

Corbicula
• 2003-4 Studies
• Summer 2004 Proposed Study

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April 14, 2004

September 9, 2003

Proposal to South River Science Team

Ongoing Transplant Study: Purpose

Why use transplanted clams as biomonitors?

- Transplanted *Corbicula* could be used to monitor mercury levels at any river site, rather than only where *Corbicula* is currently found.
- Using transplants provides increased control of exposure conditions.

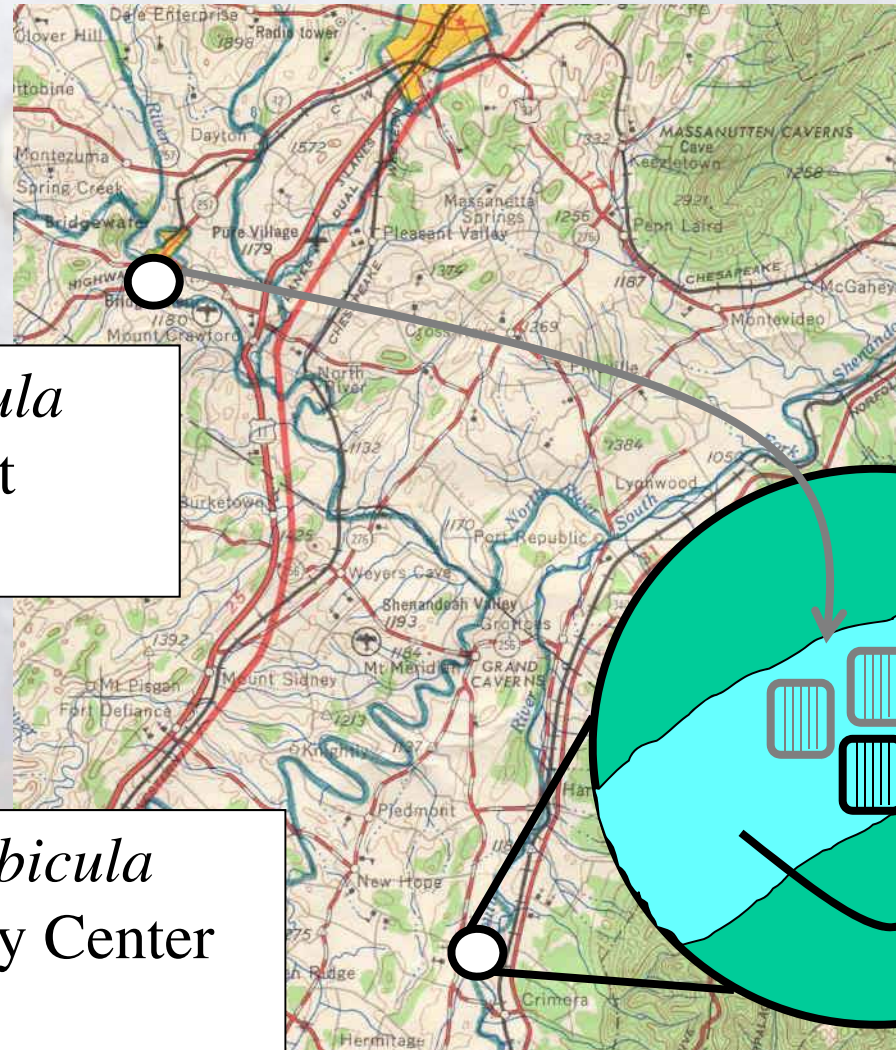
2003-4 Study Goals:

- Establish a protocol for using *Corbicula* transplants as a biomonitoring tool.
- Determine the rate of mercury uptake in *Corbicula*.

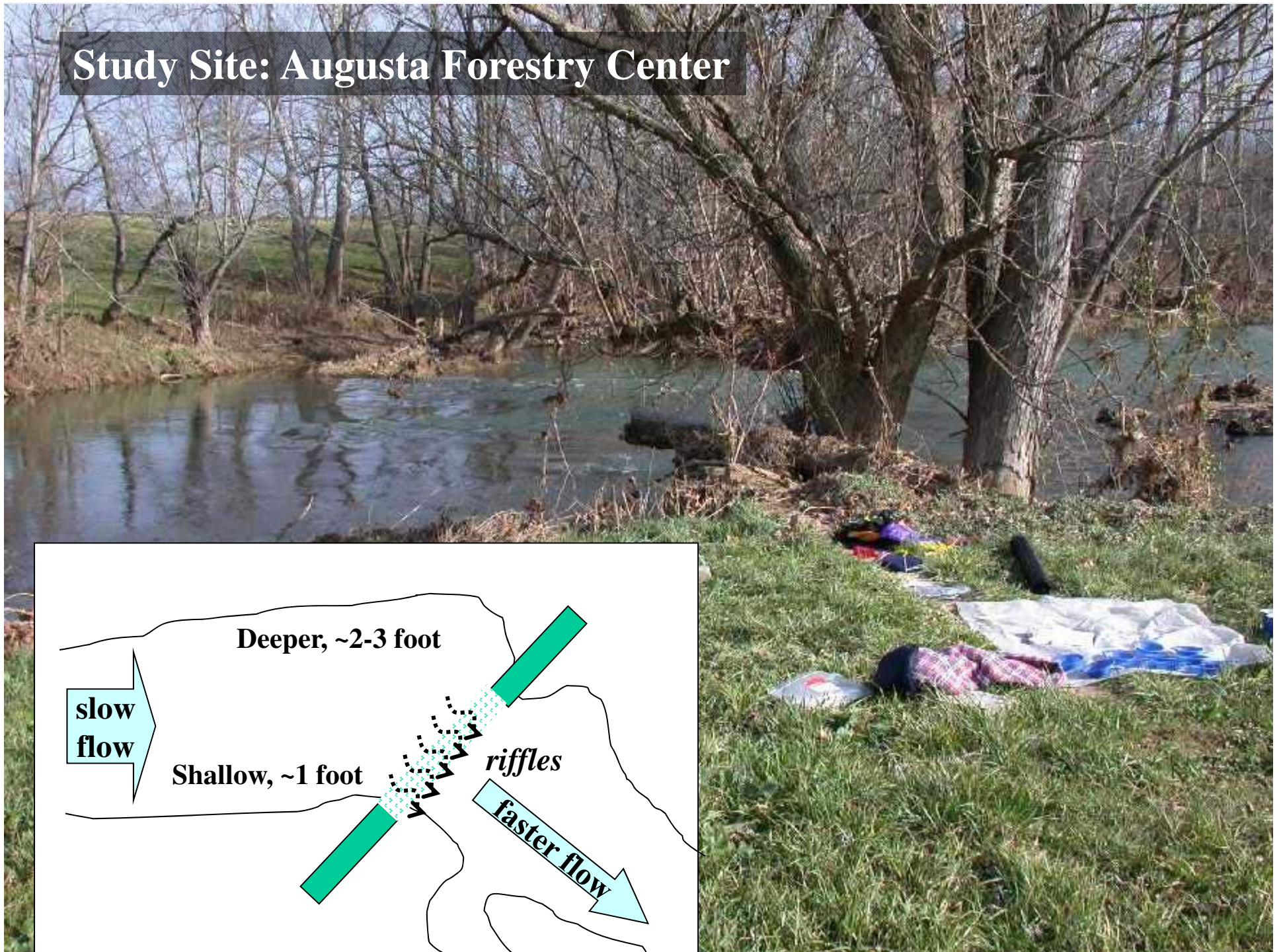
Experimental Design of Transplant Study

Transplant group of *Corbicula*
from North River to cages at
Augusta Forestry Center

Control group of *Corbicula*
from Augusta Forestry Center
moved into cages.



Study Site: Augusta Forestry Center

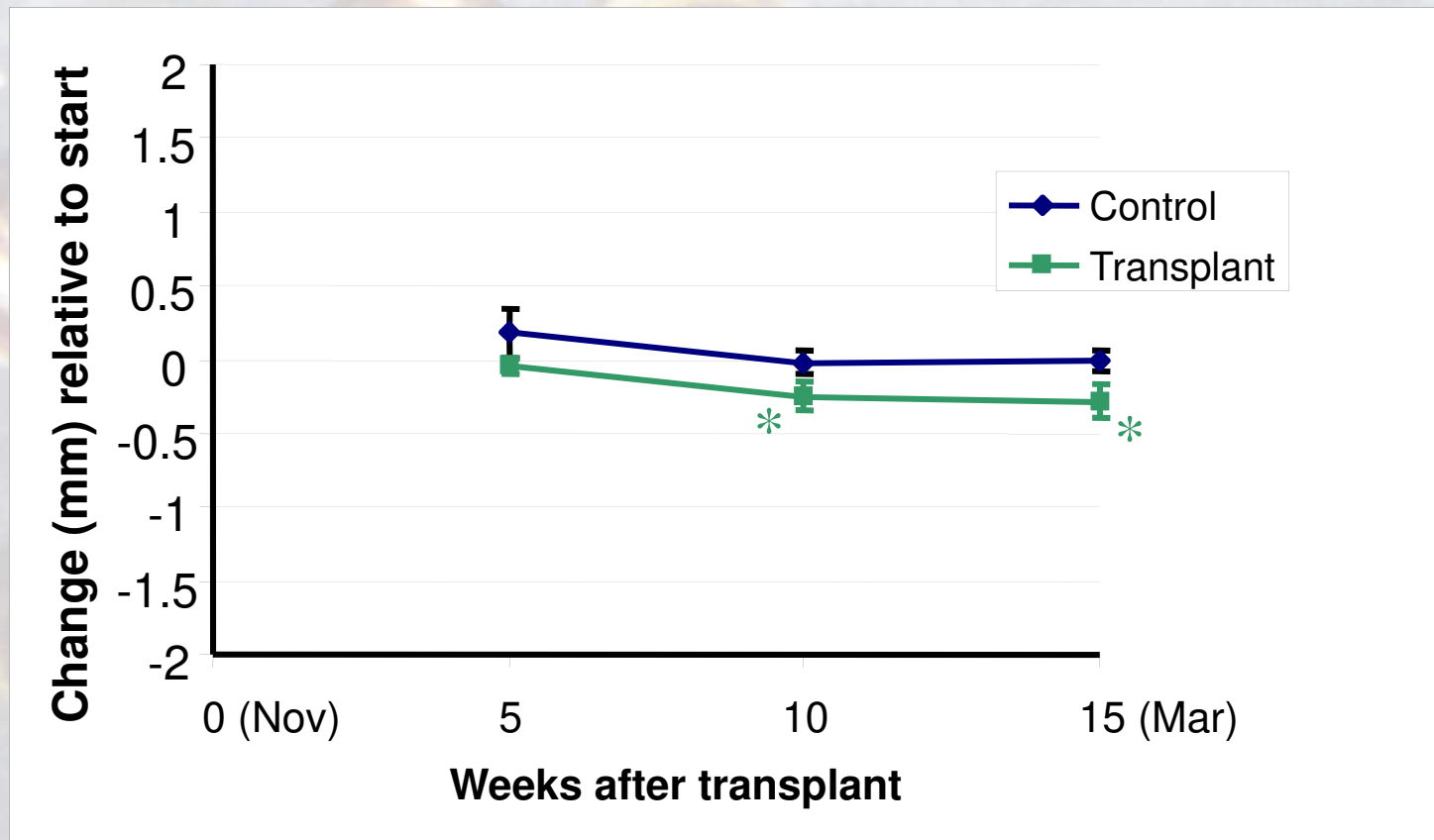




Results: Growth

Why measure growth?

No increase in shell length (through March)

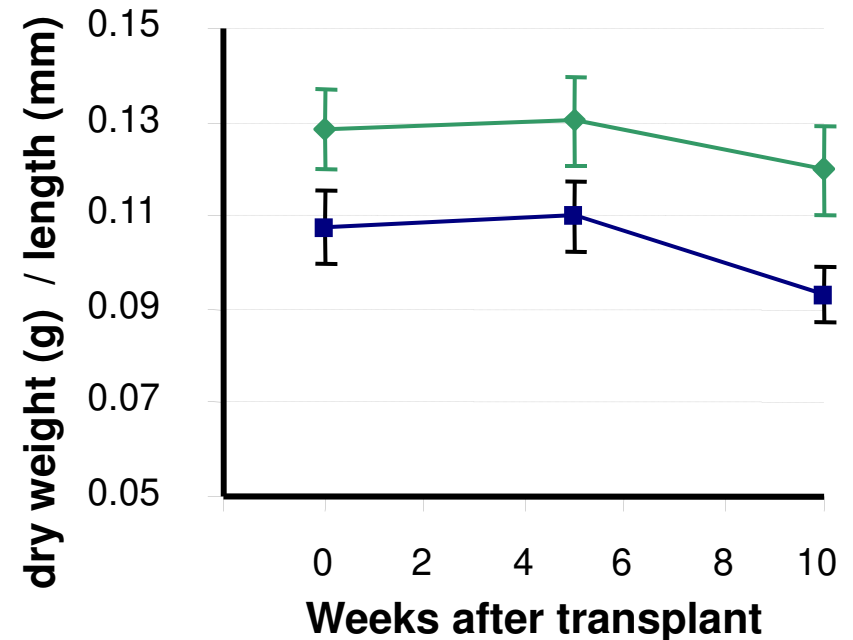
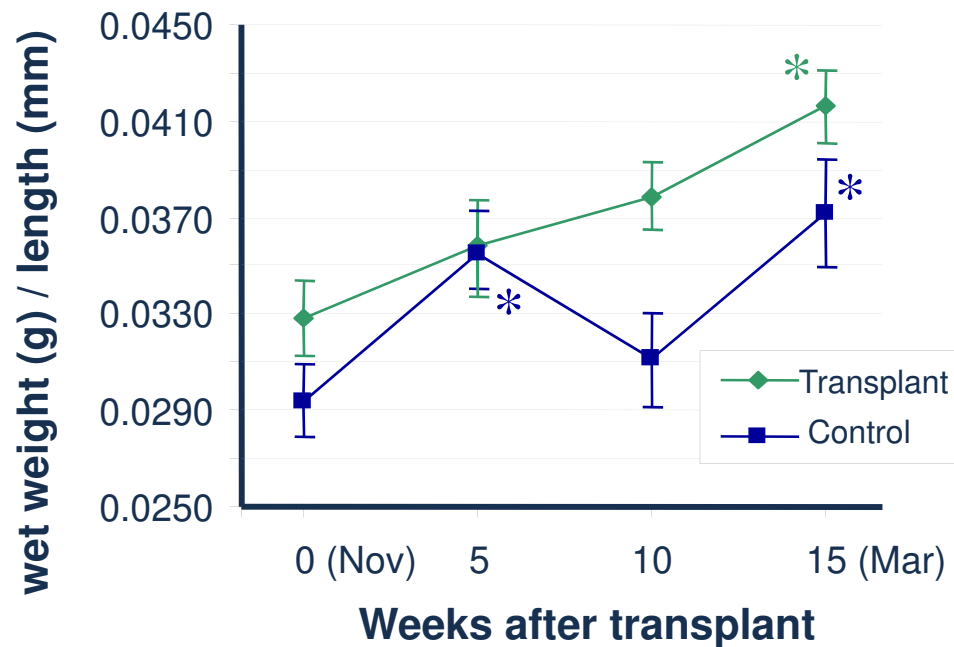


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Proposal to South Pole for one year
on 10 October 2003
*significantly different; $p < 0.05$, paired t-test)

Results: Growth

“Condition Index” (weight / length) increased steadily



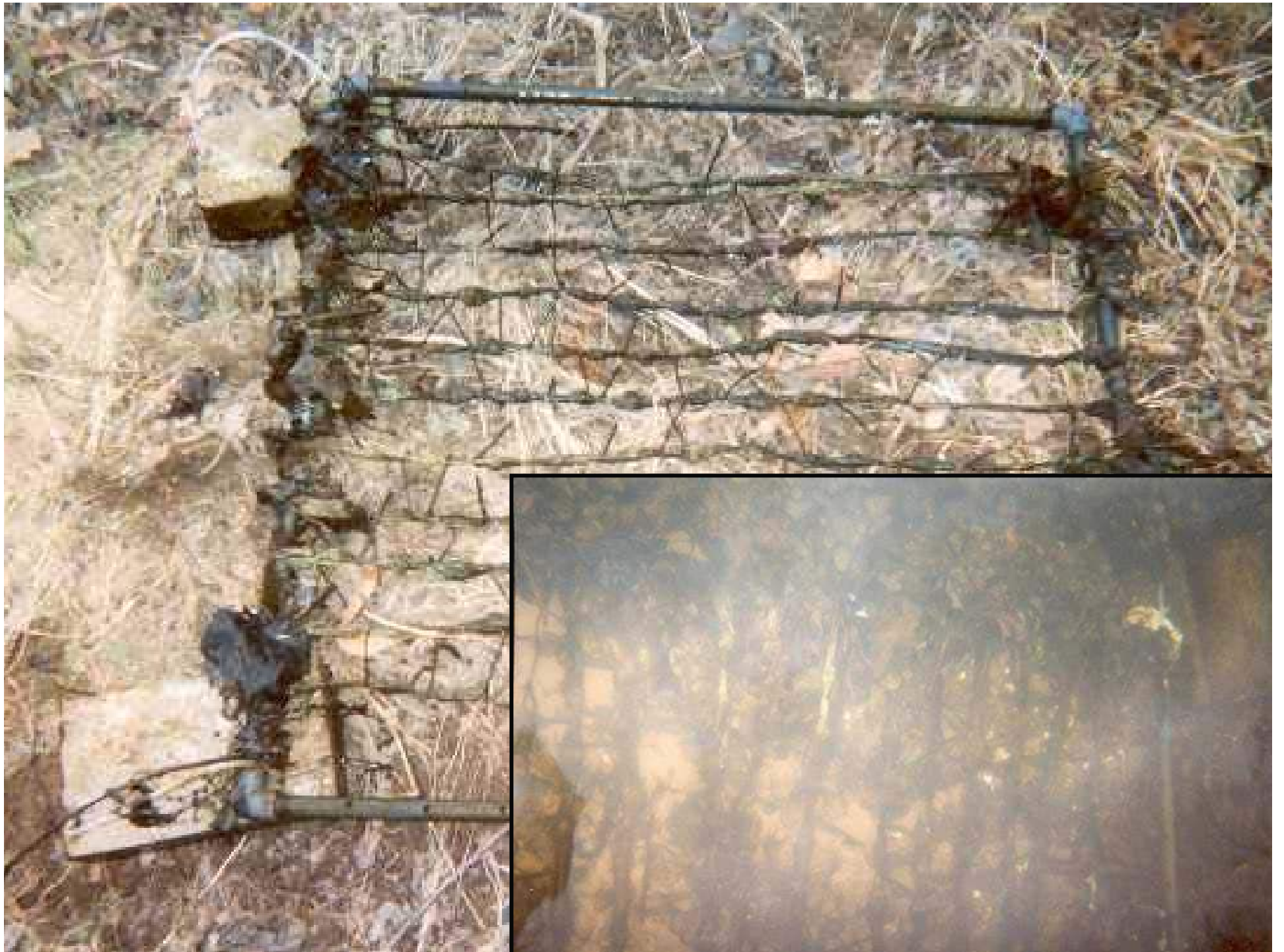
(n=30 clams for each point; mean $\pm$ standard error)

*significantly different from Nov.; $p < 0.05$, Dunnett's test)

- Population appears healthy
- Algae(?) covers trap (likely food source for clams)
- Mortality near zero, no escapees

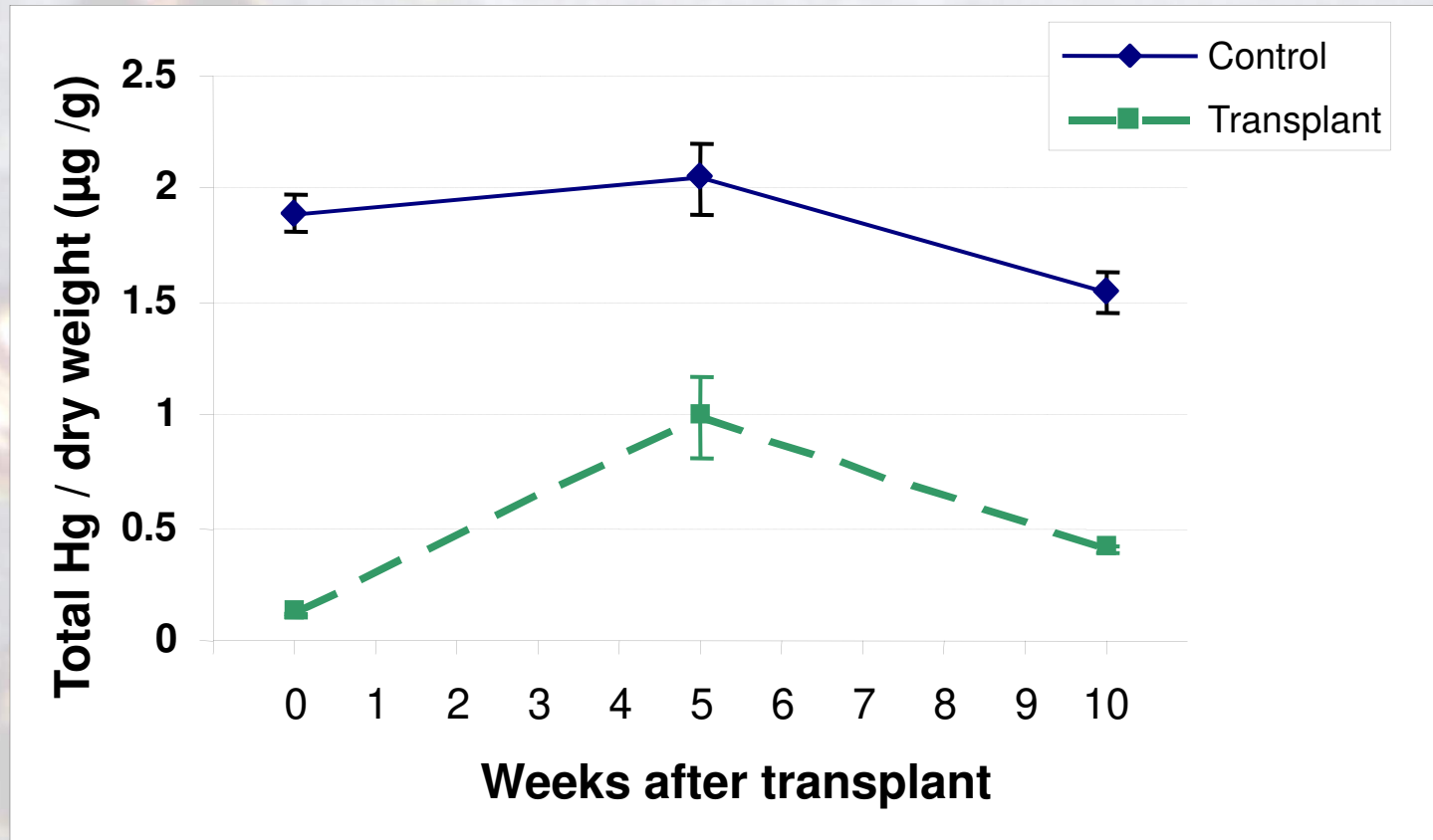
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Results: Mercury concentrations

- Relatively rapid changes in mercury concentration occurred



(n=3 samples for each point; mean $\pm$ standard error)

Next Steps: Where from here with current cages?

- **Mercury concentrations in transplants uncertain at present**
- **Six traps remain with ~60 clams in each**



Questions:



How quickly is mercury accumulated in tissues?

How quickly is mercury lost from tissues?

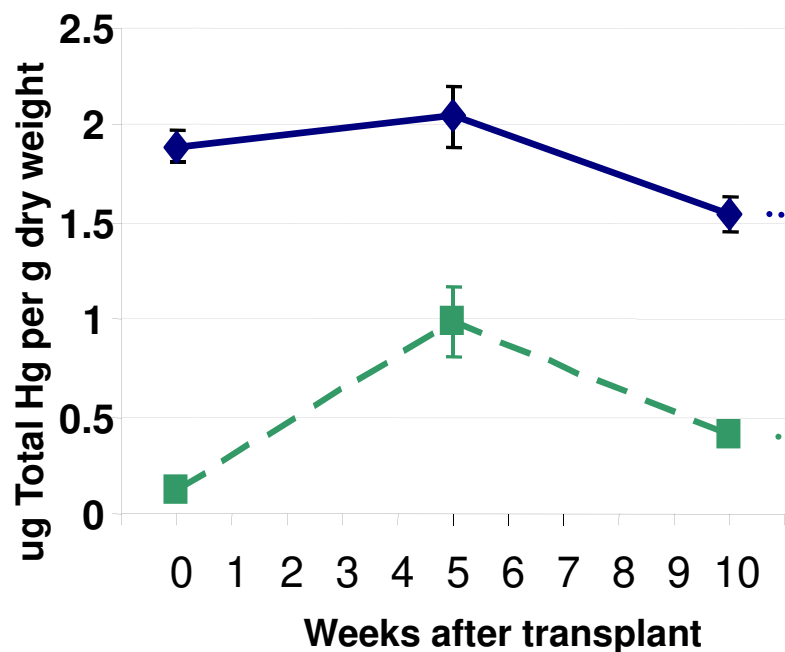
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Are there seasonal changes in mercury concentrations?

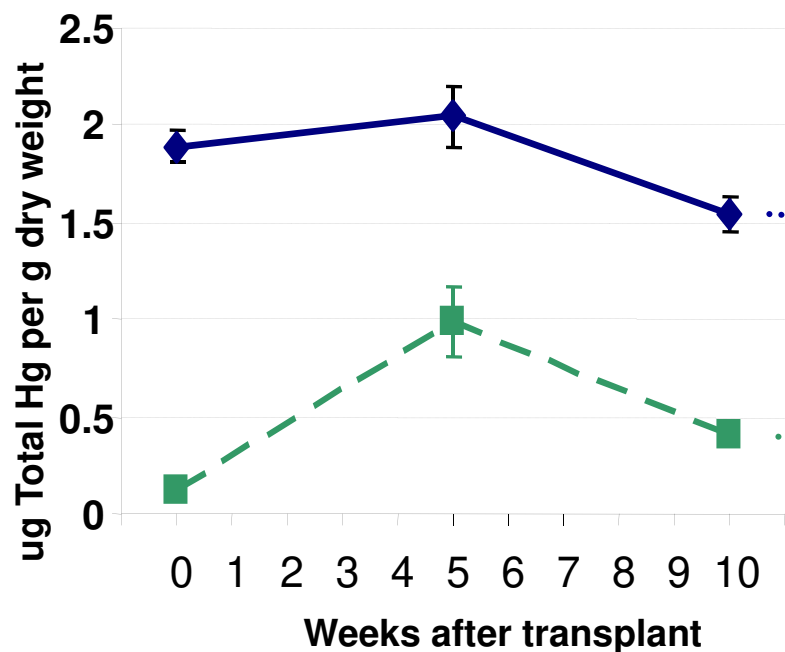
Next Steps: Where from here with current cages?

- Tomorrow collect 4 mo. sample; include an analysis of uncaged clams from forestry center
- Monthly control and transplant samples through June



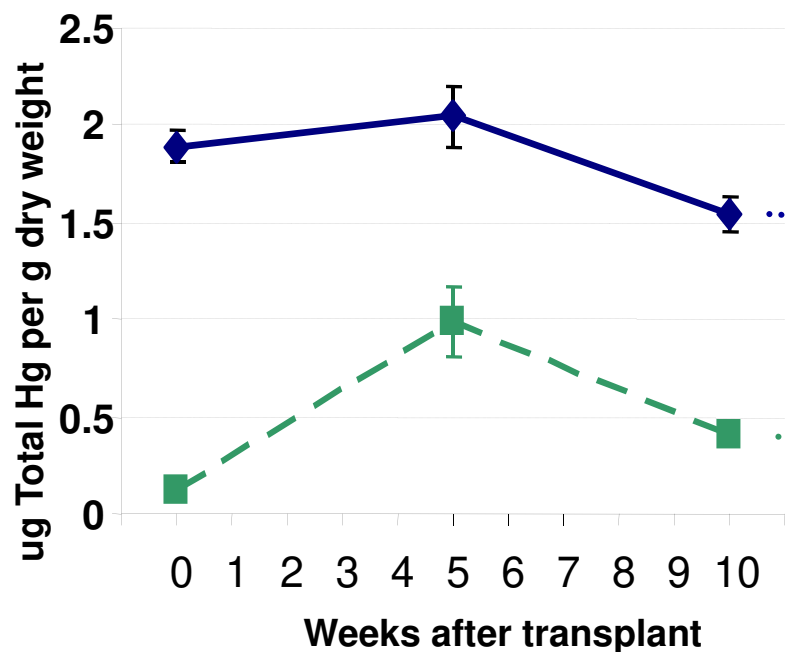
Next Steps: Where from here with current cages?

July through October: Continue sampling from three “control” cages at Forestry Center.

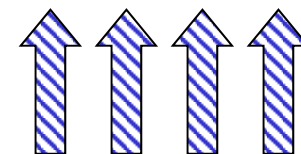


Next Steps: Where from here with current cages?

- Move three “transplant” cages to an uncontaminated site (North River at Rt 668 bridge)
- Collect samples at 2-3 week intervals
- Measure total and methylmercury for first sample (*Does methylmercury take longer to clear from animals?*)



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Next Steps: Testing Potential Hotspots

Cage Design

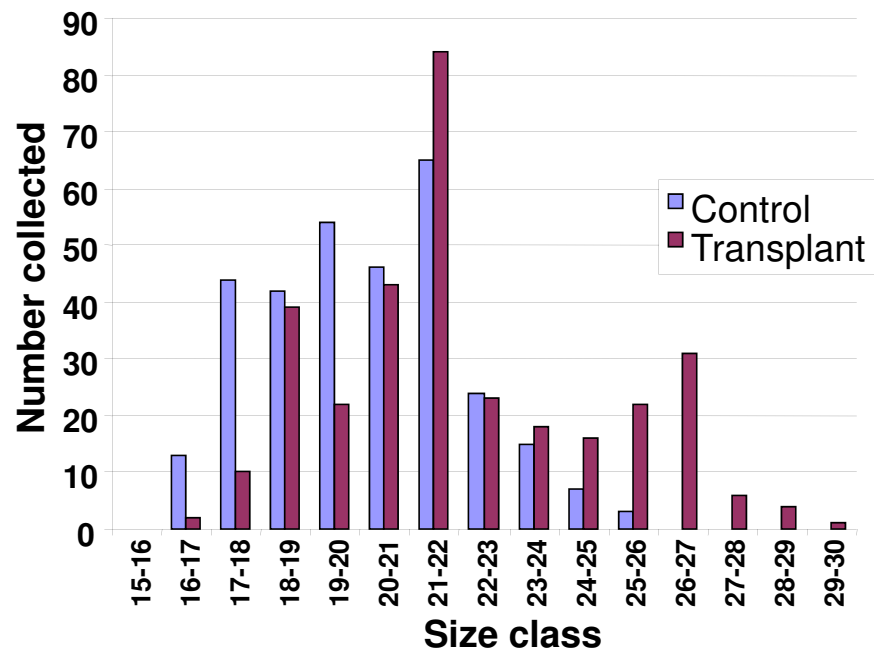
- All PVC/plastic/nylon/cement
- Place directly on bottom sediments.
- Anchor with concrete blocks
- Reduce size to hold ~45 clams



Next Steps: Testing Potential Hotspots

Clams

- Collect clams from North River at Bridgewater College
- Use narrow size class of clams (16-20mm).
- Monitoring condition index facilitates interpretation of mercury uptake data.
- Methylmercury and total mercury?

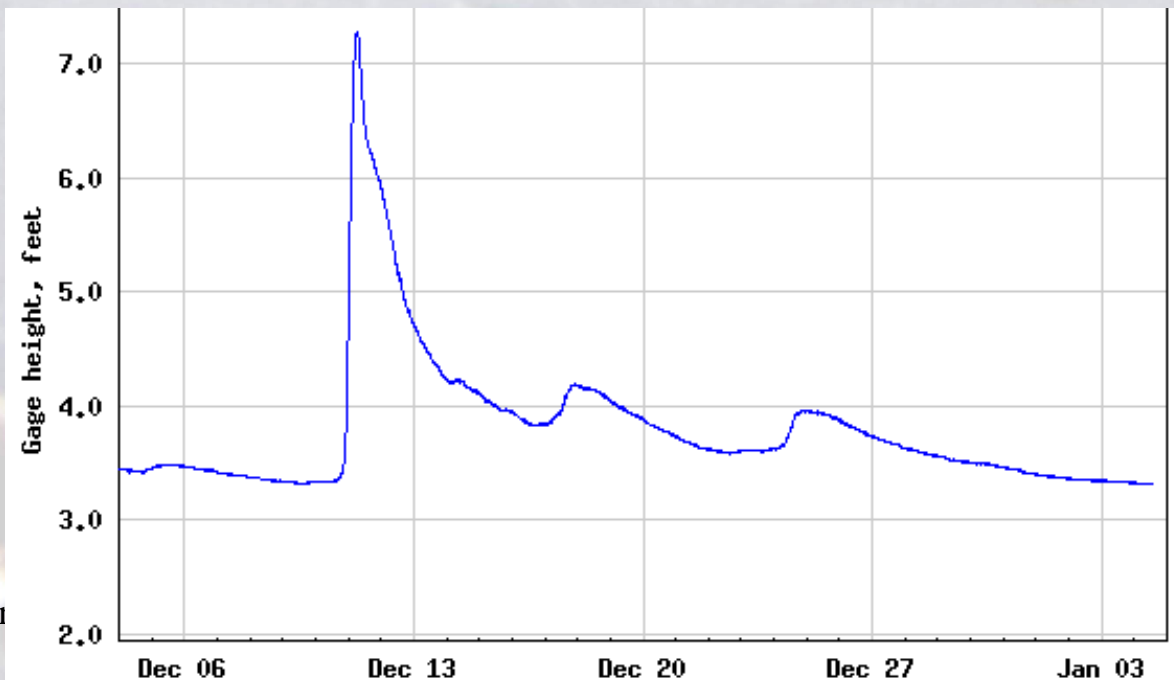


North River Sc

Next Steps: Testing Potential Hotspots

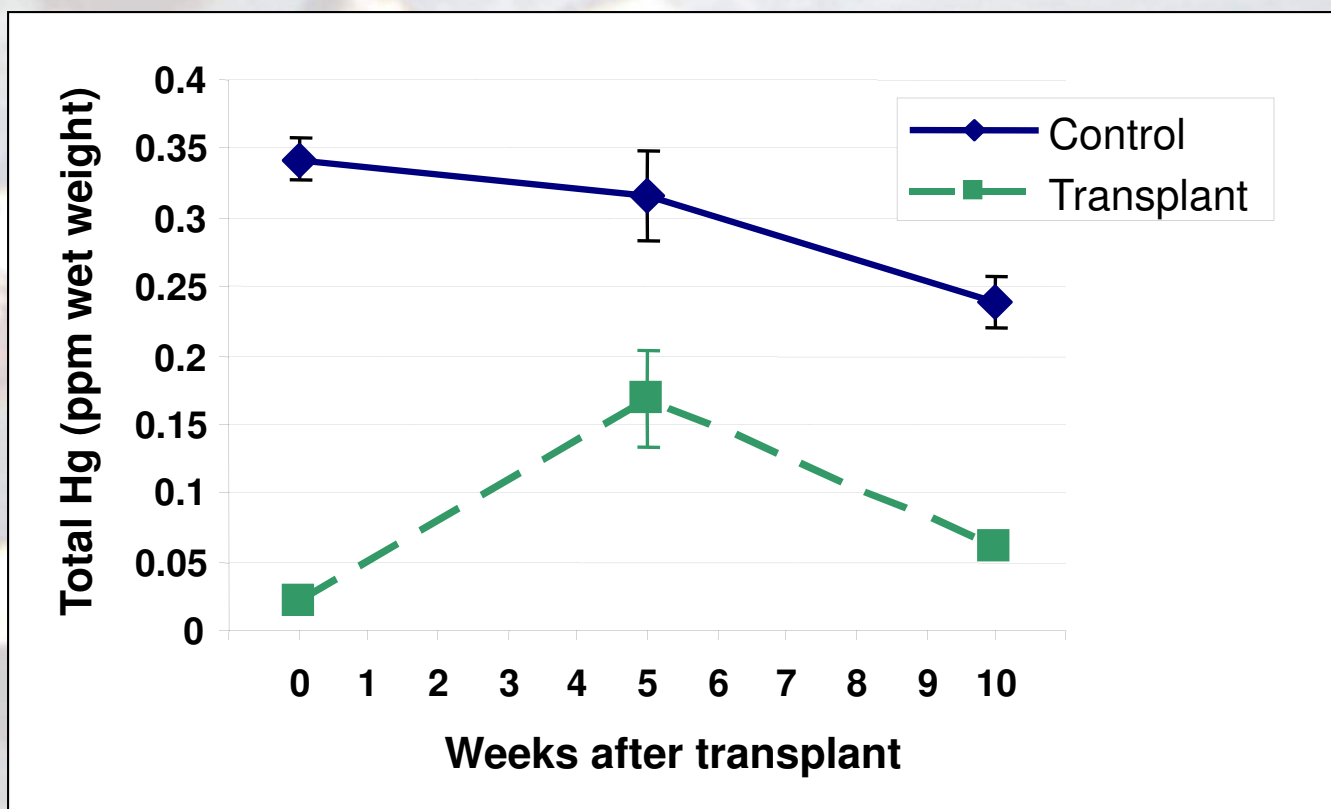
Placement & Timing

- Set cages as soon as possible to take advantage of low water
- Timing of all cages should be in parallel (placement and pick-up at approximately same dates)
- Allow 3 months (?) for uptake
- Check periodically for mortality or other problems



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