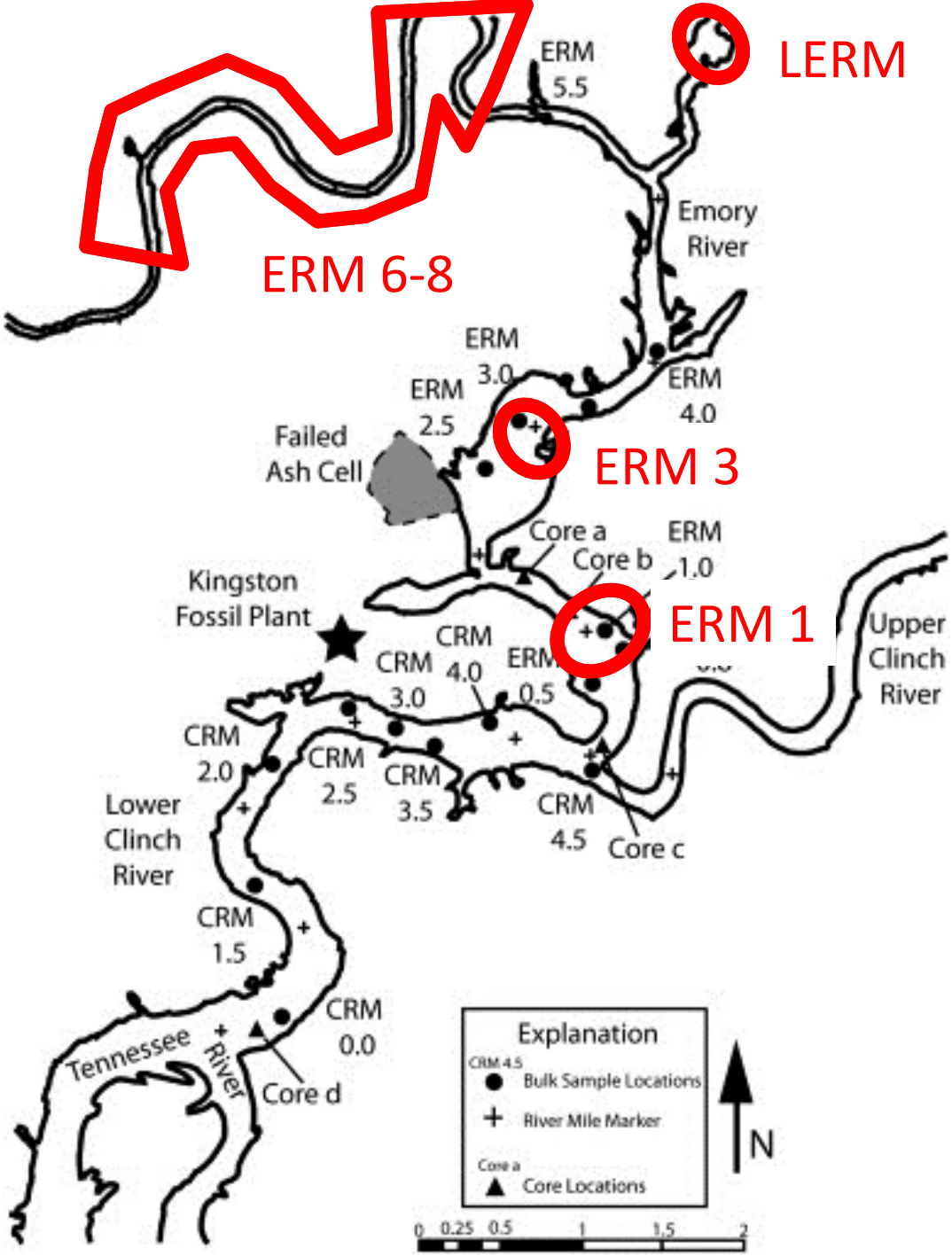
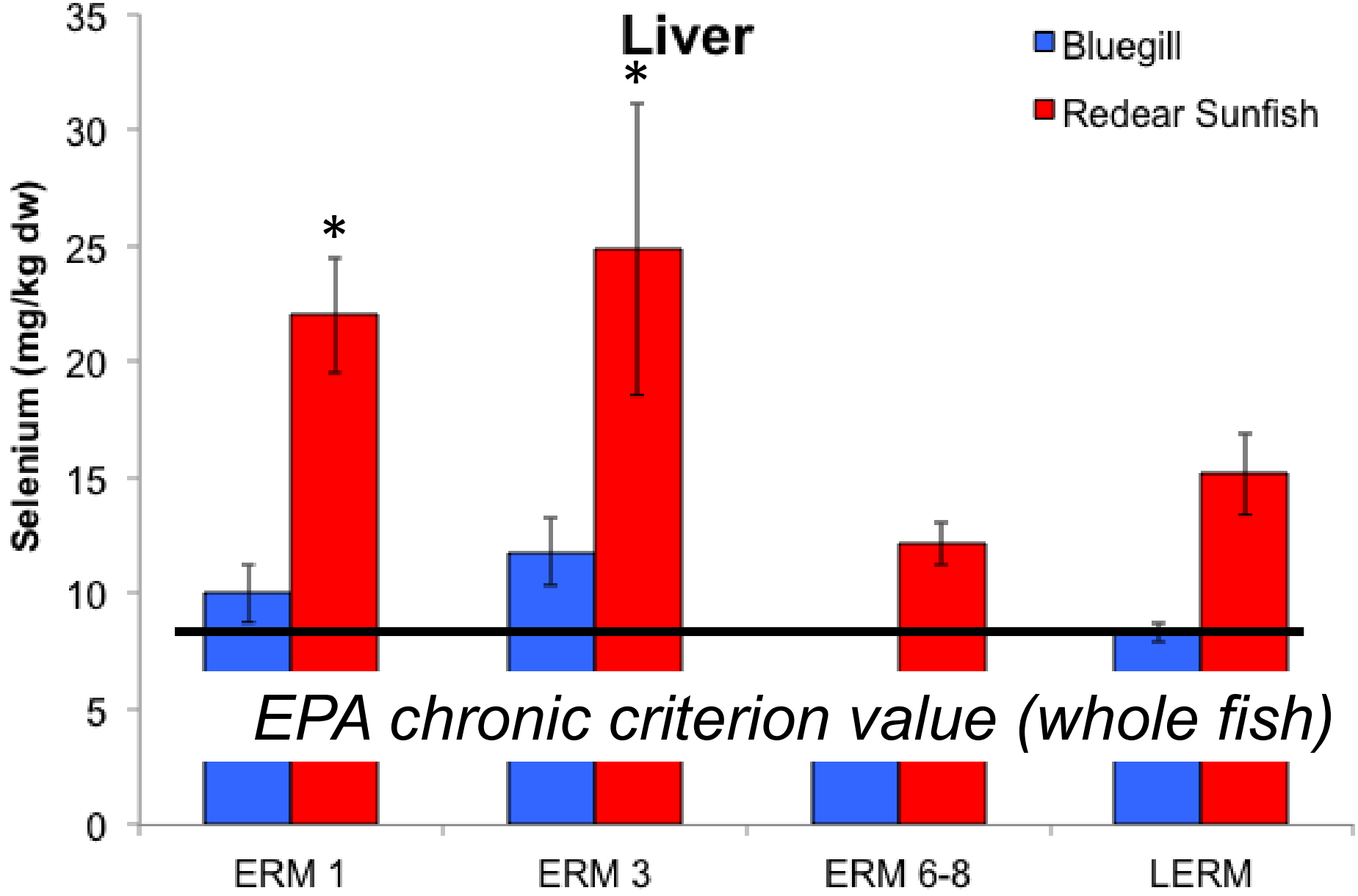
Does selenium from Kingston coal ash spill accumulate in biota?

Ryan R. Otter

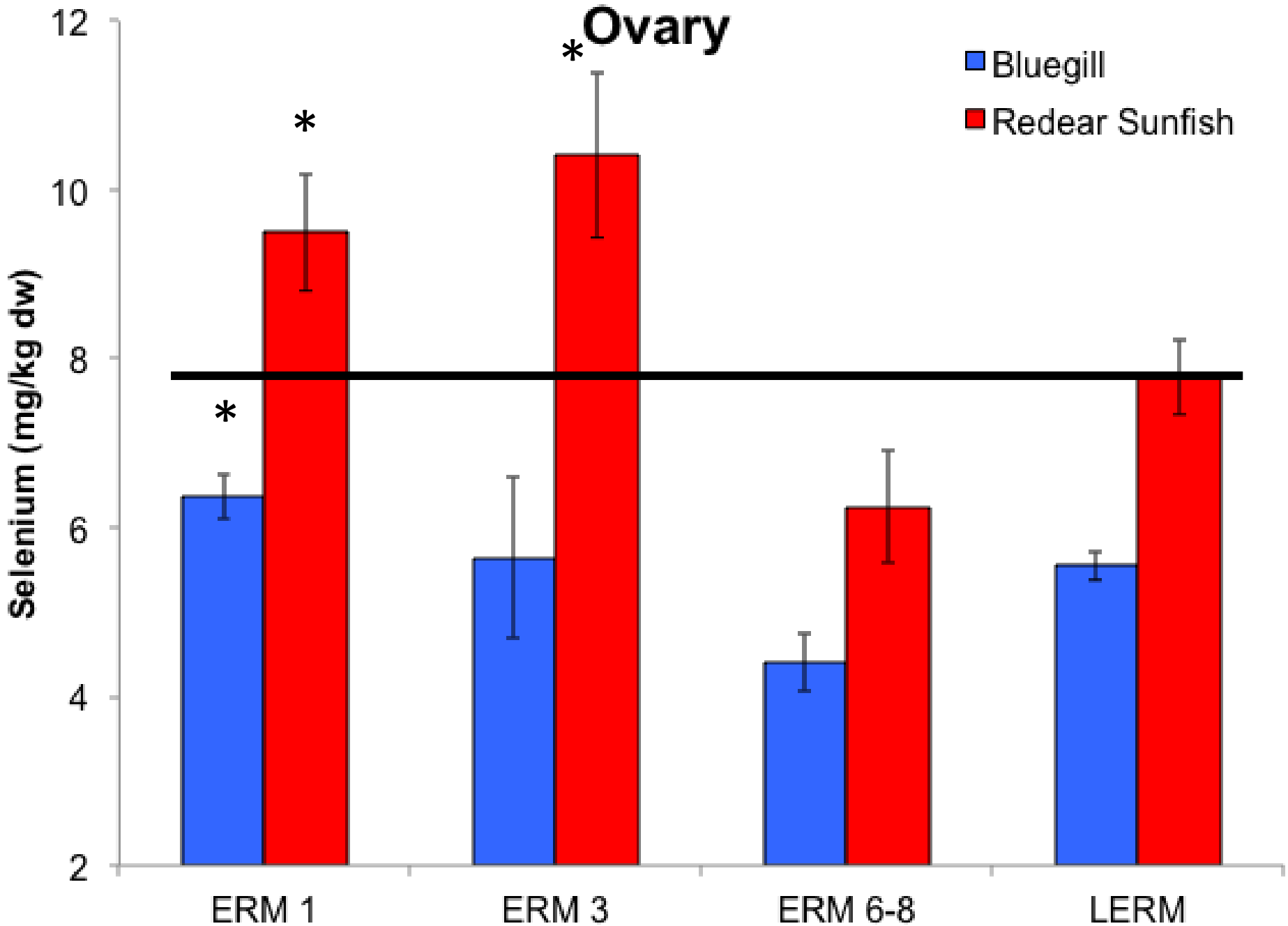
David McKinney, Terry Mathews, Frank Bailey, Bobby Brown, Susan Lainer, Don Hubbs, Bob Read, Allison Fortner, Mary Hayden, John Smith, Will Monroe, S. Marshall Adams


LERM
ERM 6-8
ERM 3
ERM 1
ERM 5.5
Emory River
ERM 4.0
ERM 3.0
ERM 2.5
Failed Ash Cell
Core a
Core b
ERM 1.0
Kingston Fossil Plant
CRM 4.0
CRM 3.0
ERM 0.5
Upper Clinch River
CRM 2.0
CRM 2.5
CRM 3.5
CRM 4.5
Core c
Lower Clinch River
CRM 1.5
CRM 0.0
Tennessee River
Core d
Explanation
CRM 4.5
Bulk Sample Locations
River Mile Marker
Core a
Core Locations
N
0 0.25 0.5 1 1.5 2

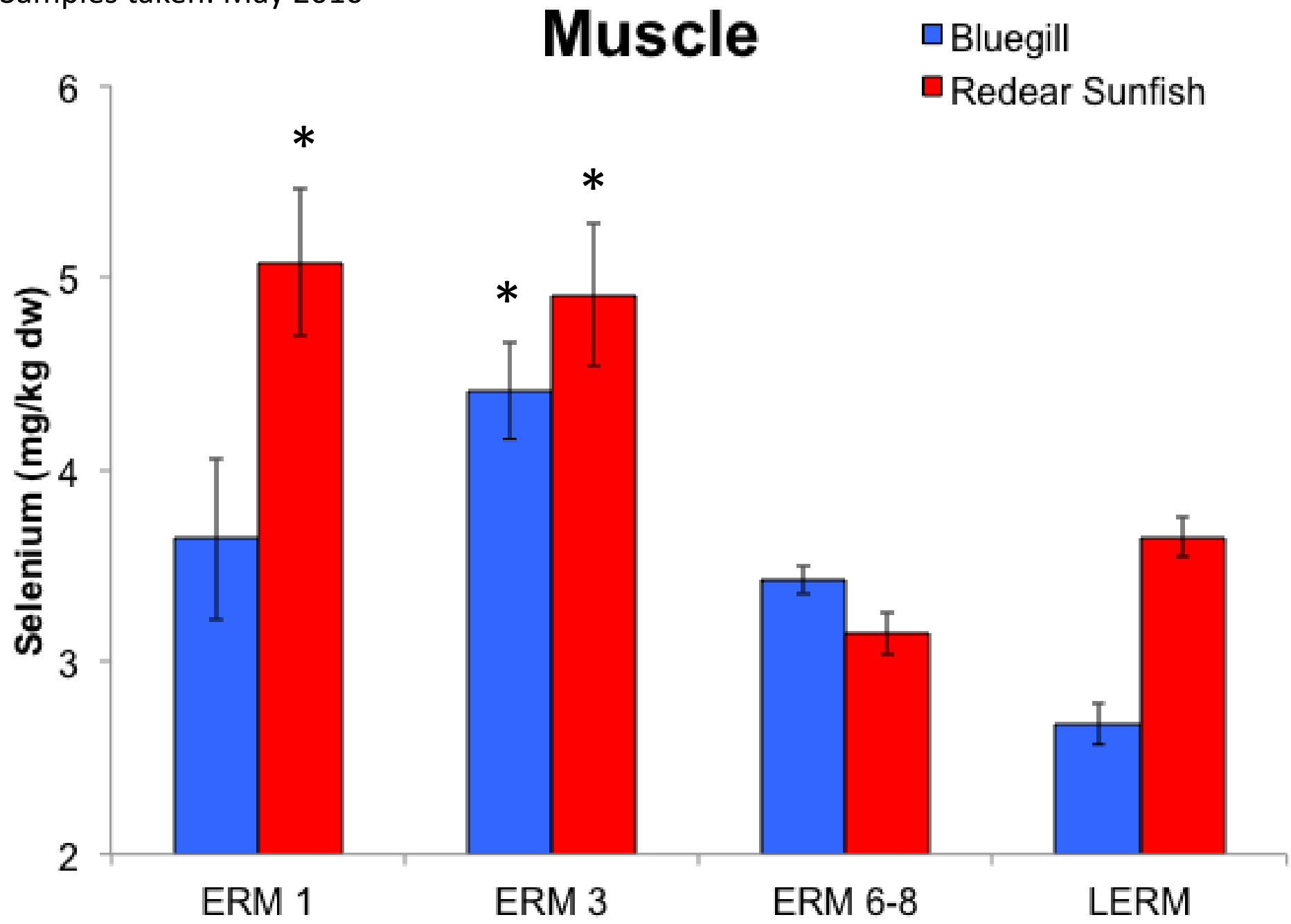
Samples taken: May 2010



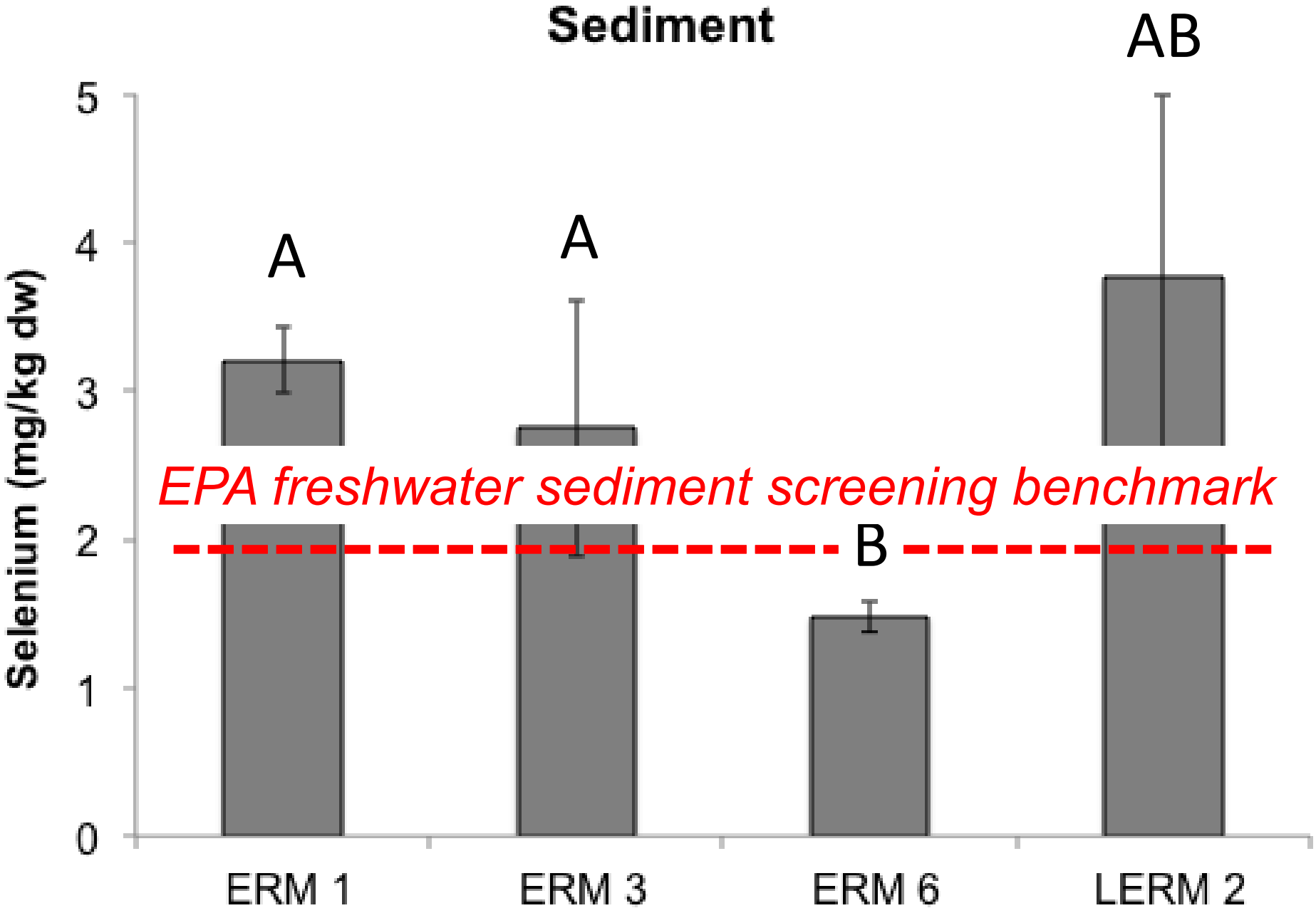
Samples taken: May 2010



Samples taken: May 2010



Samples taken: May 2011 – Dec. 2012



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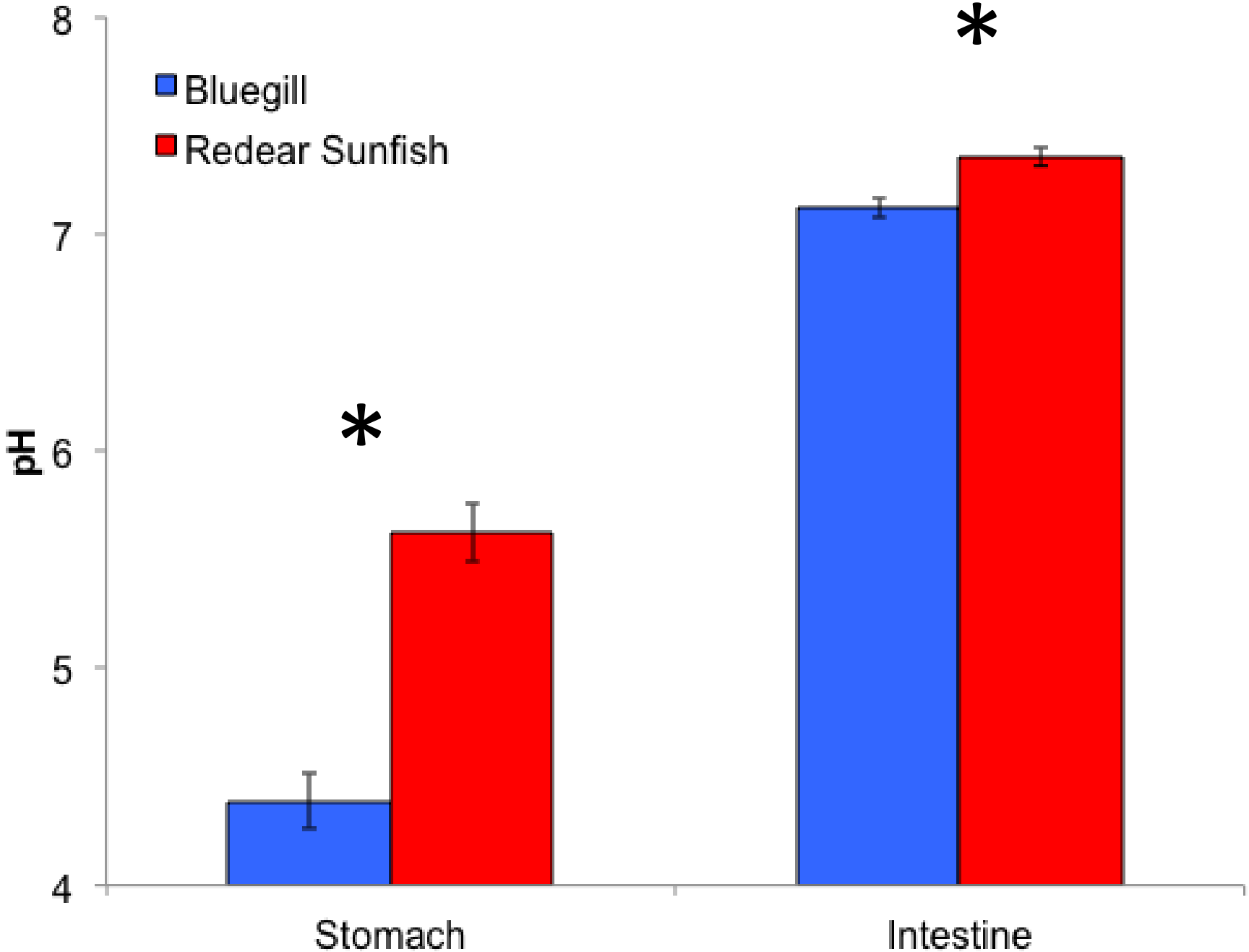
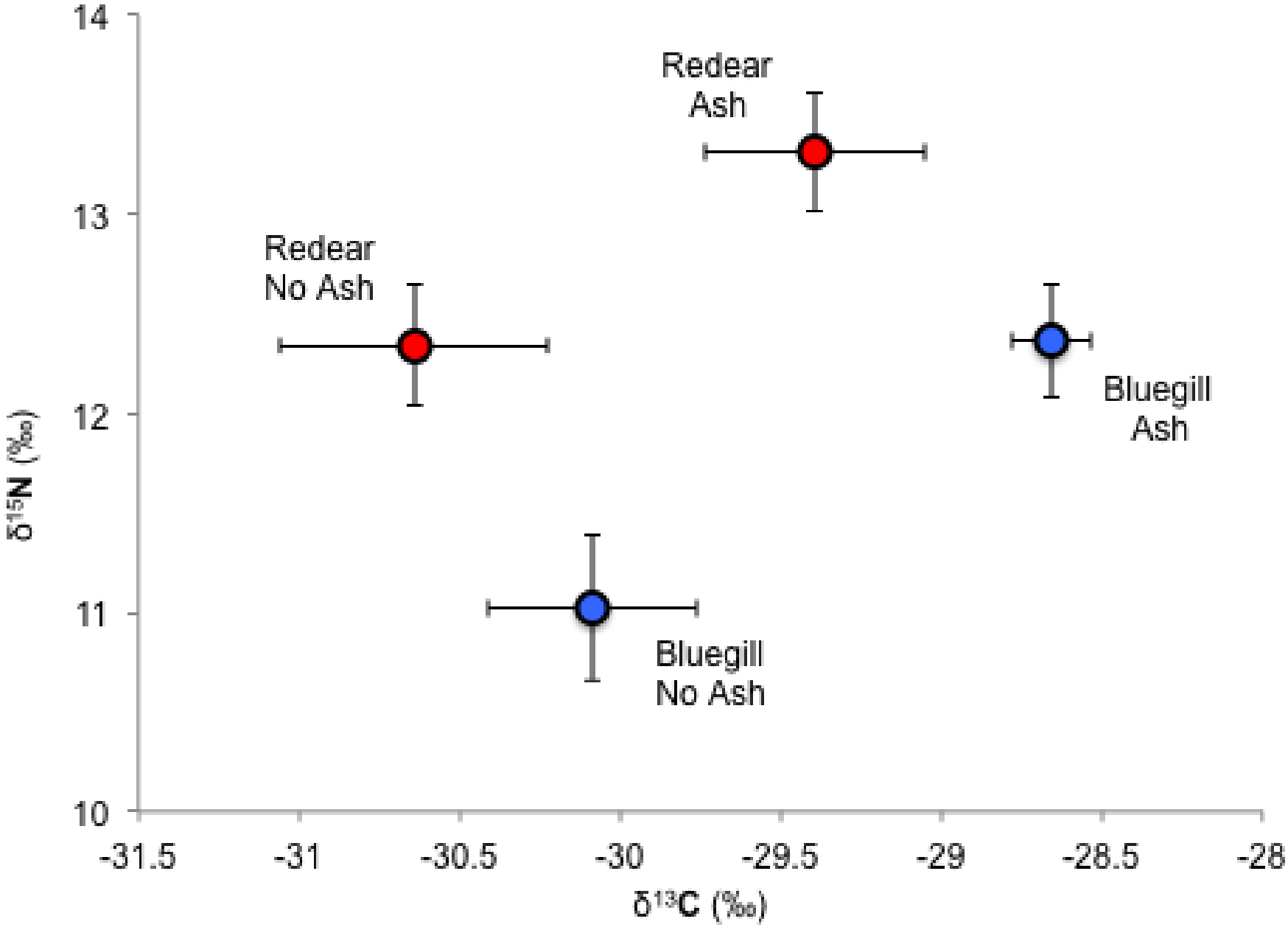


Samples taken: May 2011



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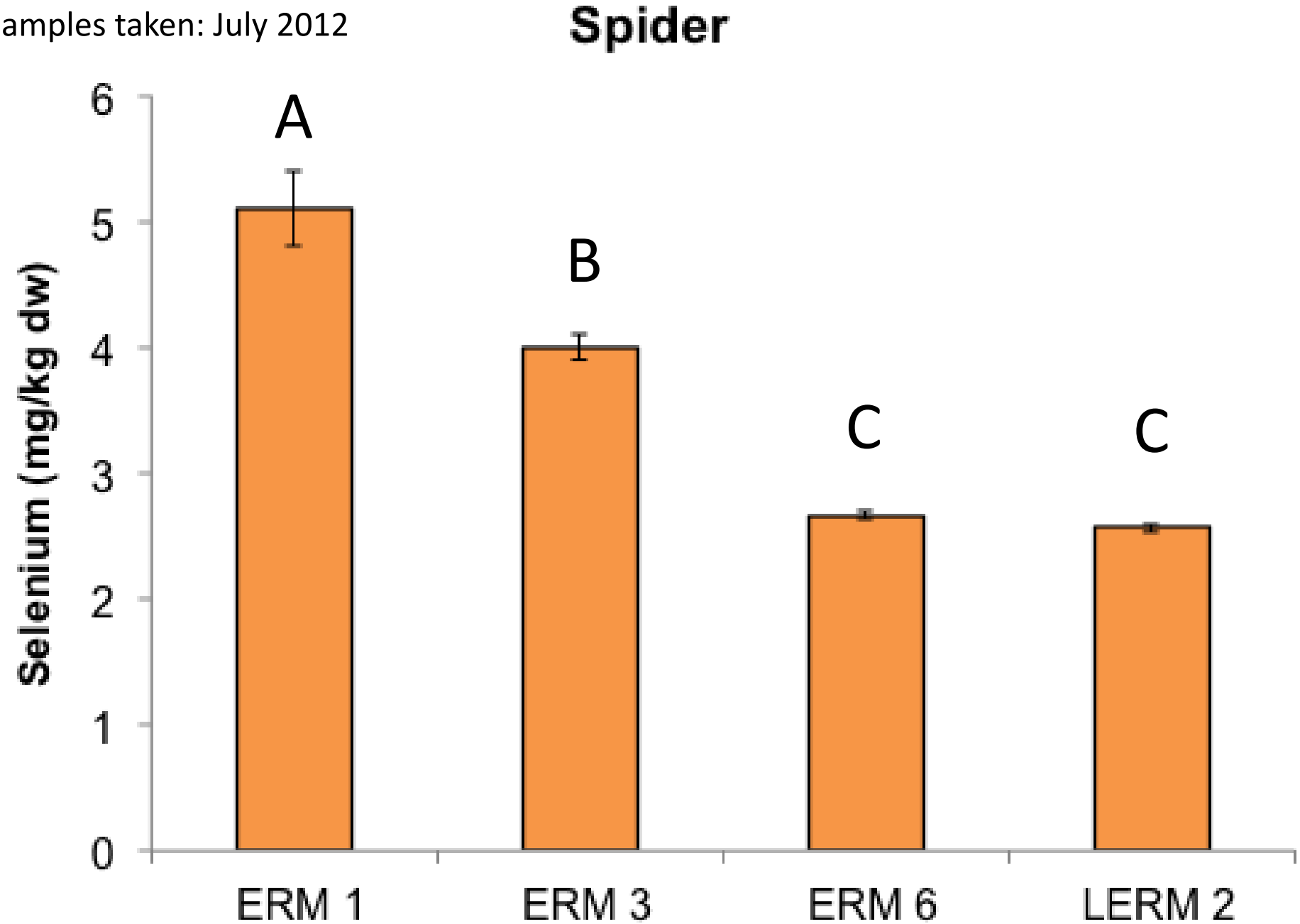
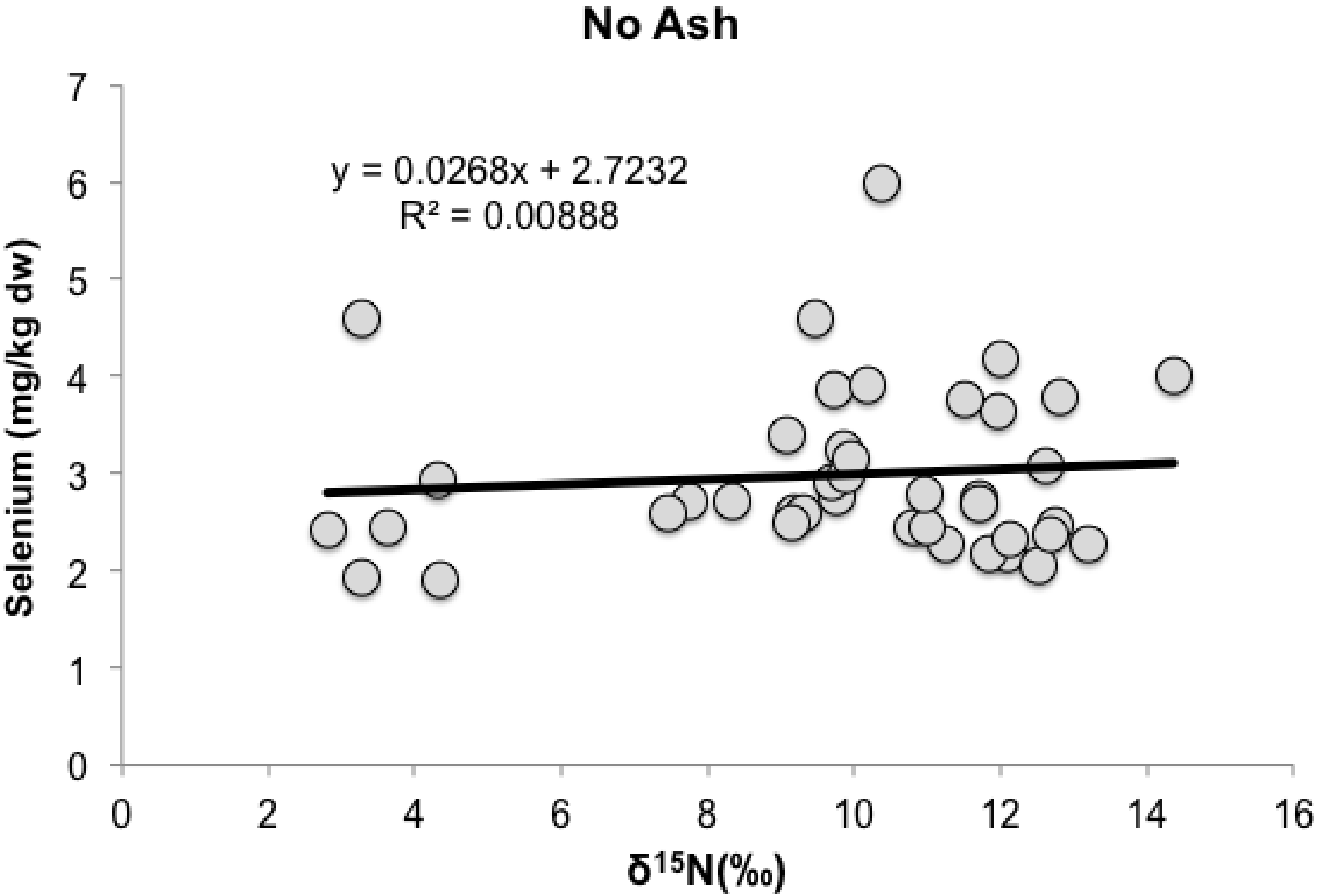
EPA chronic criterion value (whole fish)

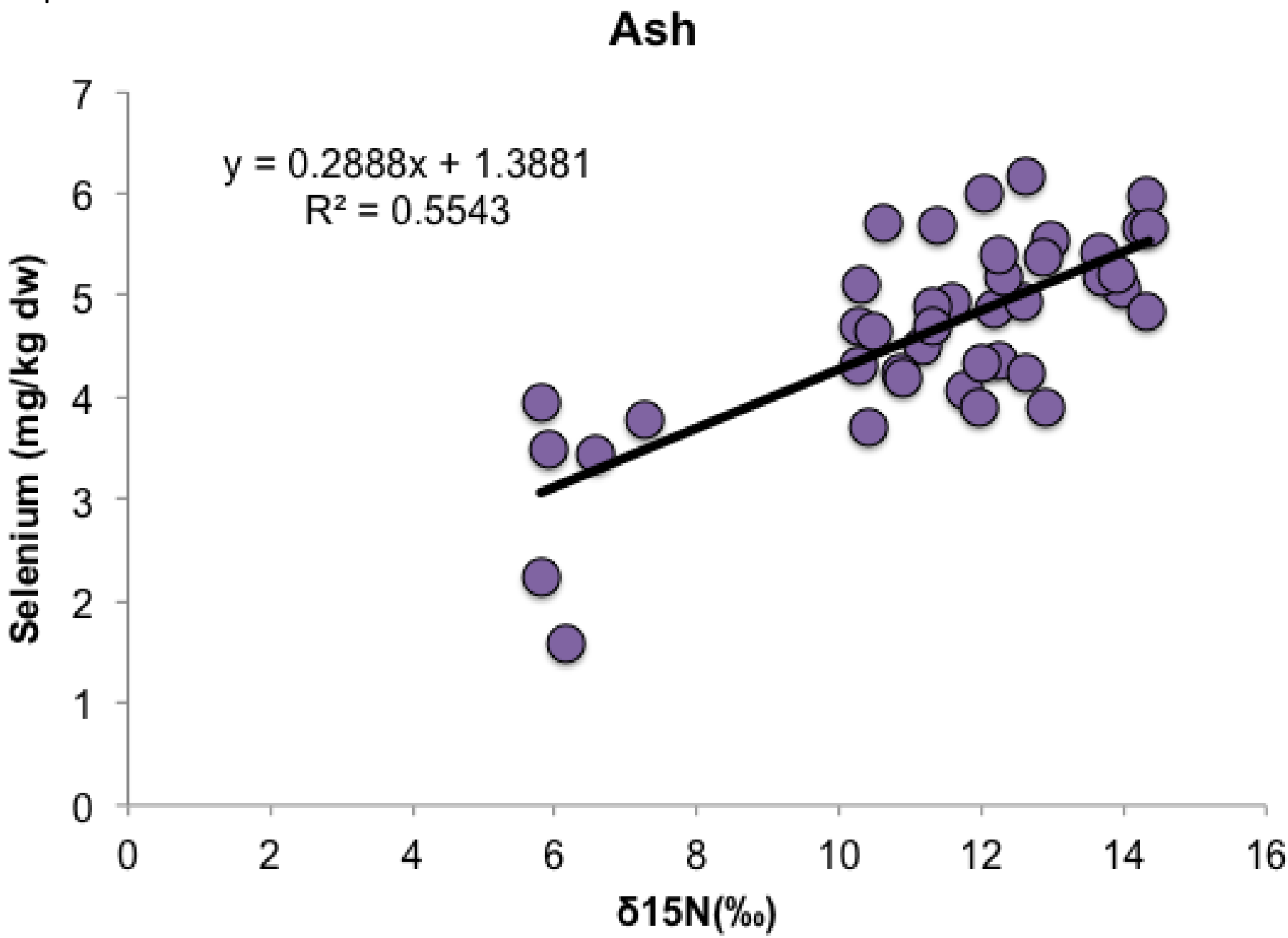
Samples taken: July 2012

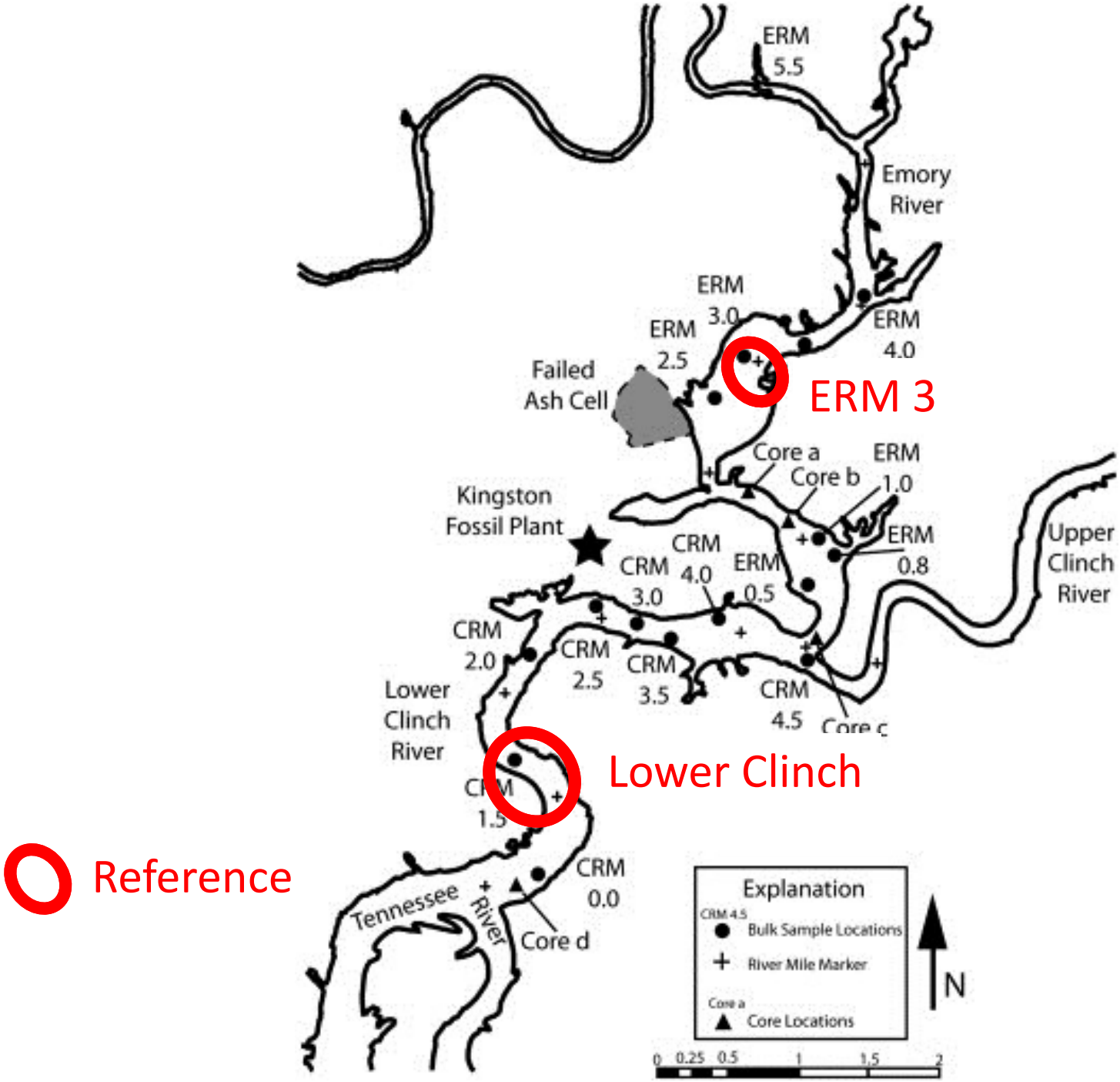


Samples taken: 2010-2012

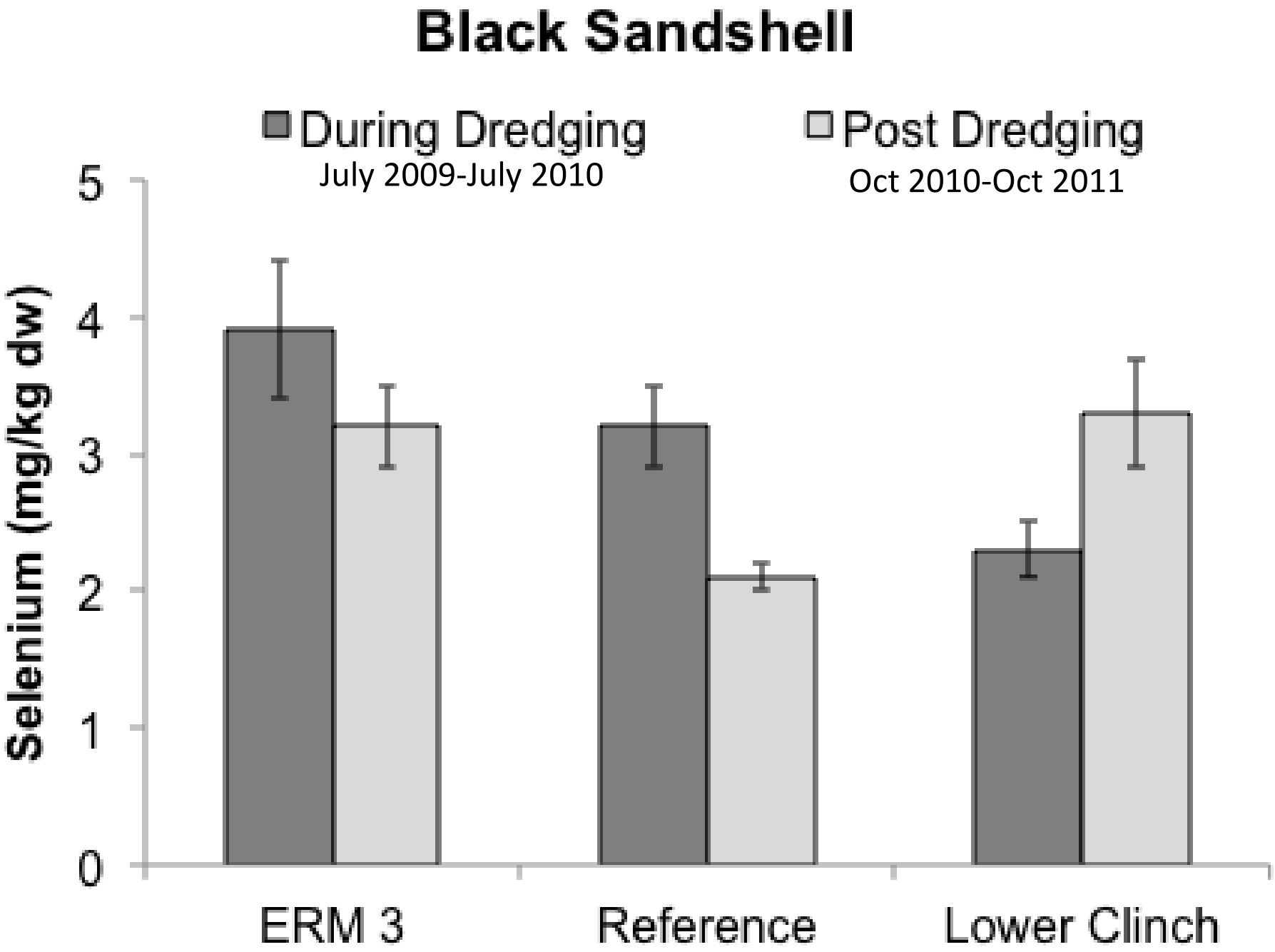


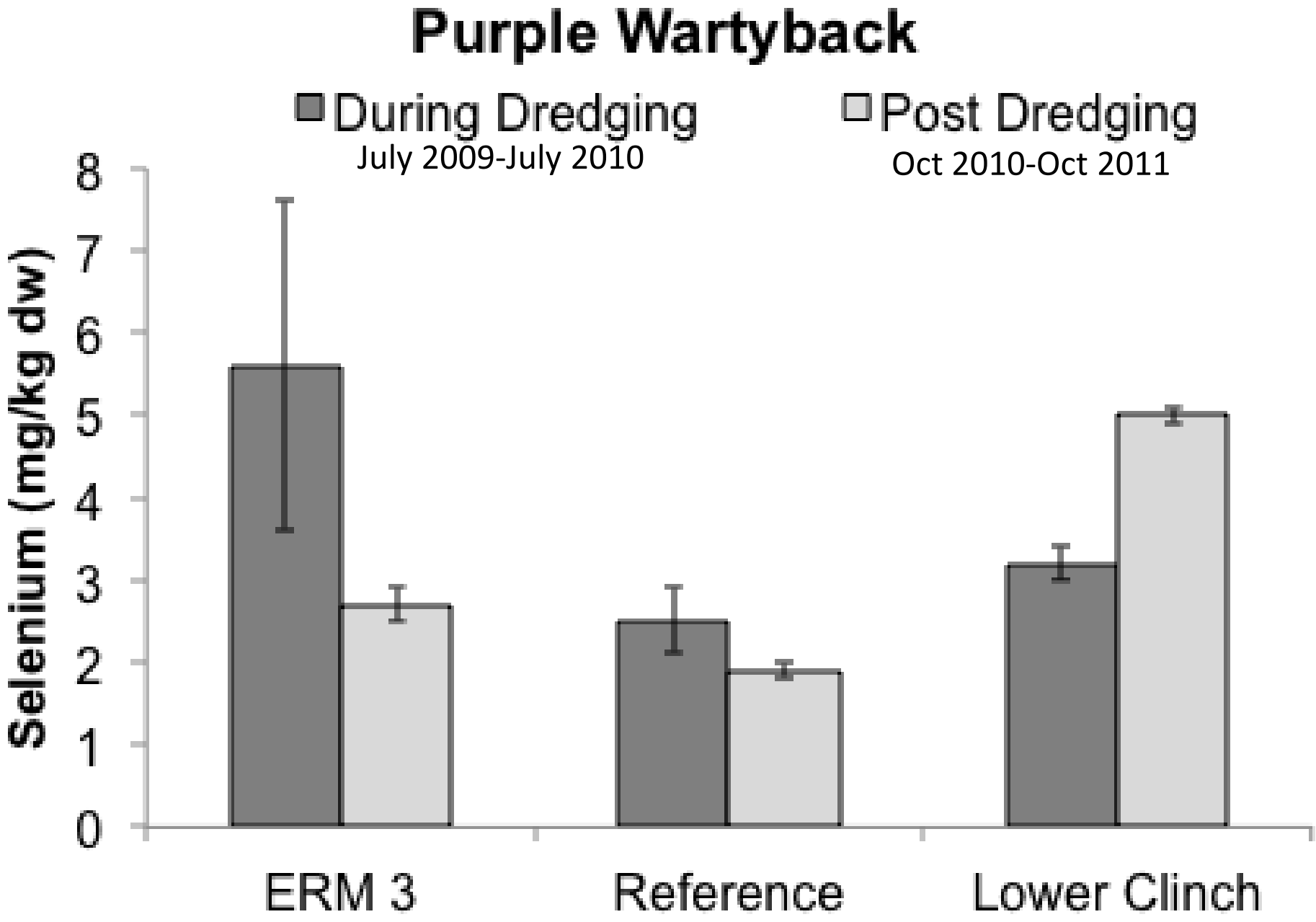
Samples taken: 2010-2012

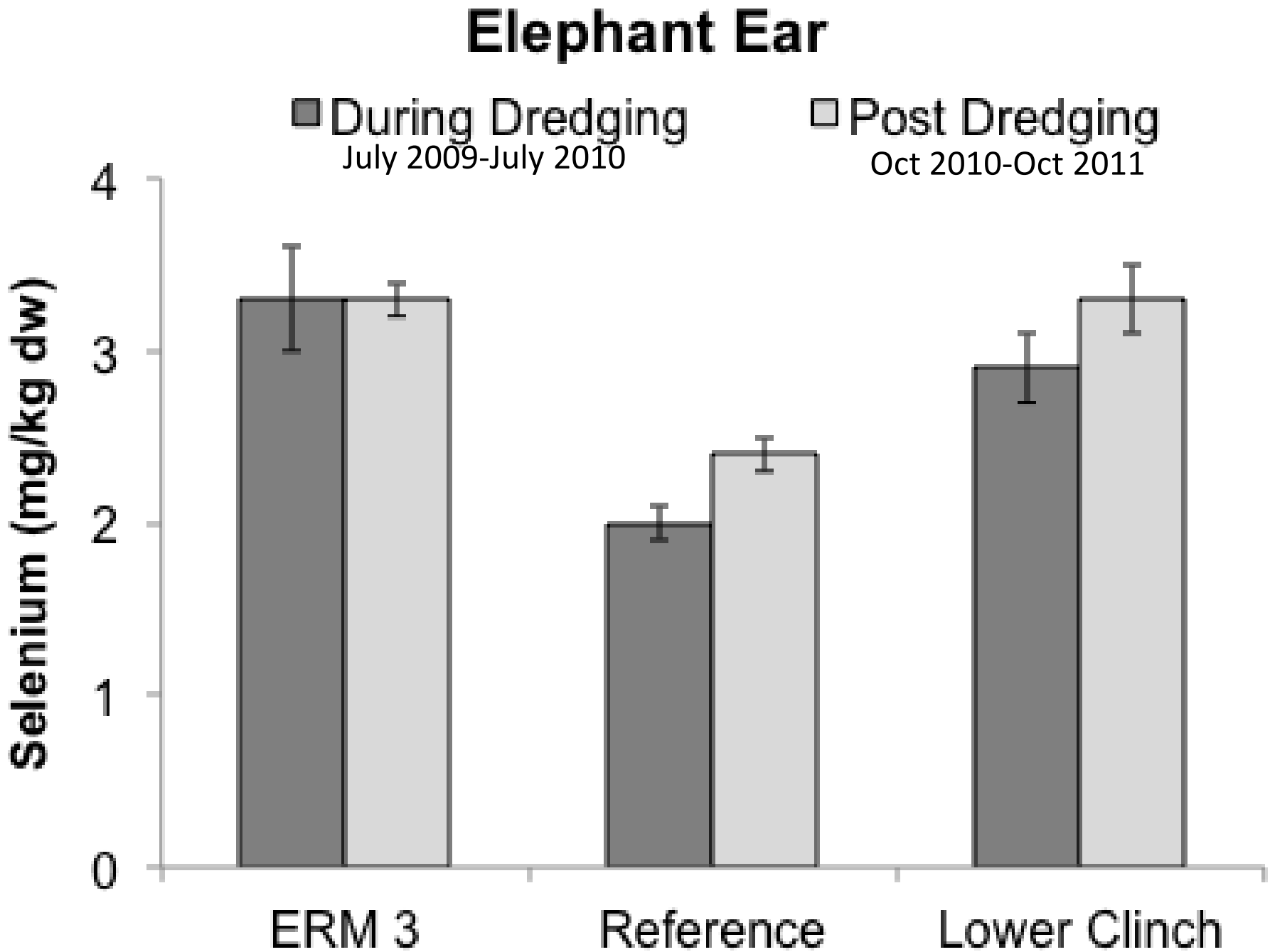


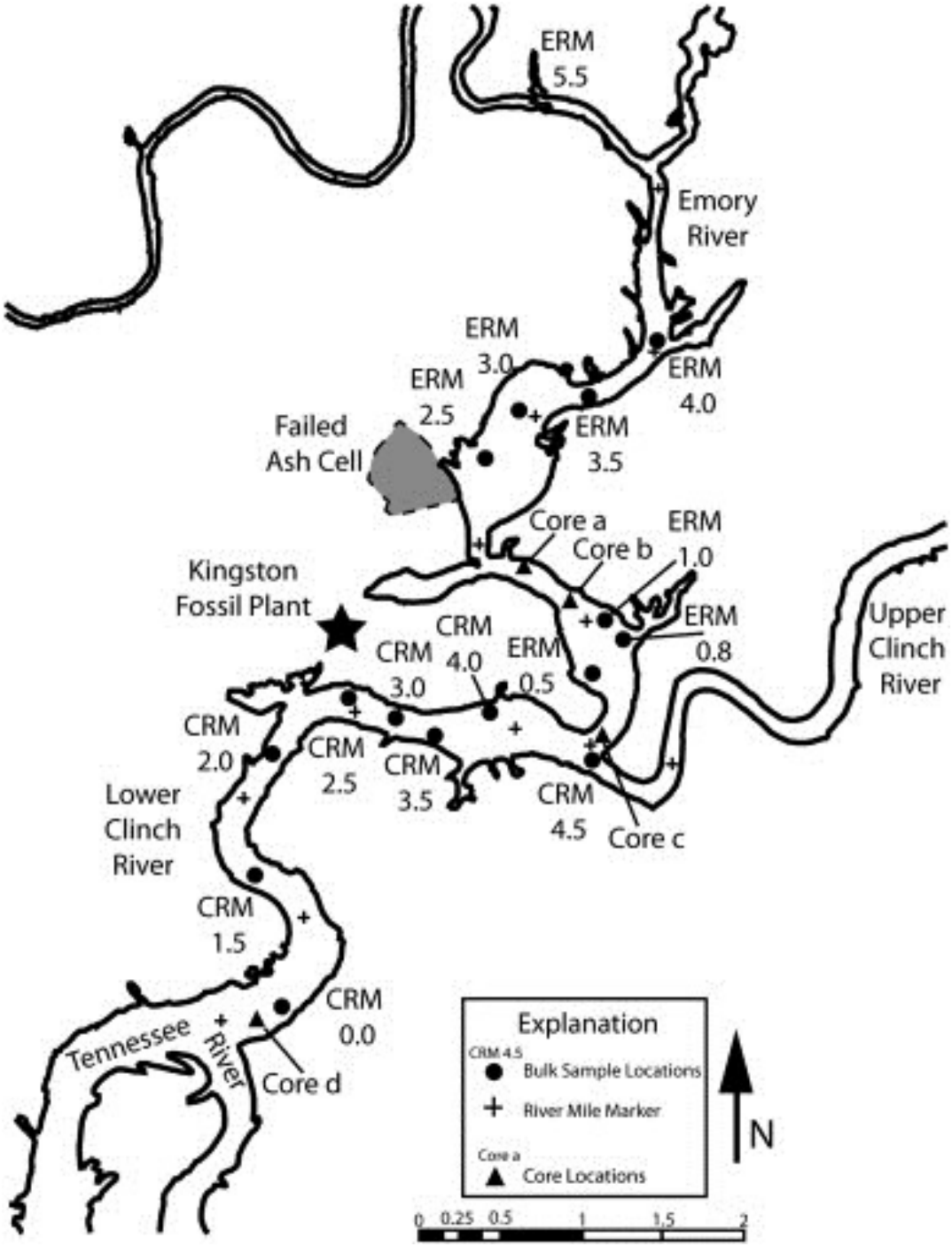

ERM 5.5
Emory River
ERM 3.0
ERM 2.5
ERM 4.0
Failed Ash Cell
ERM 3
Core a
Core b
ERM 1.0
Kingston Fossil Plant
ERM 0.8
Upper Clinch River
CRM 4.0
CRM 3.0
ERM 0.5
CRM 2.0
CRM 2.5
CRM 3.5
CRM 4.5
Core c
Lower Clinch River
Lower Clinch
CRM 1.5
Reference
CRM 0.0
Tennessee River
Core d
Explanation
CRM 4.5
Bulk Sample Locations
River Mile Marker
Core a
Core Locations
N
0 0.25 0.5 1 1.5 2

062
046


Black Sandshell
During Dredging
July 2009-July 2010
Post Dredging
Oct 2010-Oct 2011
Selenium (mg/kg dw)
5
4
3
2
1
0
ERM 3
Reference
Lower Clinch


Purple Wartyback
During Dredging
July 2009-July 2010
Post Dredging
Oct 2010-Oct 2011
Selenium (mg/kg dw)
0
1
2
3
4
5
6
7
8
ERM 3
Reference
Lower Clinch


Elephant Ear
During Dredging
July 2009-July 2010
Post Dredging
Oct 2010-Oct 2011
Selenium (mg/kg dw)
4
3
2
1
0
ERM 3
Reference
Lower Clinch


ERM
5.5
Emory
River
ERM
3.0
ERM
2.5
ERM
4.0
Failed
Ash Cell
ERM
3.5
Core a
Core b
ERM
1.0
Kingston
Fossil Plant
ERM
0.8
Upper
Clinch
River
CRM
4.0
CRM
3.0
ERM
0.5
CRM
2.0
CRM
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3.5
CRM
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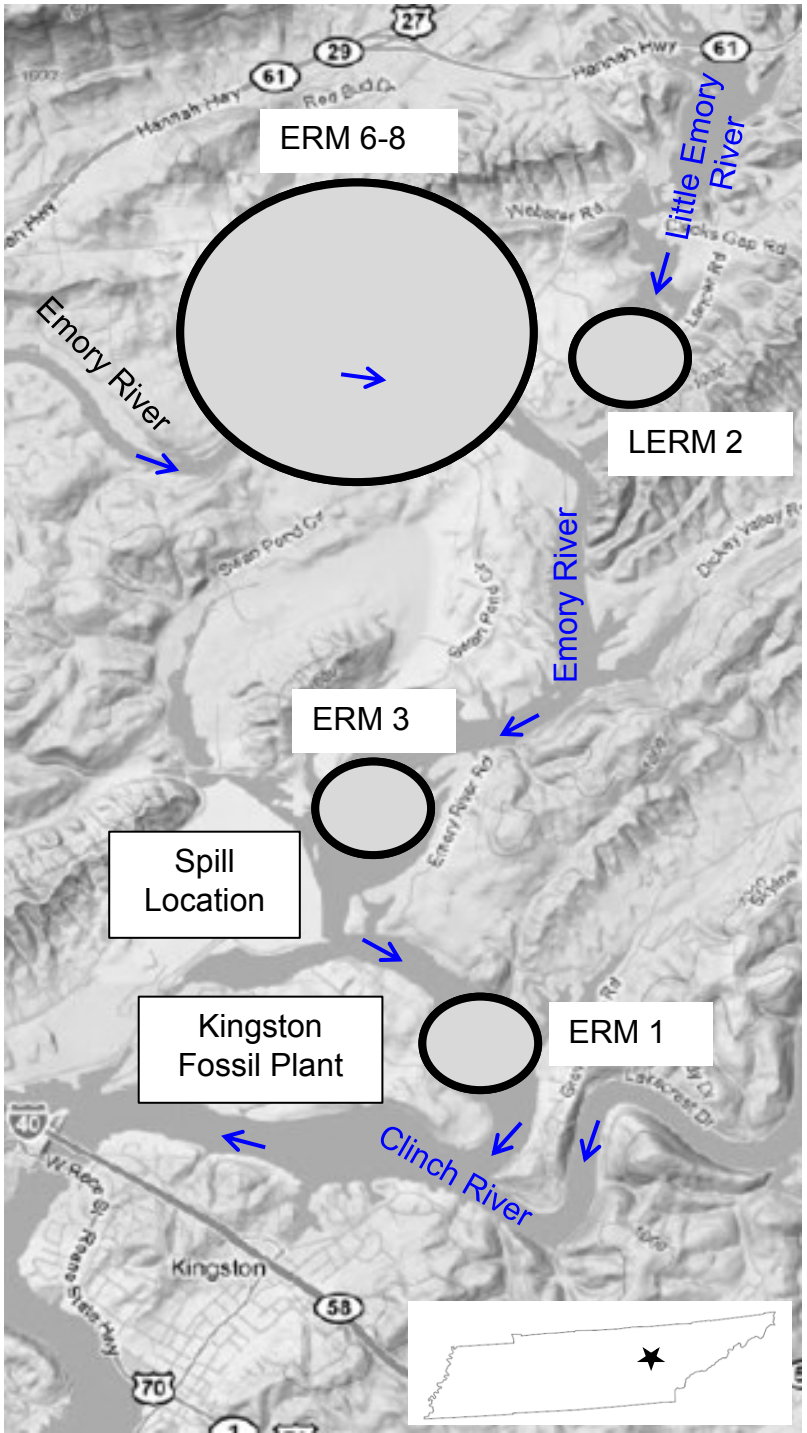
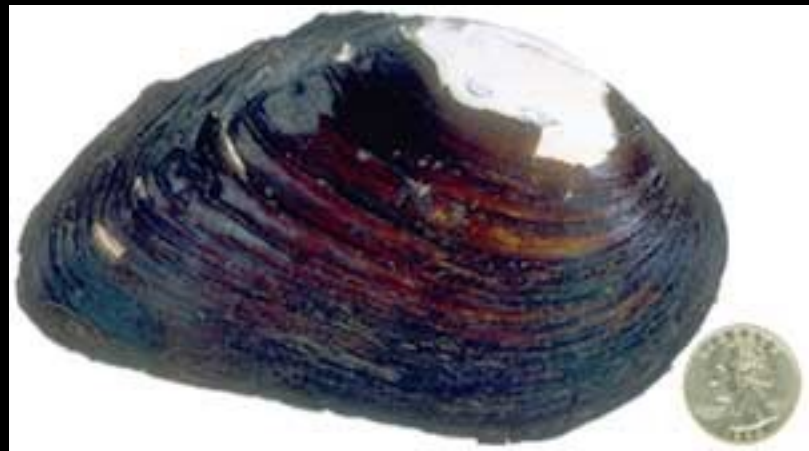

ERM 6-8
Little Emory River
Emory River
LERM 2
Emory River
ERM 3
Spill Location
Kingston Fossil Plant
ERM 1
Clinch River
Kingston

Black Sandshell
Ligumia recta

Pink Heelsplitter
Potamilus alatus

Purple Wartyback
Cyclonaias tuberculata

Pimpleback
Quadrula pustulosa

Elephant Ear
Elliptio crassidens