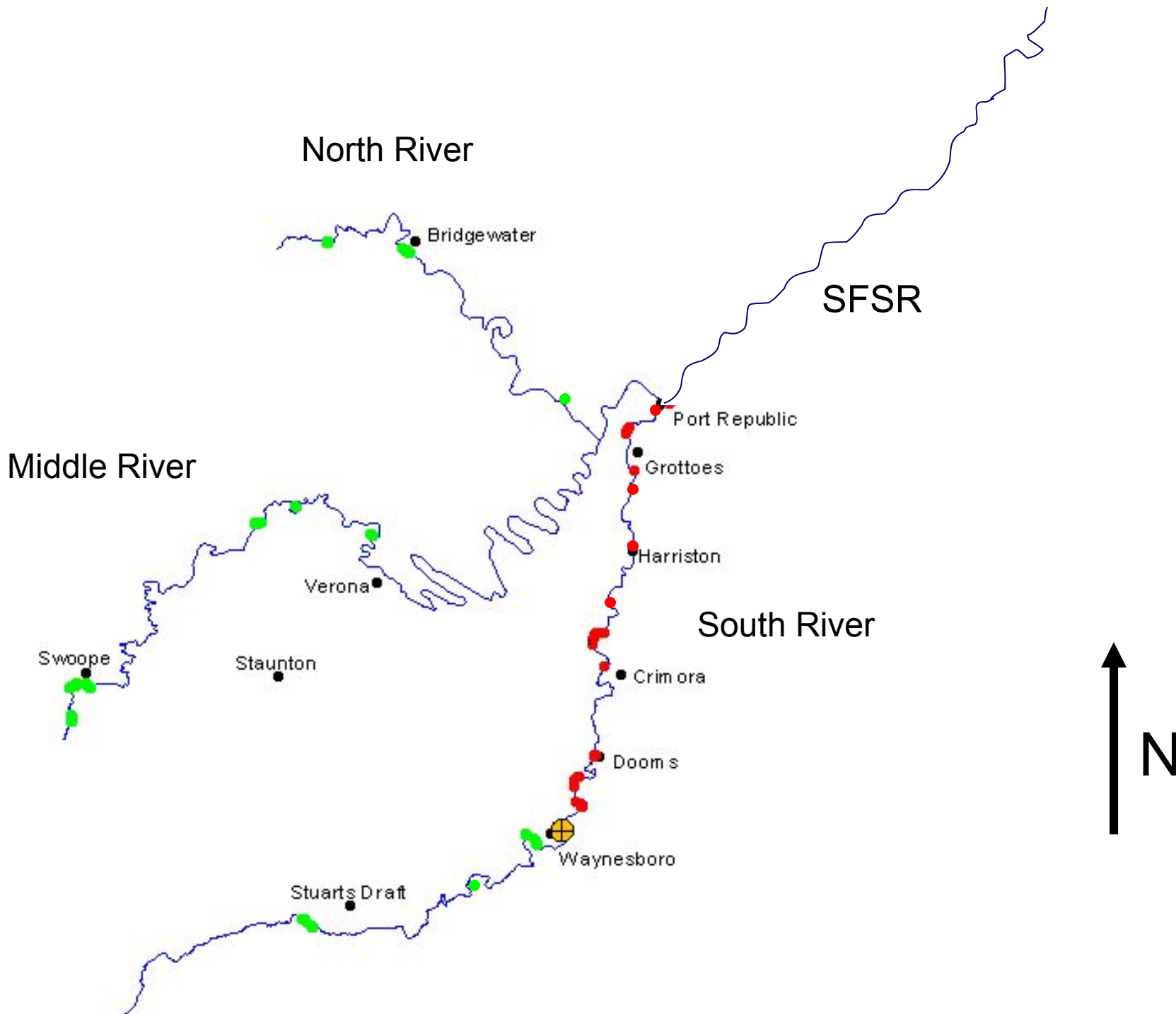
2006

- 287 nest boxes
 - 119 South River (C)
 - 168 reference
- # nests
 - 80 South River (C)
 - 130 reference
- Banded 242 adults, 790 nestlings (162 broods)
 - 49 birds returned from 2005

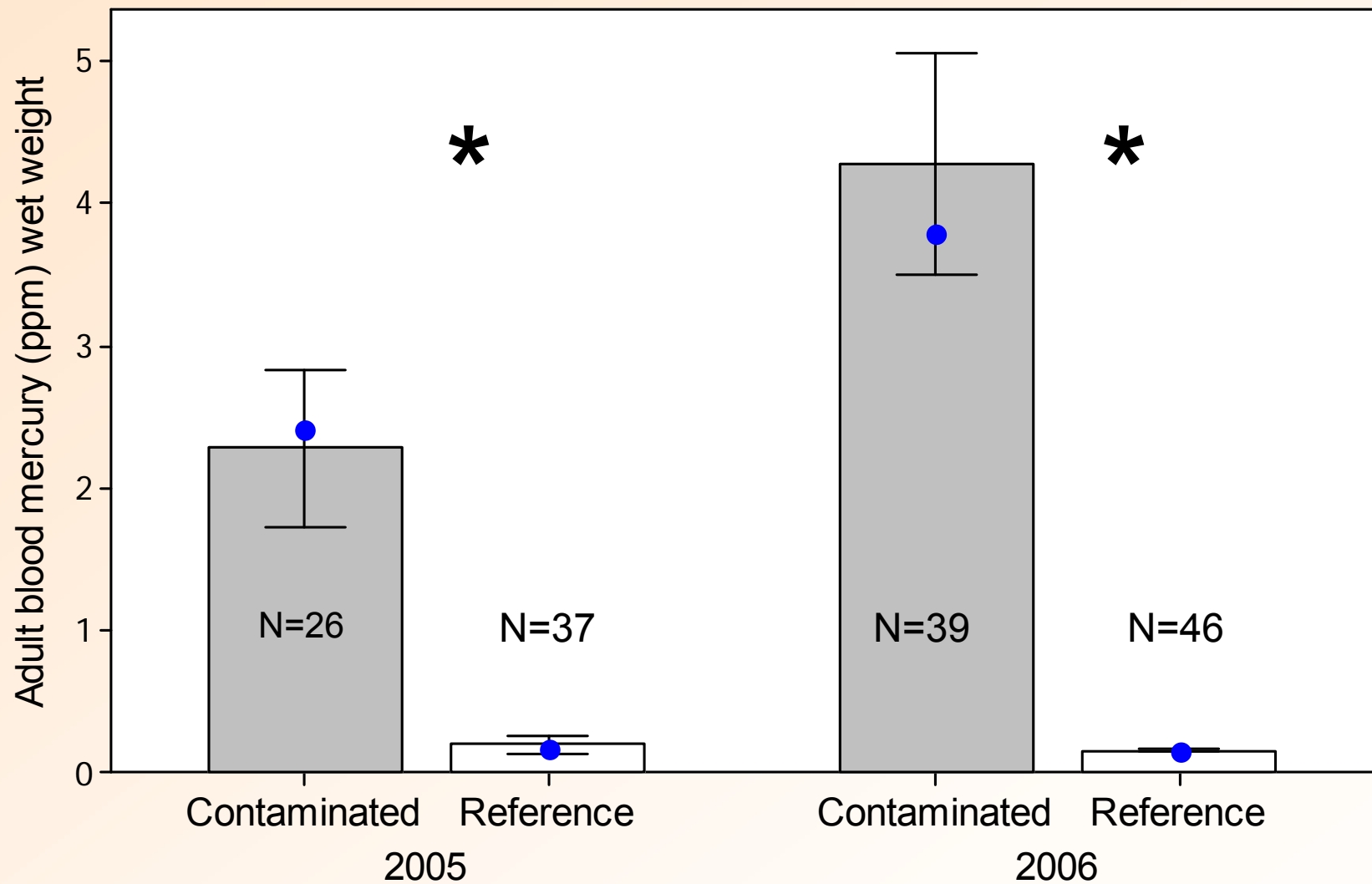
Measures of reproductive success

- Clutch initiation date
- Clutch size
- Hatching success
- Nestling survivorship
- Egg size (2006 only)



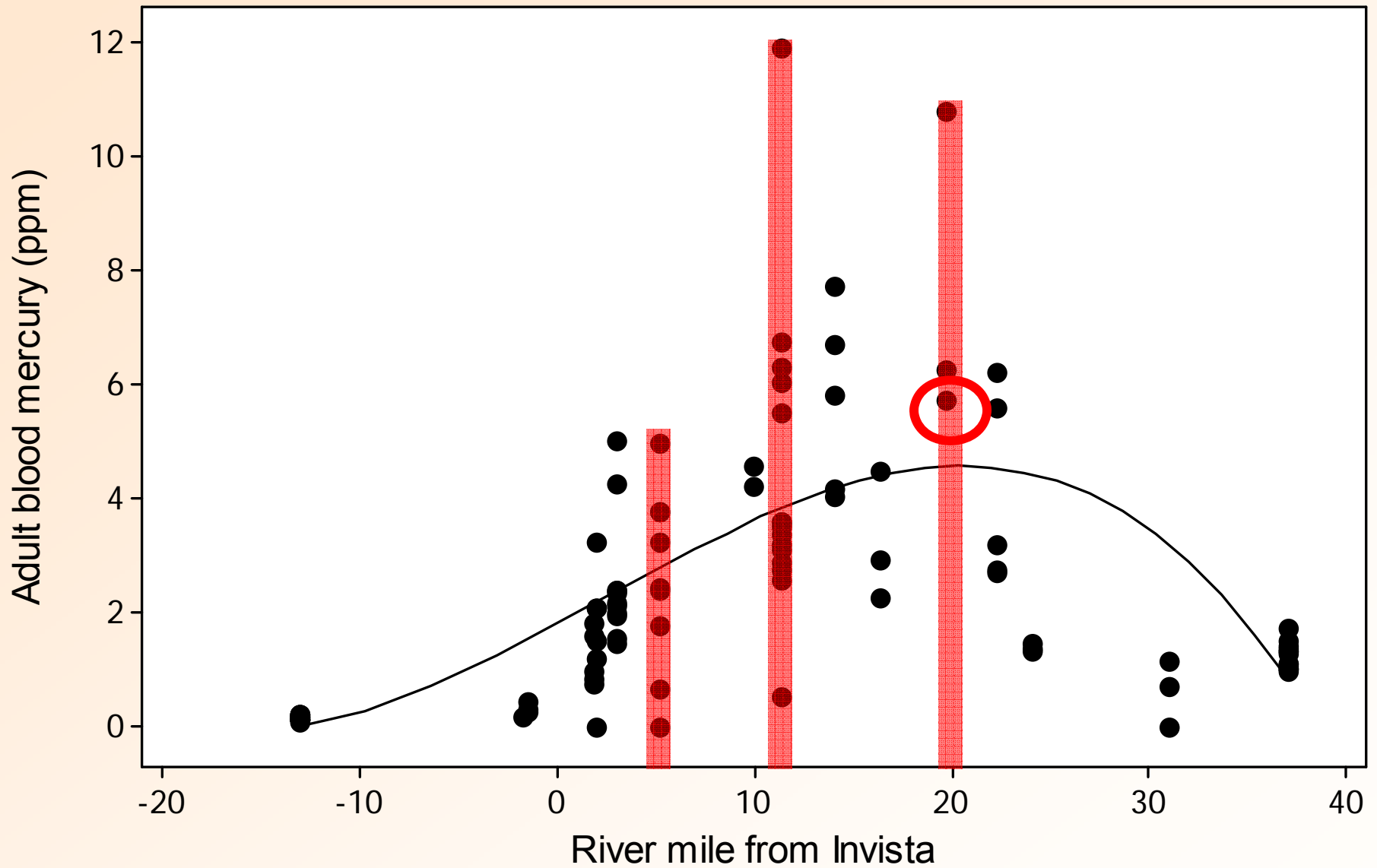


Tree swallow mercury levels



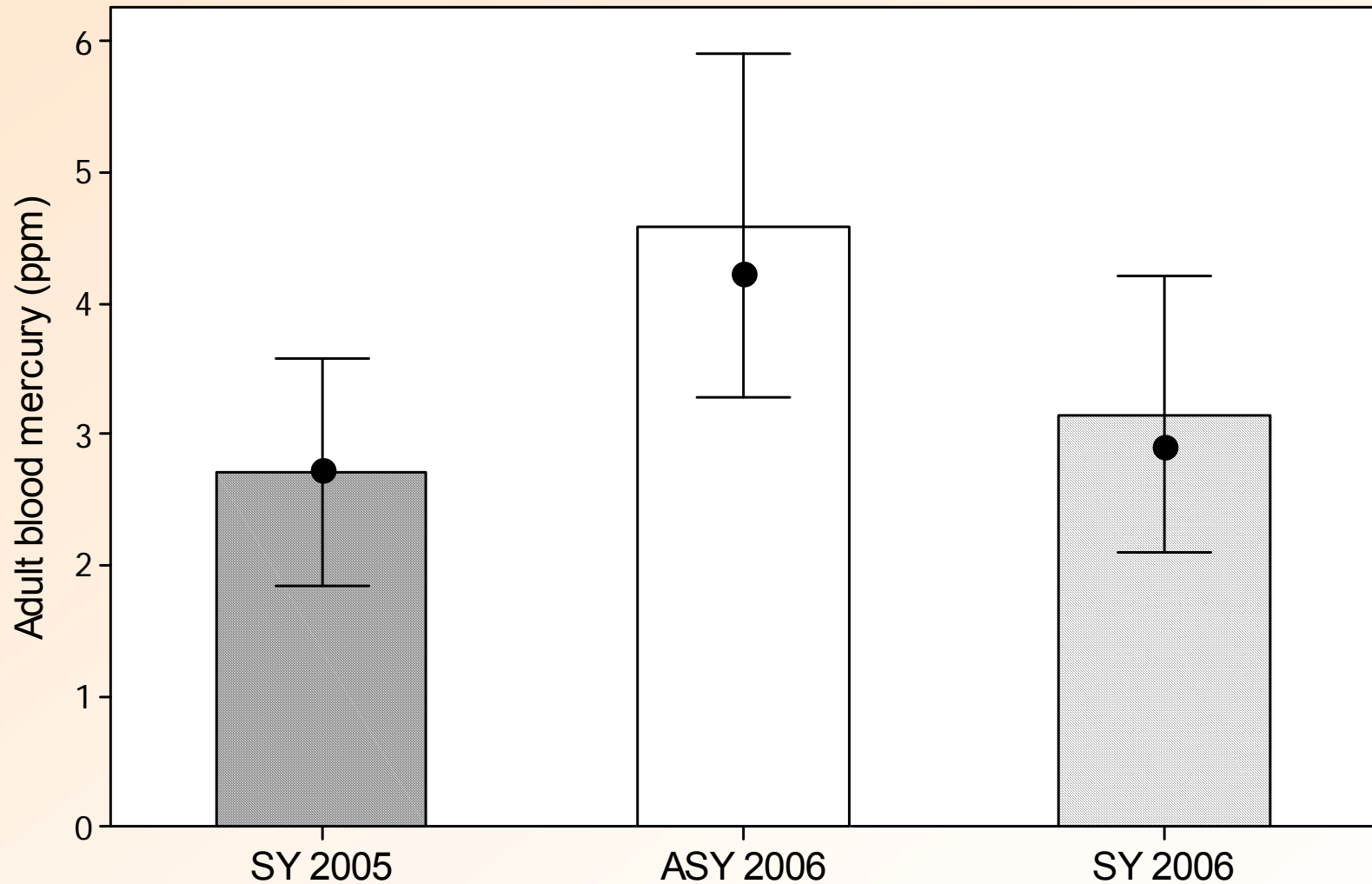
* Contaminated vs. reference 2005: $F = 85.58$, $p < 0.01$; 2006: $F = 129.47$, $p < 0.01$

Mercury with river mile



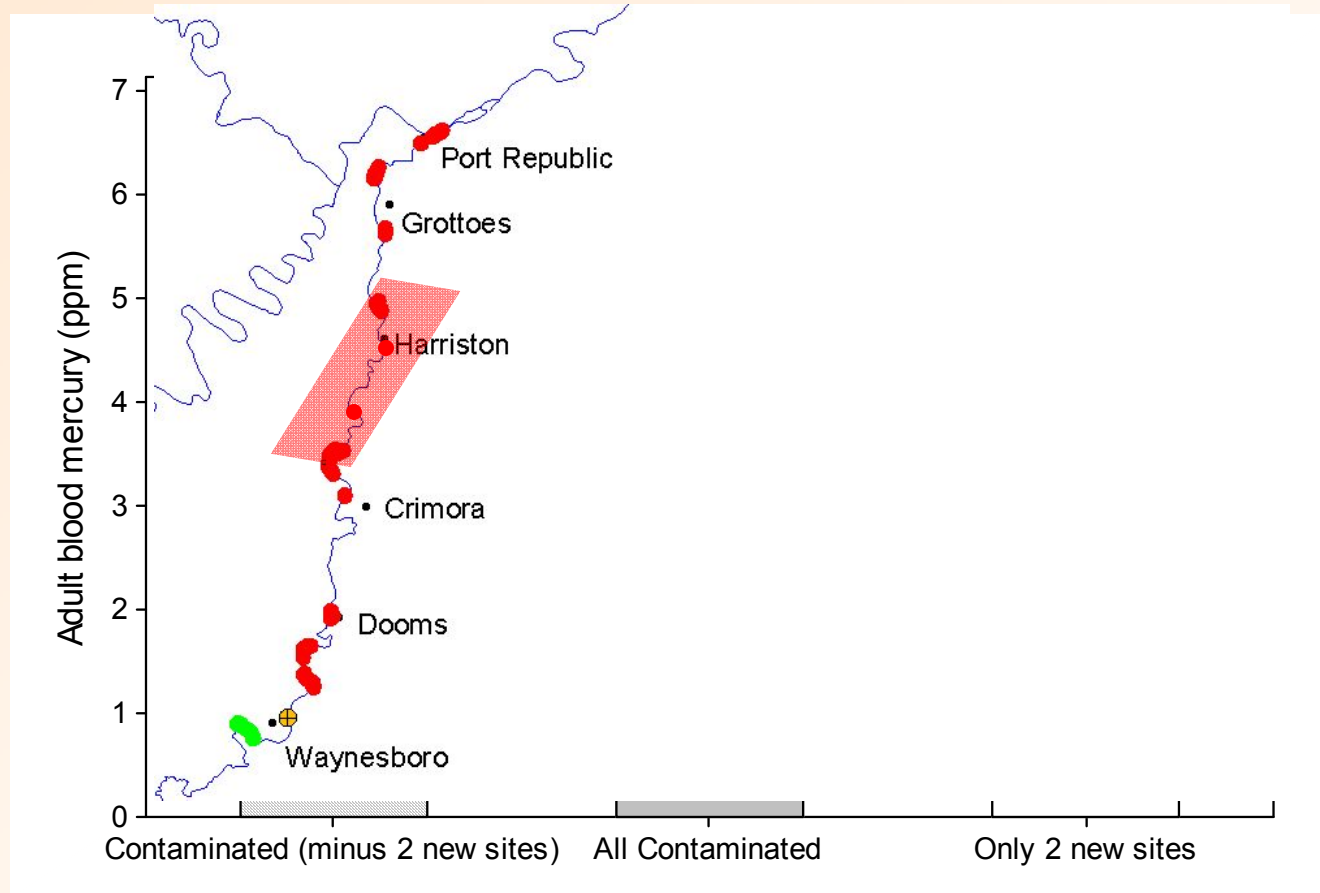
What is driving higher Hg in 2006?

- Older birds have higher mercury?



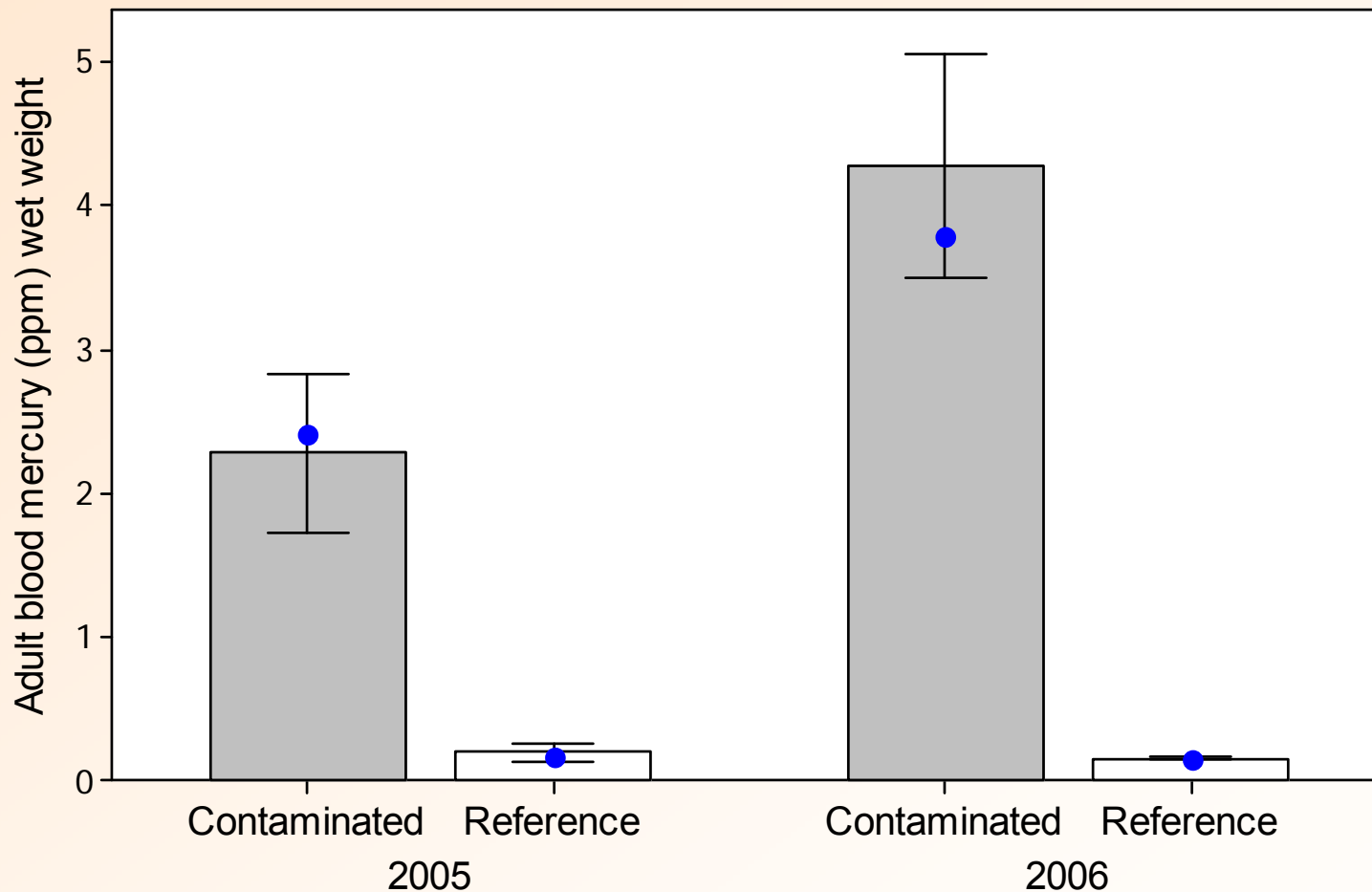
What's driving higher Hg in 2006?

- New sites added between Crimora and Grand Caverns in 2006?

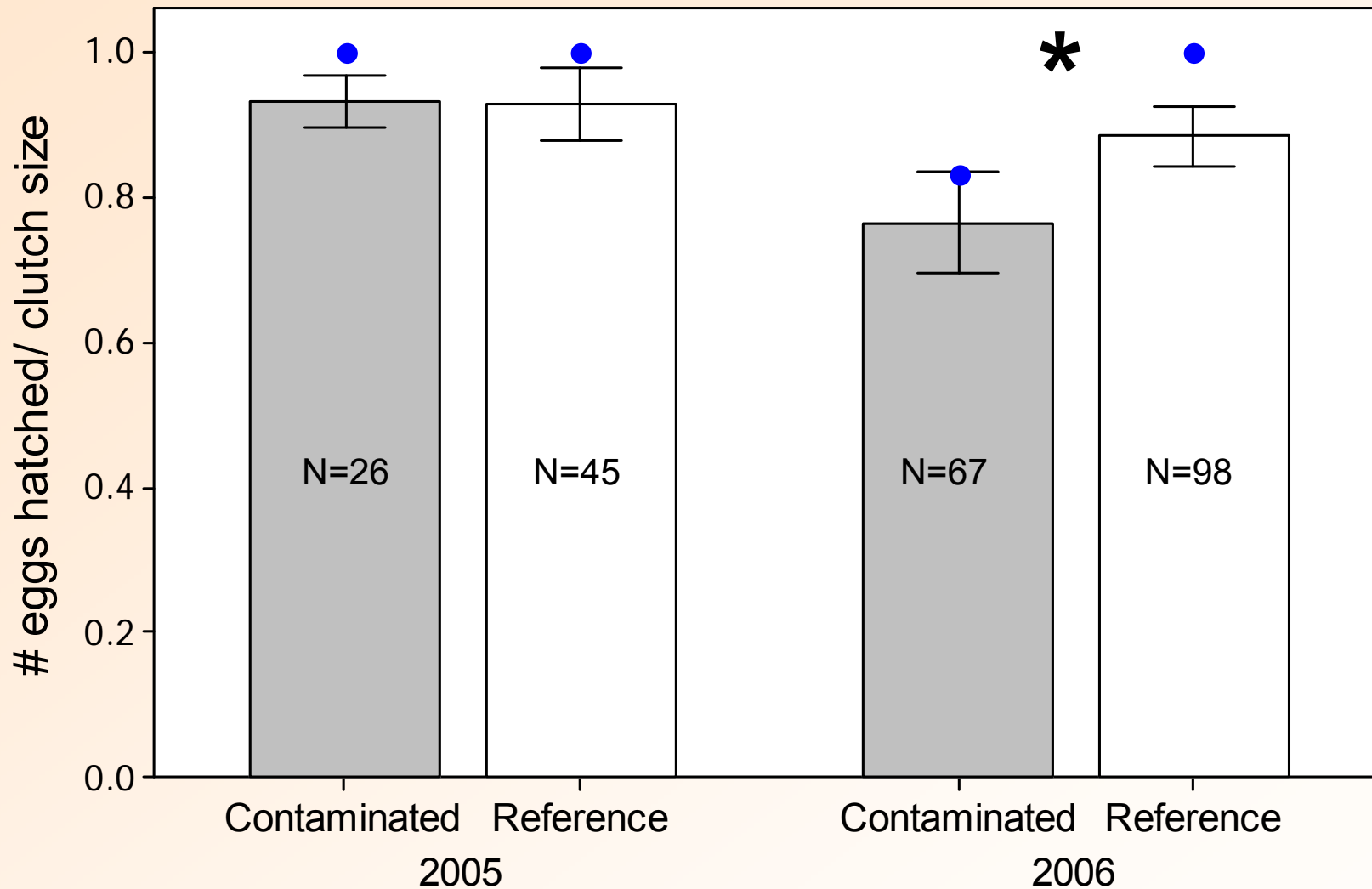


What's driving higher Hg in 2006?

Was more Hg available due to weather conditions?

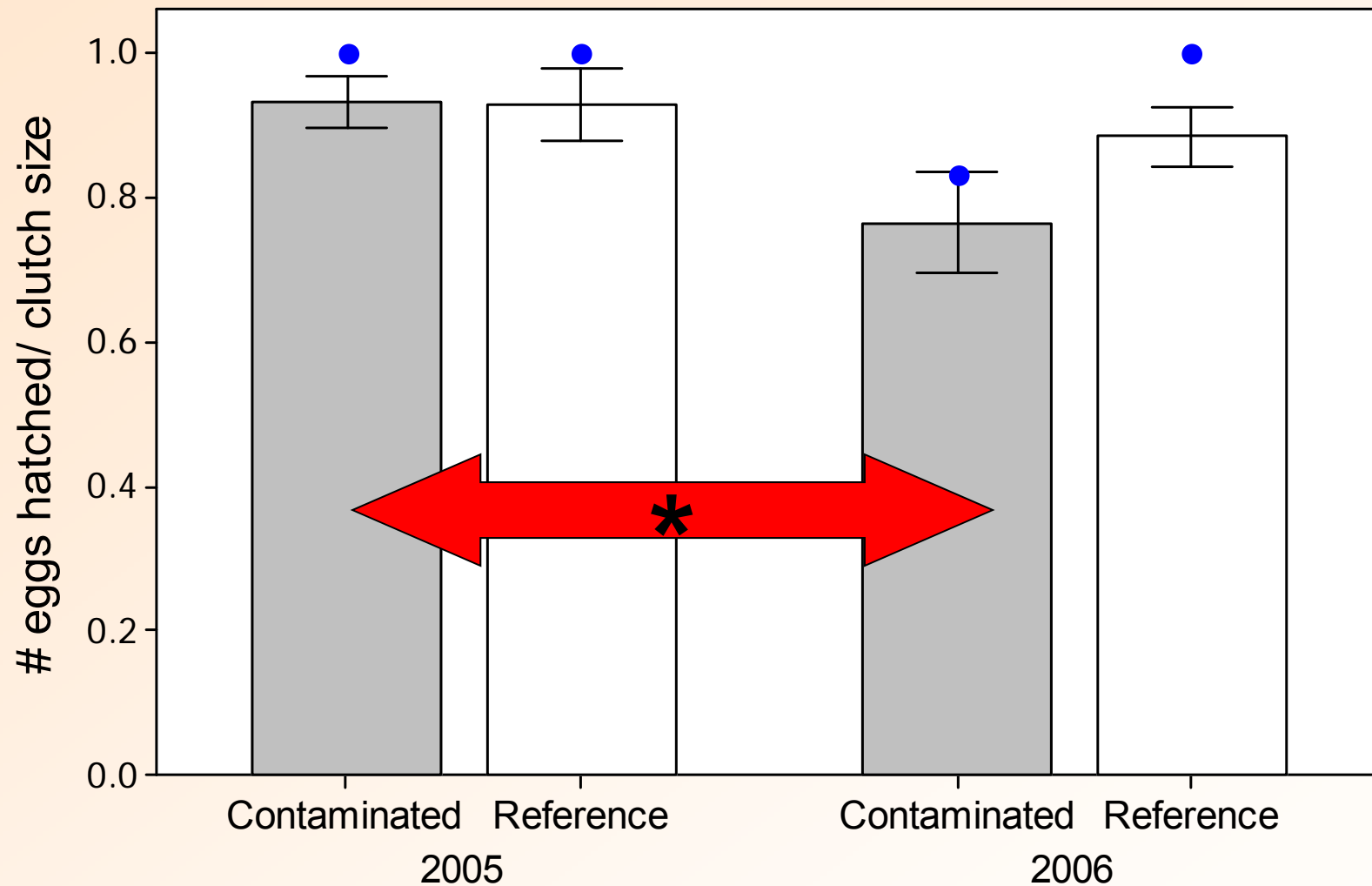


Results: hatching success



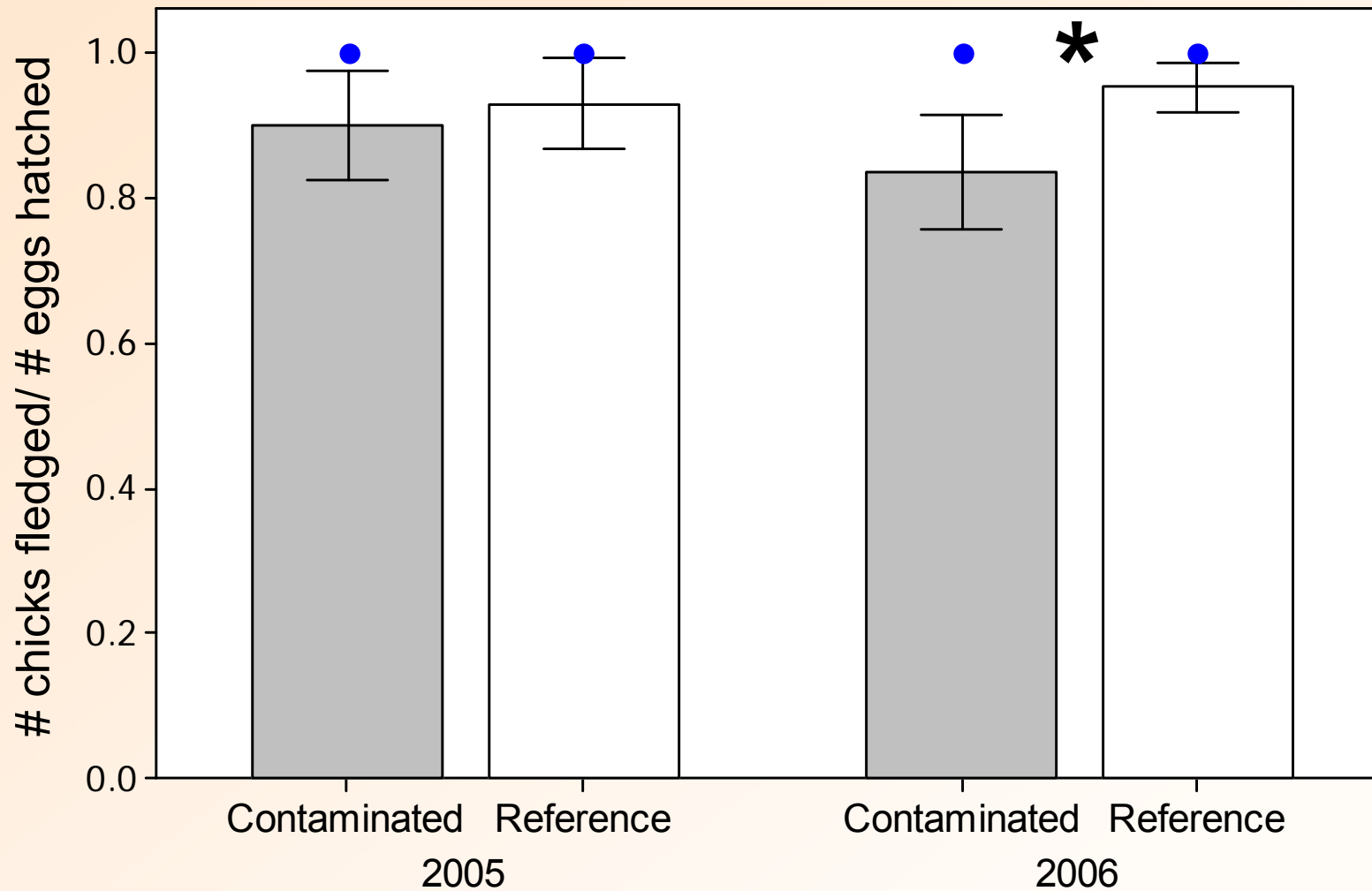
* Contaminated vs. Reference 2006: $F = 6.71$, $p = 0.01$; no effect of female age ($F = 1.30$, $p = 0.26$)

Results: hatching success



* Contaminated 2005 vs. Contaminated 2006: $F = 4.07$, $p = 0.05$, no effect of female age ($F = 0.74$, $p = 0.39$)

Results: nestling survivorship



* Contaminated vs. Reference 2006: $F = 15.77$, $p < 0.01$; interaction female age and nesting site ($F = 5.28$, $p = 0.02$)

Results: nesting success

- No differences detected in:
 - Clutch initiation date
 - (2005, $p=0.54$ and 2006, $p=0.50$)
 - Clutch size
 - (2005, $p=0.64$ and 2006, $p=0.63$)
 - Egg size
 - (2006, $p=0.38$)



Results: return rate



Estimating adult female return rate

- Tree swallows are site faithful
- Used return rate of birds banded in 2005
- Return rate
 - # recaptured in 2006/
total # banded in 2005

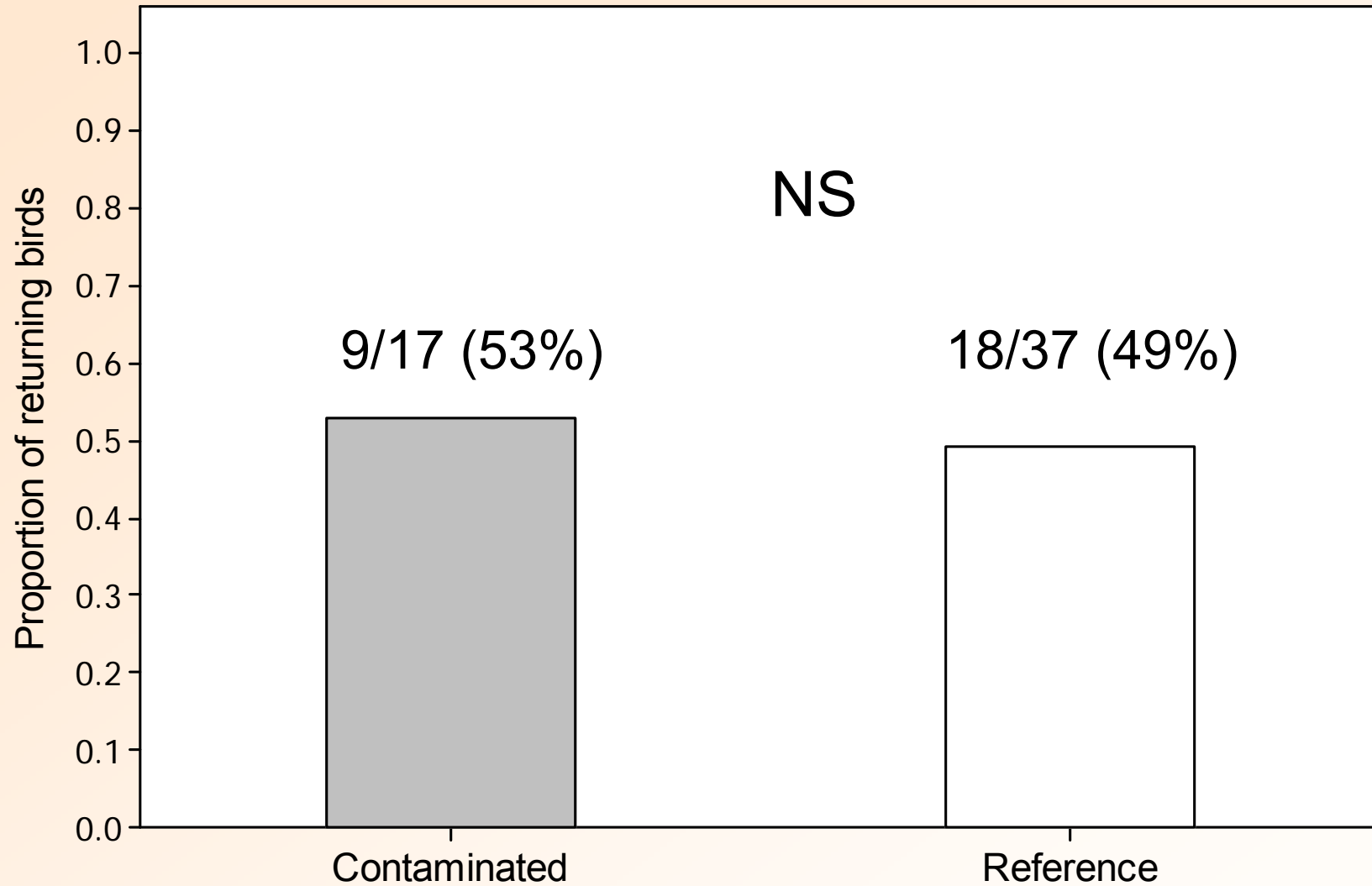


Results: female return rate

- Total recaptured 2006: 27/54 (50%)
- Recaps contaminated
 - 9/17 (53%)
- Recaps reference
 - 18/37 (49%)



Results: female return rate



$\chi^2 = 0.028, p = 0.87$

Conclusions

- Elevated adult mercury levels 2005
 - No effects detected on reproduction
- Higher mercury in 2006
 - Decreased hatching success and nestling survivorship
- Mercury accumulation did not impact adult female return rate to one year
- Next year should be interesting...





Acknowledgements



- **Major funding provided by E.I. Dupont de Nemour and Company**
- Additional funding: Virginia Society of Ornithology, Williamsburg Bird Club, W&M Graduate Student Association, W&M Roy R. Charles Center
- Thank you: logistical assistants and landowners in the Shenandoah Valley for allowing research to proceed on their properties; USFWS Gloucester Field Office; Tom Meier (for building 300+ nest boxes); Becton Dickinson (supply donation)

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