



Longitudinal Resource Use of Bluegill in Five Reaches of the UMRS

Shaley Valentine (she/hers) and Greg Whitley

2022 IL AFS Annual Meeting

March 18, 2022

Introduction

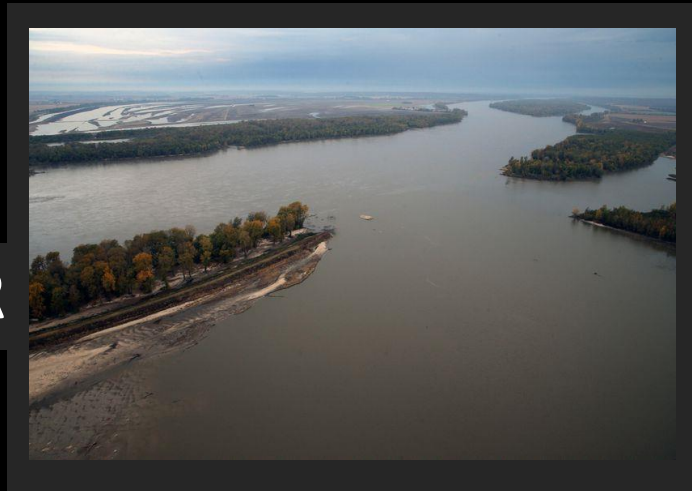
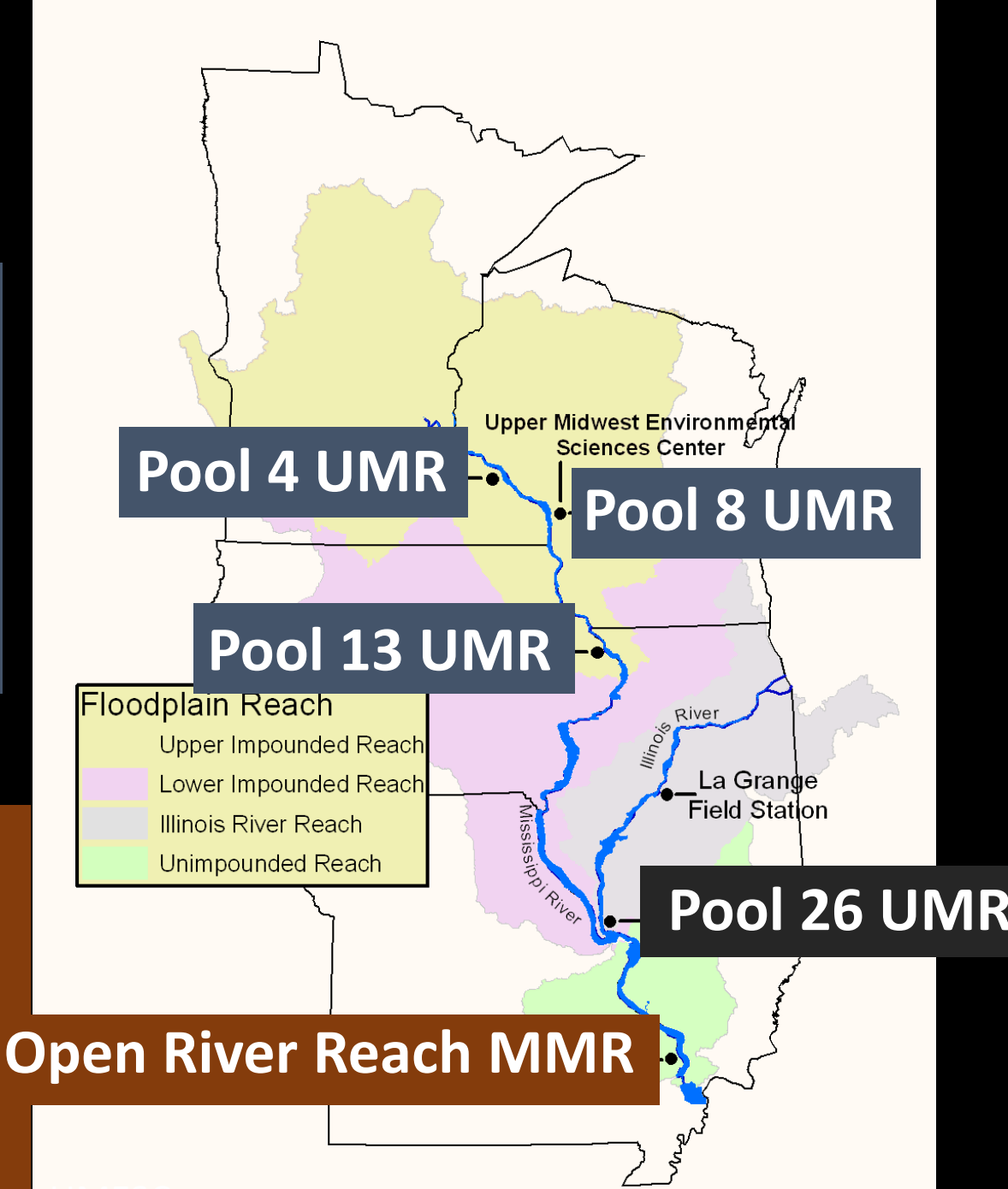


Physical environment affects resource availability and accessibility



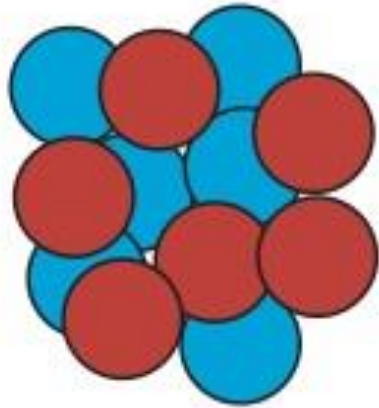
Physical environment affects resource availability and accessibility





Stable isotopes can measure resource use

carbon-12

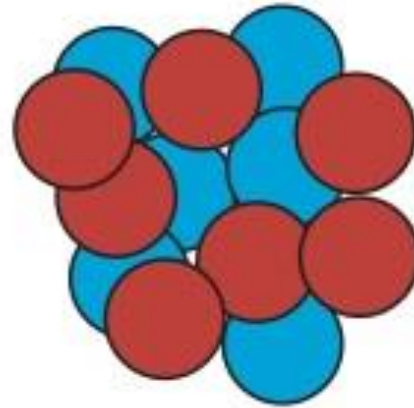


^{12}C

6 protons
6 neutrons

light

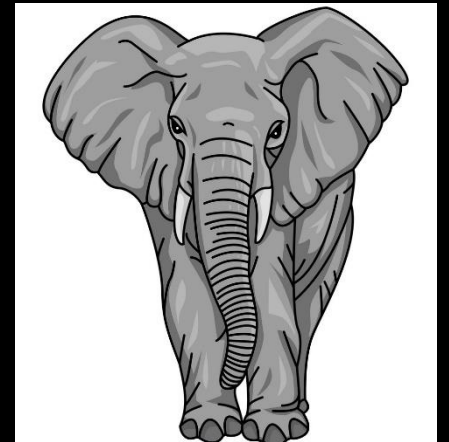
carbon-13



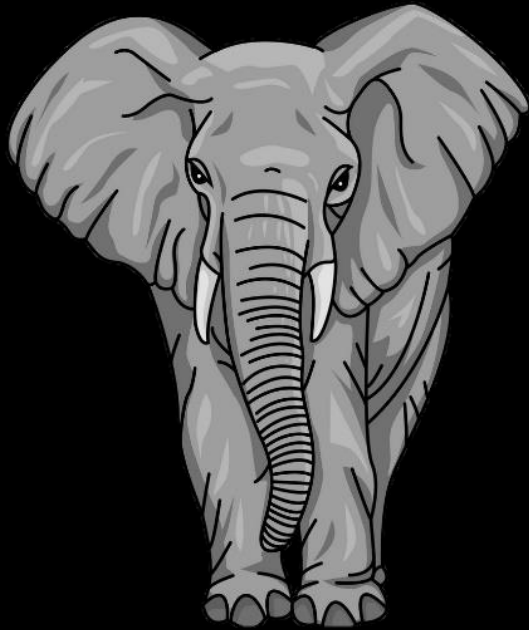
^{13}C

6 protons
7 neutrons

heavy



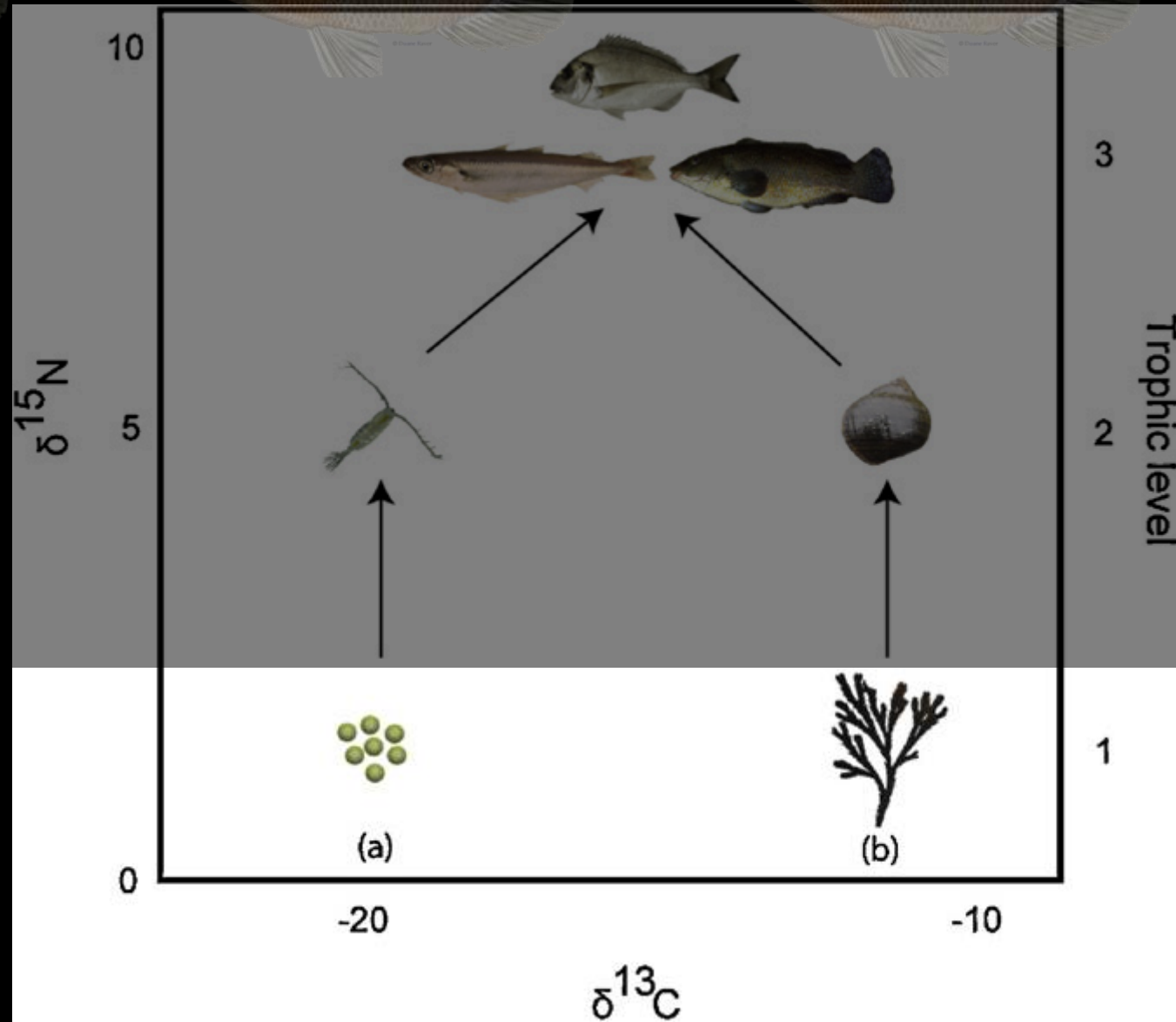
Stable isotopes can measure resource use



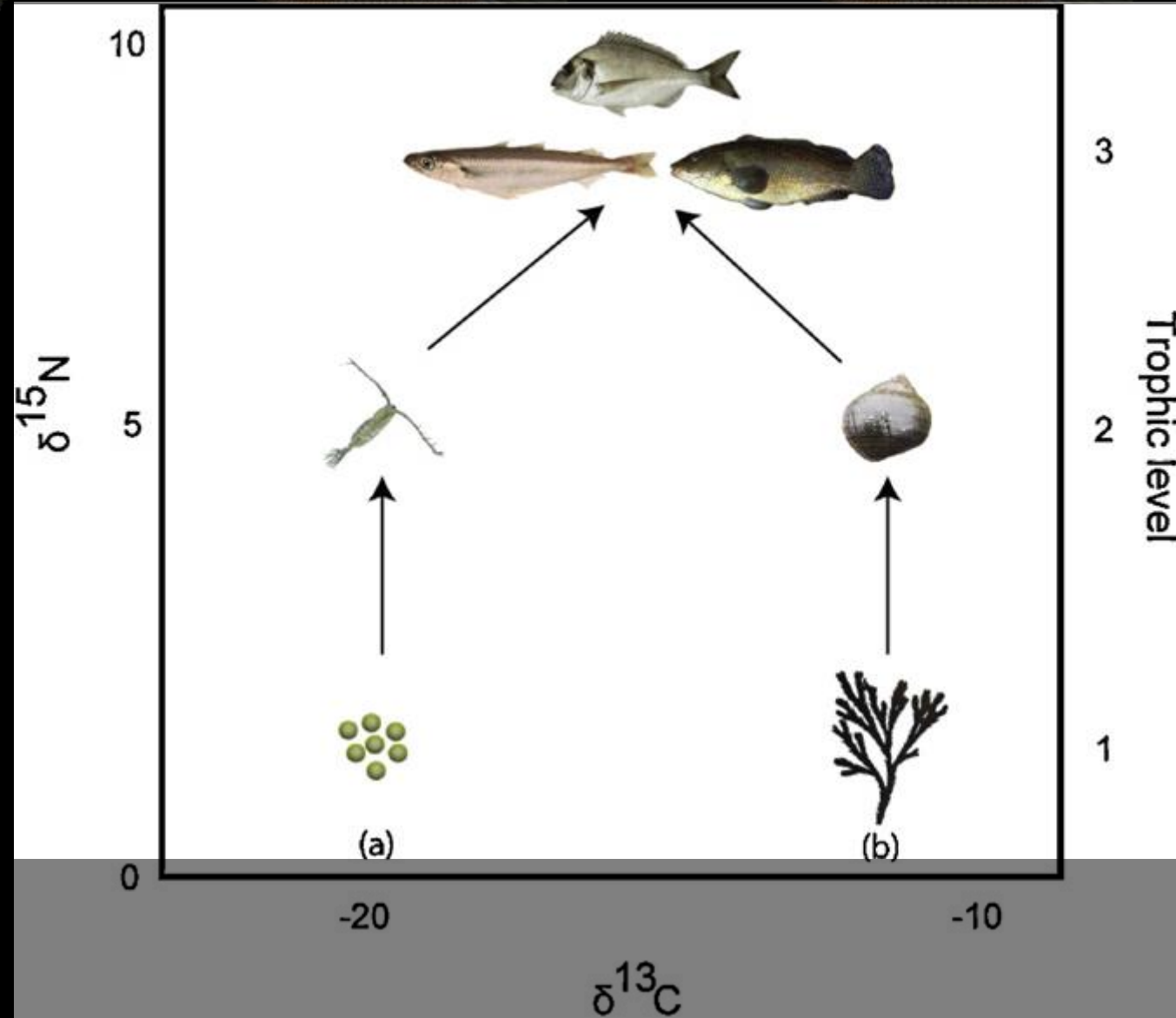
..



Carbon-Habitat



Nitrogen-Prey



Isotope values are an average of used resources



-8C, 13N

-1C, 8N



-5C, 6N



-10C, 15N



Isotope values are an average of used resources



-6C, 8N

-1C, 8N

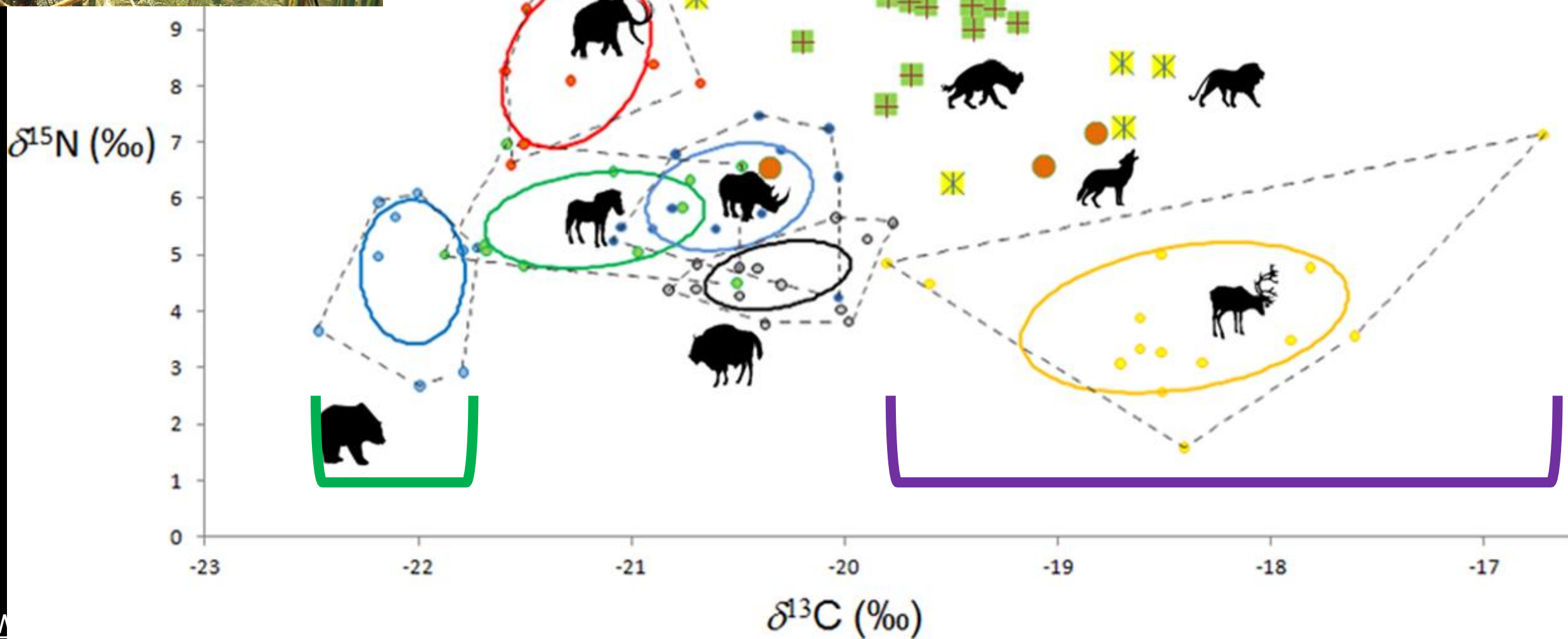
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-10C, 15N



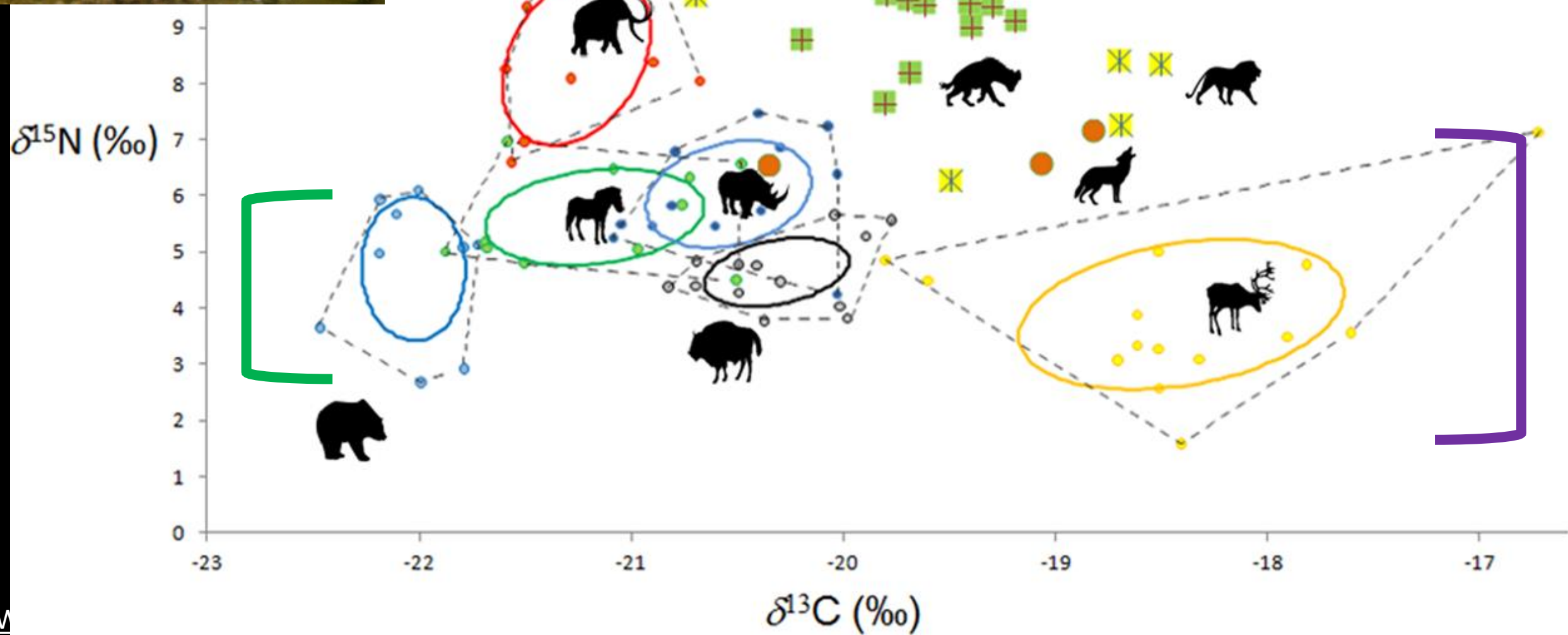


Habitat

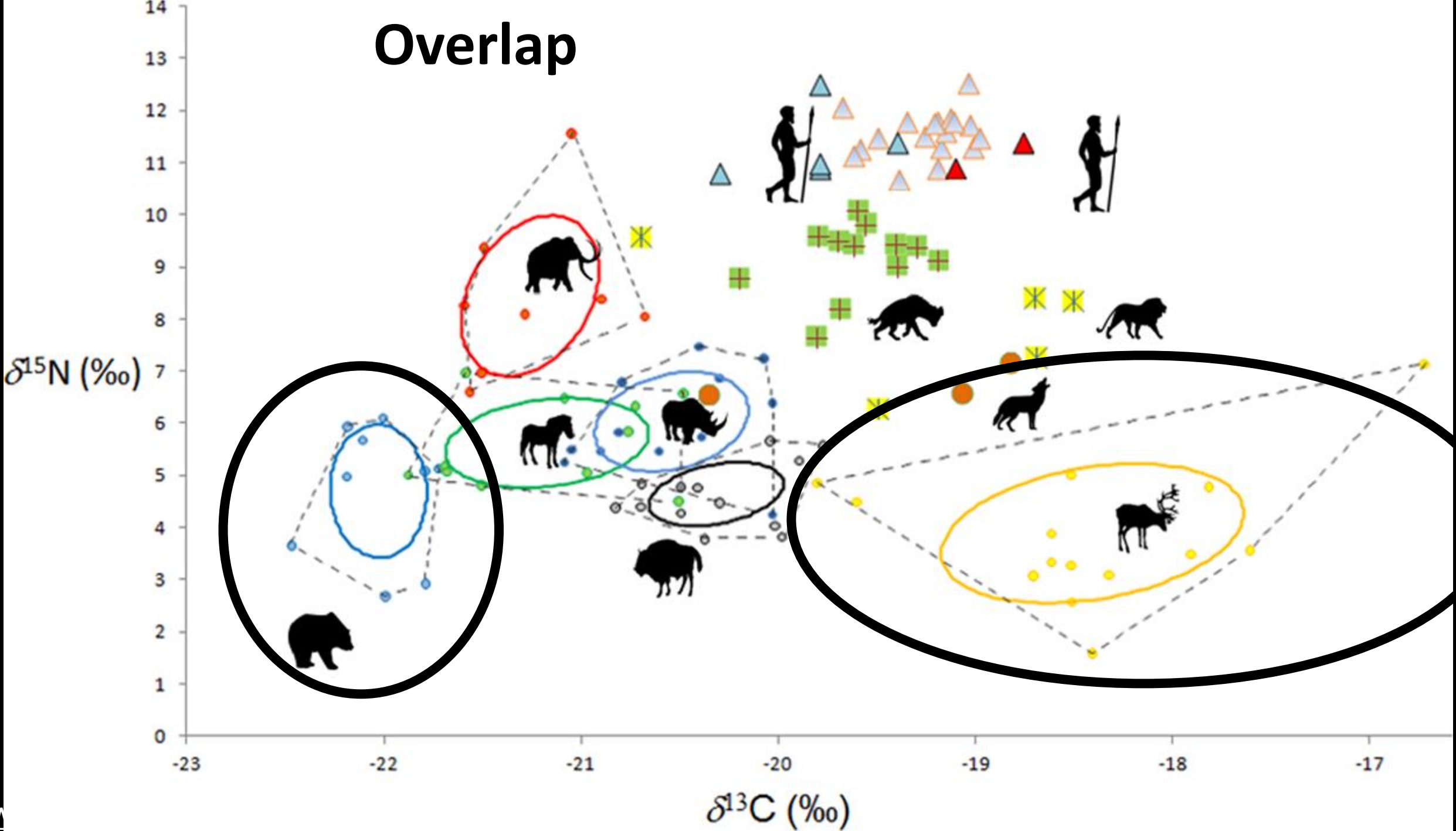




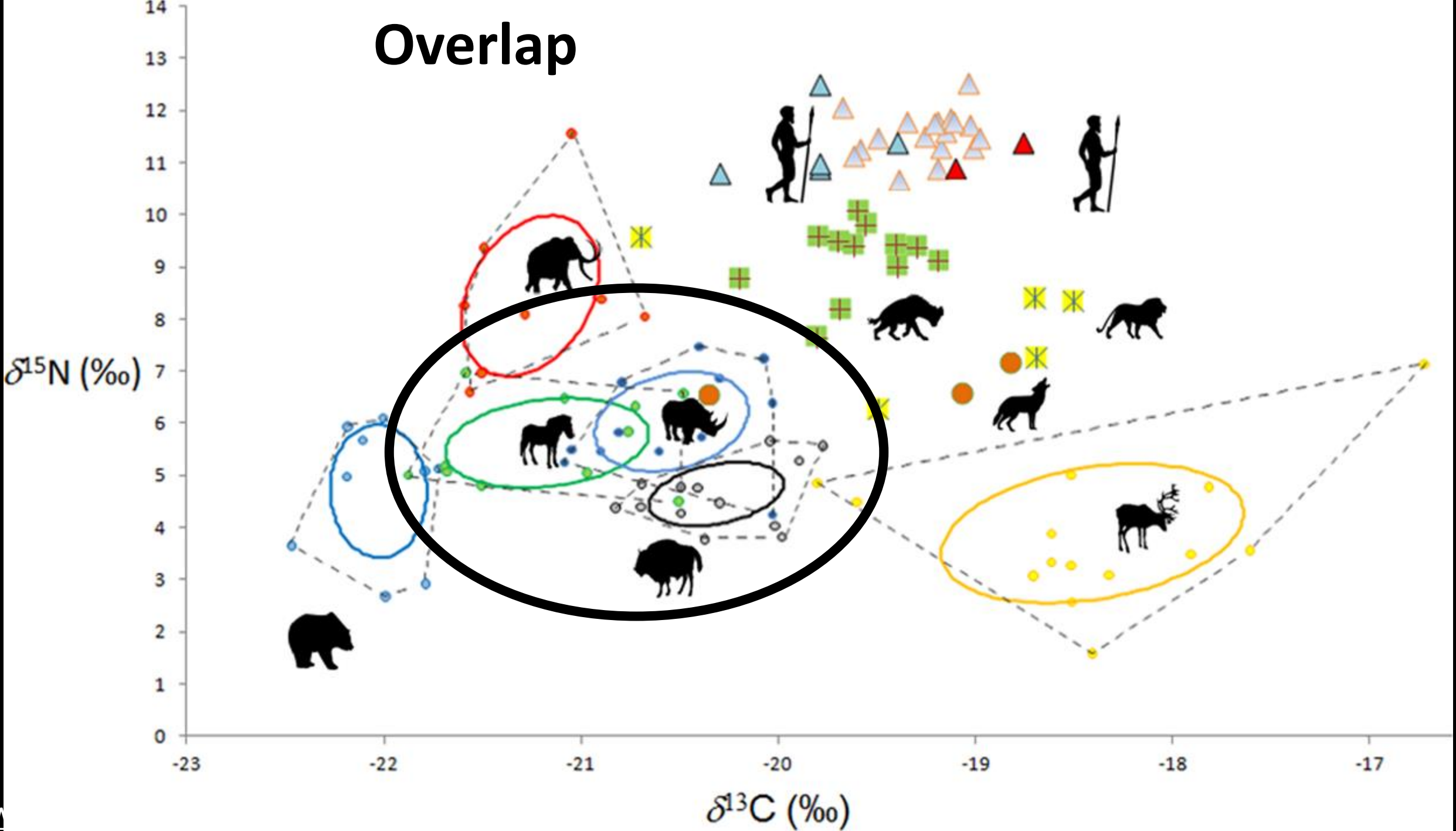
Prey



Overlap



Overlap





Largemouth Bass
(*Micropterus salmoides*)
Carnivore
Pools 4, 8, 13



Bowfin
(*Amia calva*)
Carnivore
Pools 4, 8, 13



Yellow Perch
(*Perca flavescens*)
Invertivore/Carnivore
Pools 4, 8, 13



Freshwater Drum
(*Aplodinotus grunniens*)
Invertivore/Carnivore
Pools 4, 8, 13, 26, MMR

Opportunistic

Equilibrium

Periodic

Life history strategy continuum



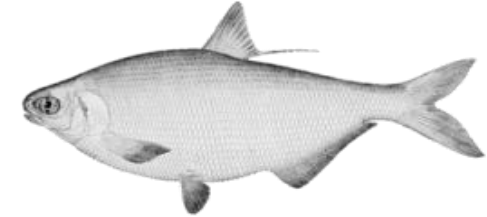
Emerald Shiner
(*Notropis atherinoides*)
Herbivore
Pools 4, 8, 13, 26, MMR



Bluegill
(*Lepomis macrochirus*)
Invertivore
Pools 4, 8, 13, 26, MMR



Shorthead Redhorse
(*Moxostoma macrolepidotum*)
Invertivore
Pools 4, 8, 13



Gizzard Shad
(*Dorosoma cepedianum*)
Herbivore
Pools 4, 8, 13, 26, MMR



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(*Micropterus salmoides*)
Carnivore
Pools 4, 8, 13



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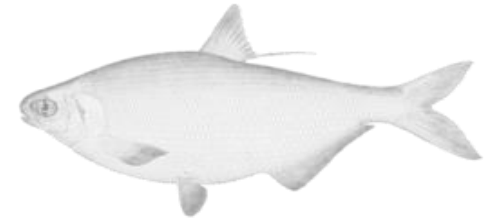
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We expect resource use and stable isotope diversity to increase with increasing physical complexity

🐟 Compare resource use diversity of Bluegill among reaches

🐟 carbon and nitrogen isotope ranges and overlap

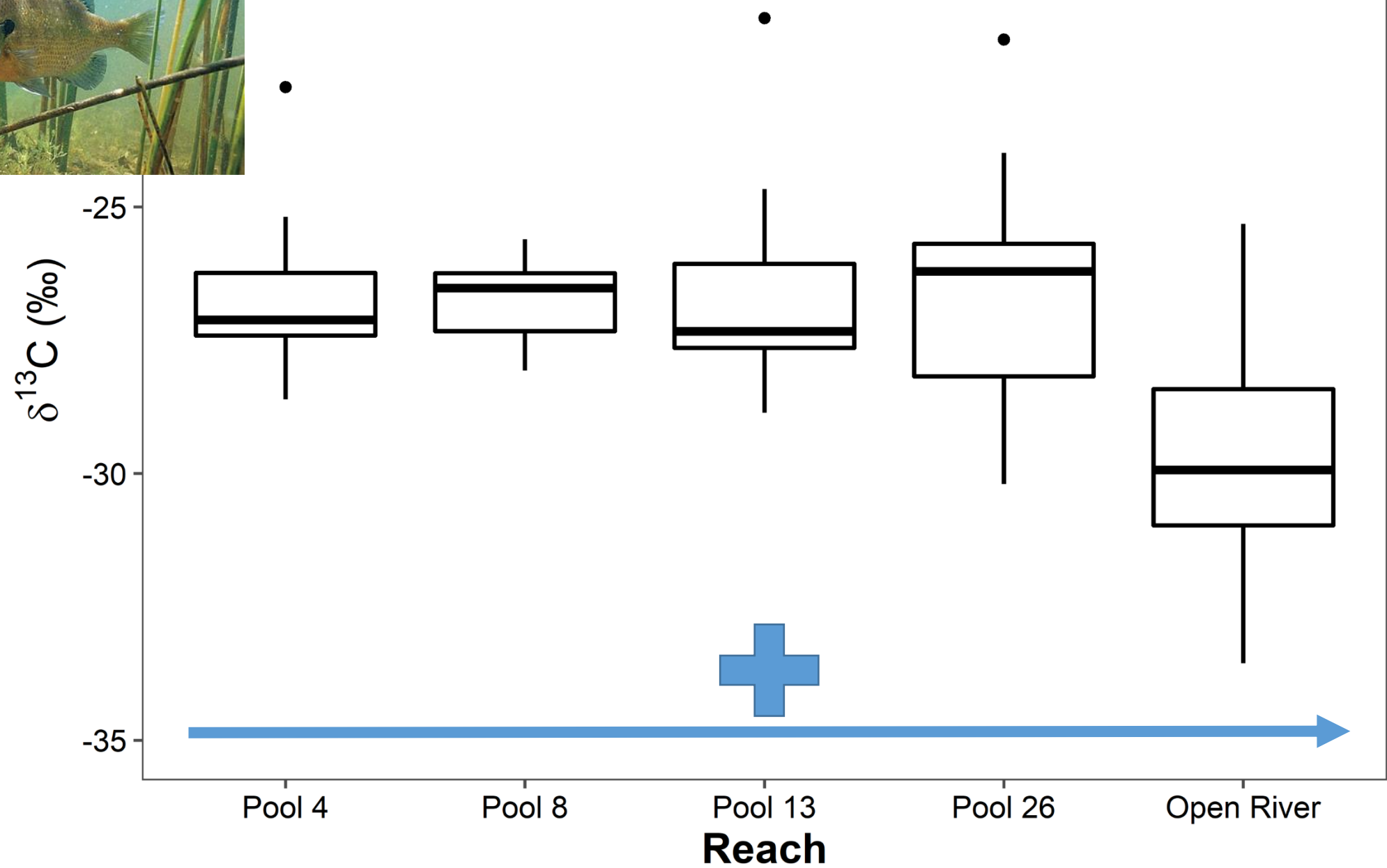


Results and Discussion



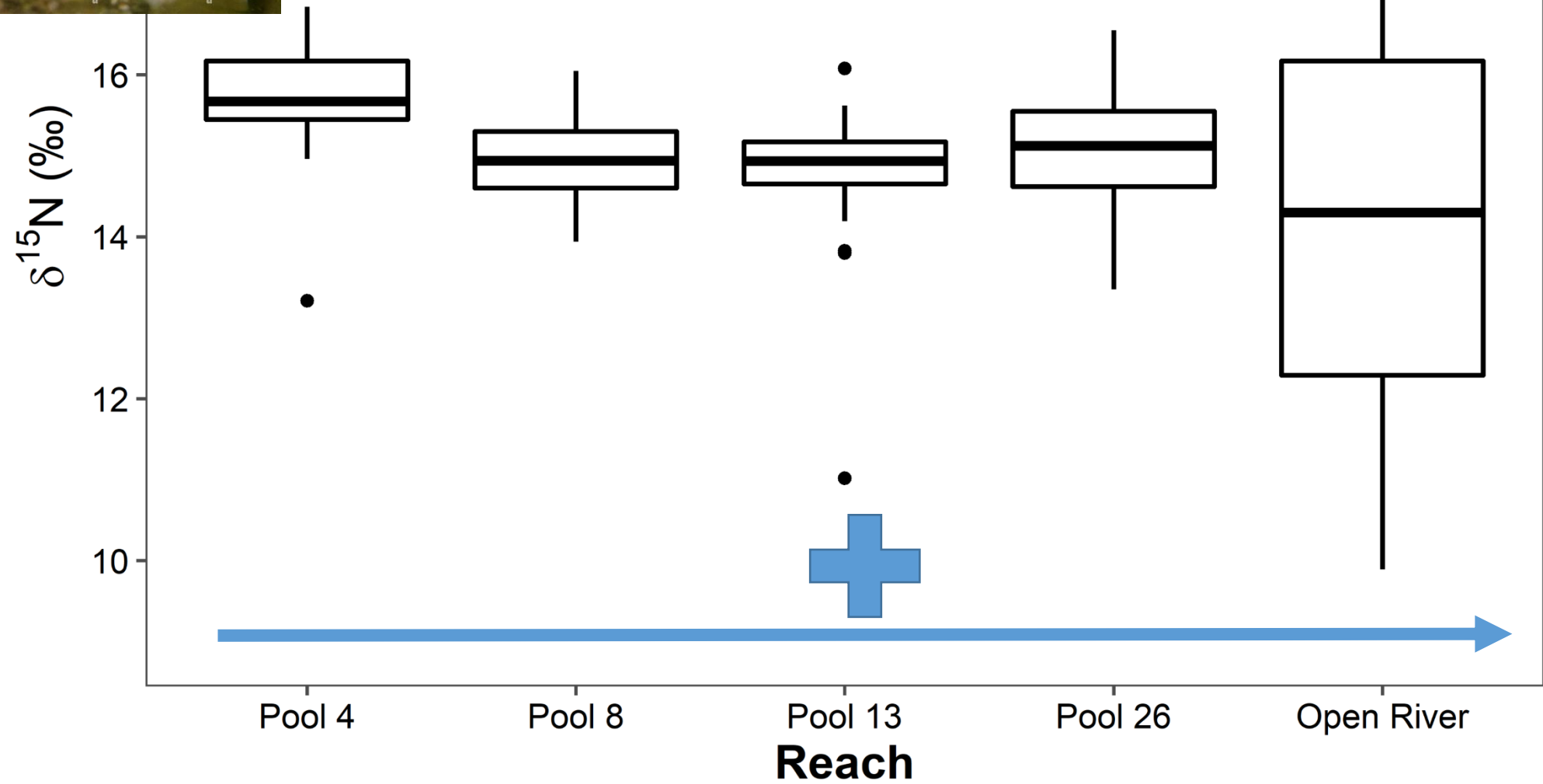


Habitat

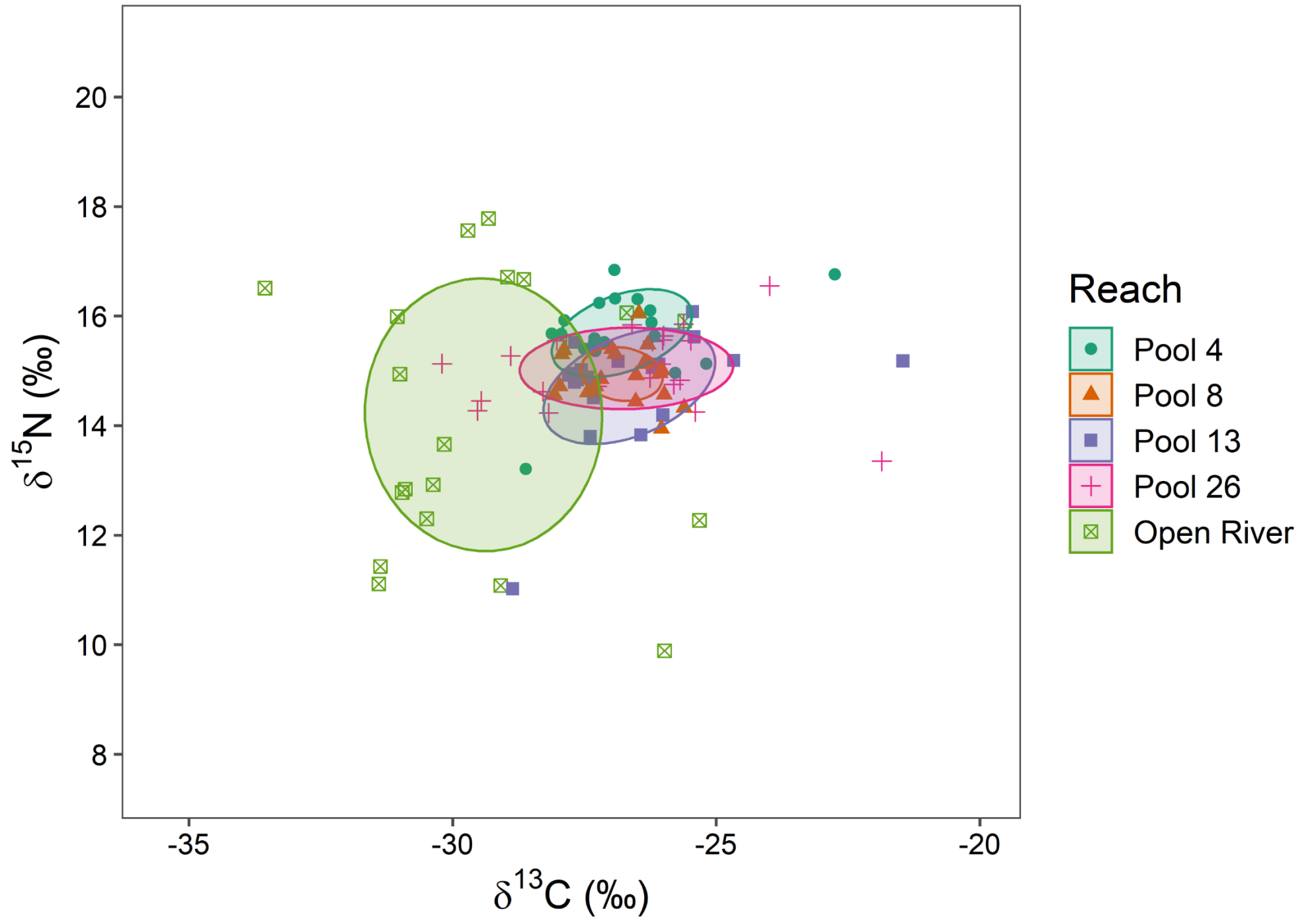


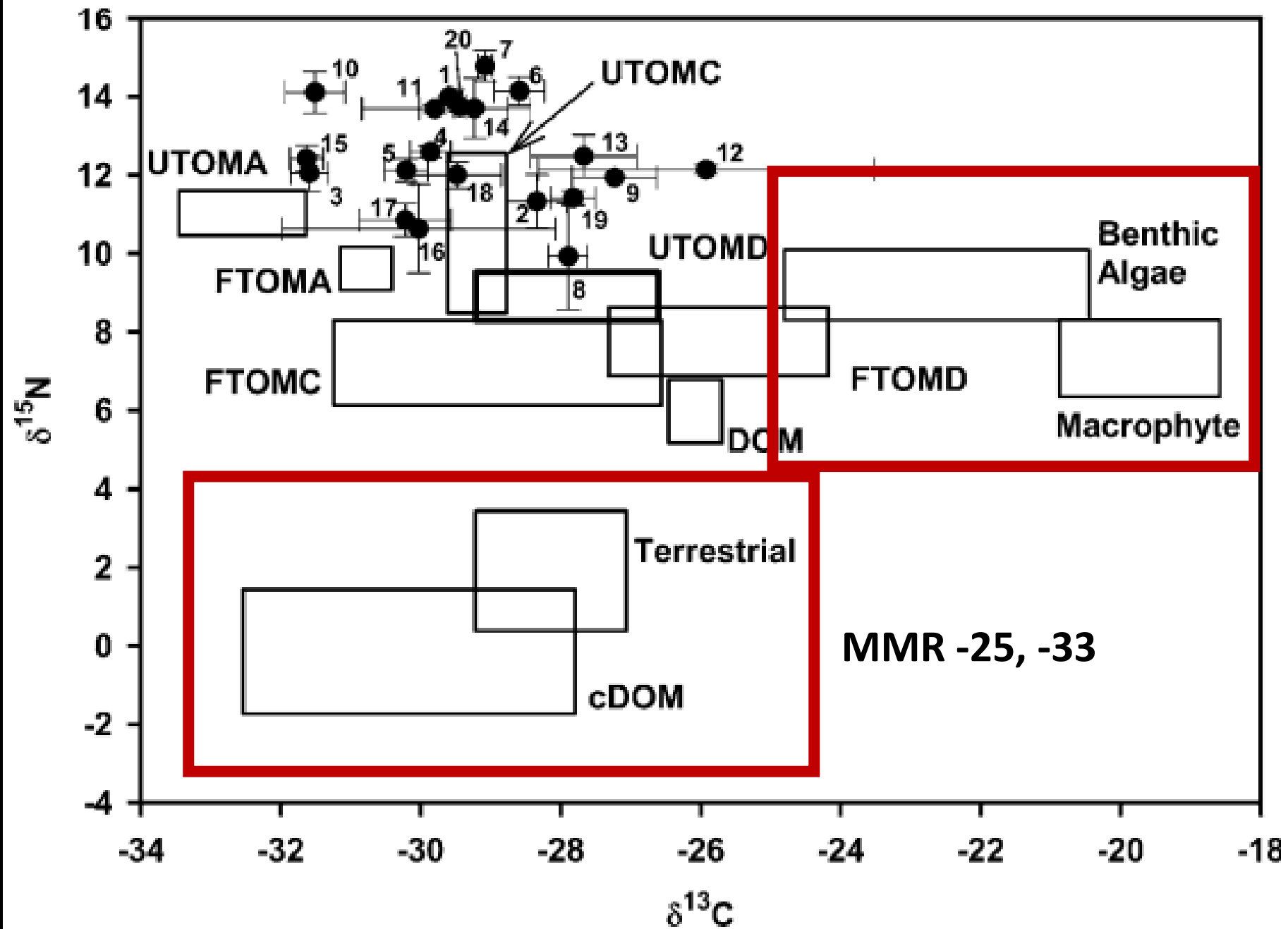


Prey



Core niche





UMR -22,-30

MMR -25,-33







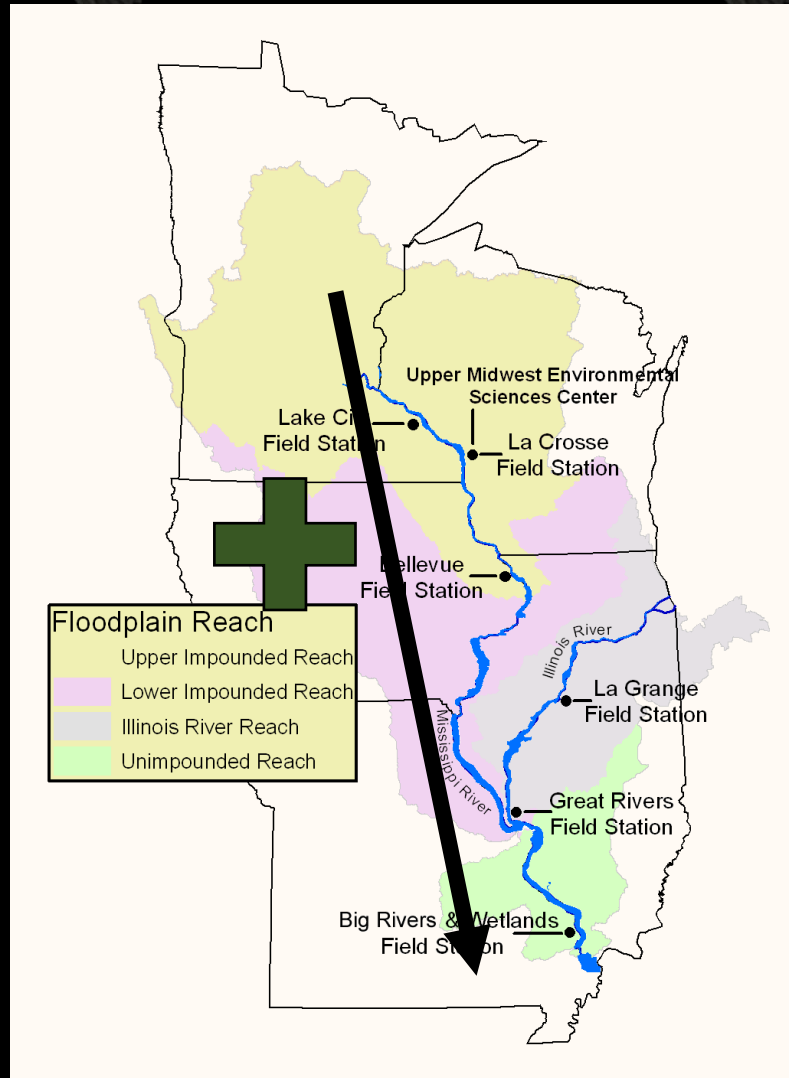




Conclusion



The Middle Mississippi River Bluegill community differs in resource use from the Upper Mississippi River





Acknowledgements

 Azareah Carson

 Mandy Rothert

 ILMA Robert E. Esser Award

 IL AFS Larimore Student Research Award



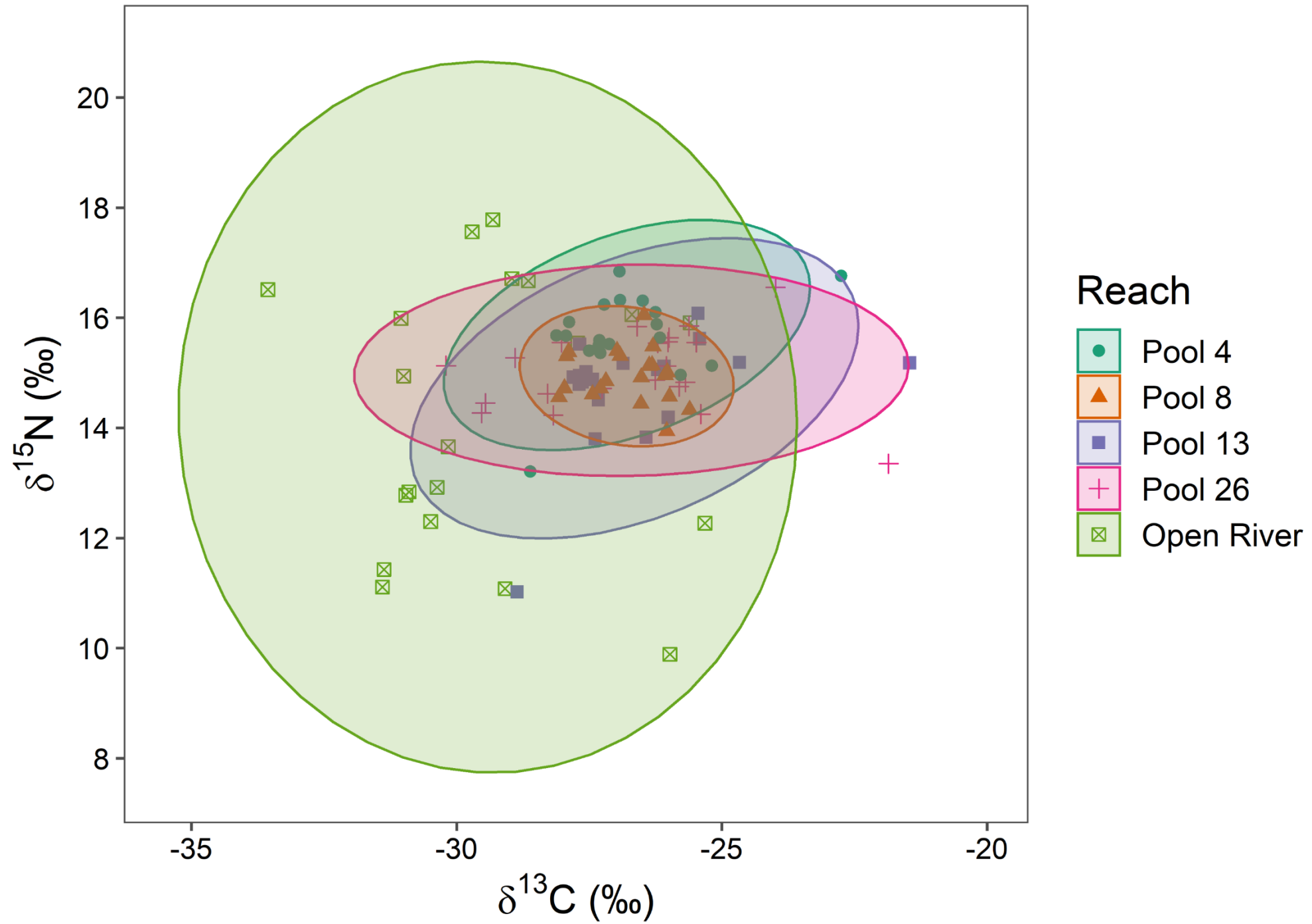
SIU
Southern
Illinois
University
CARBONDALE

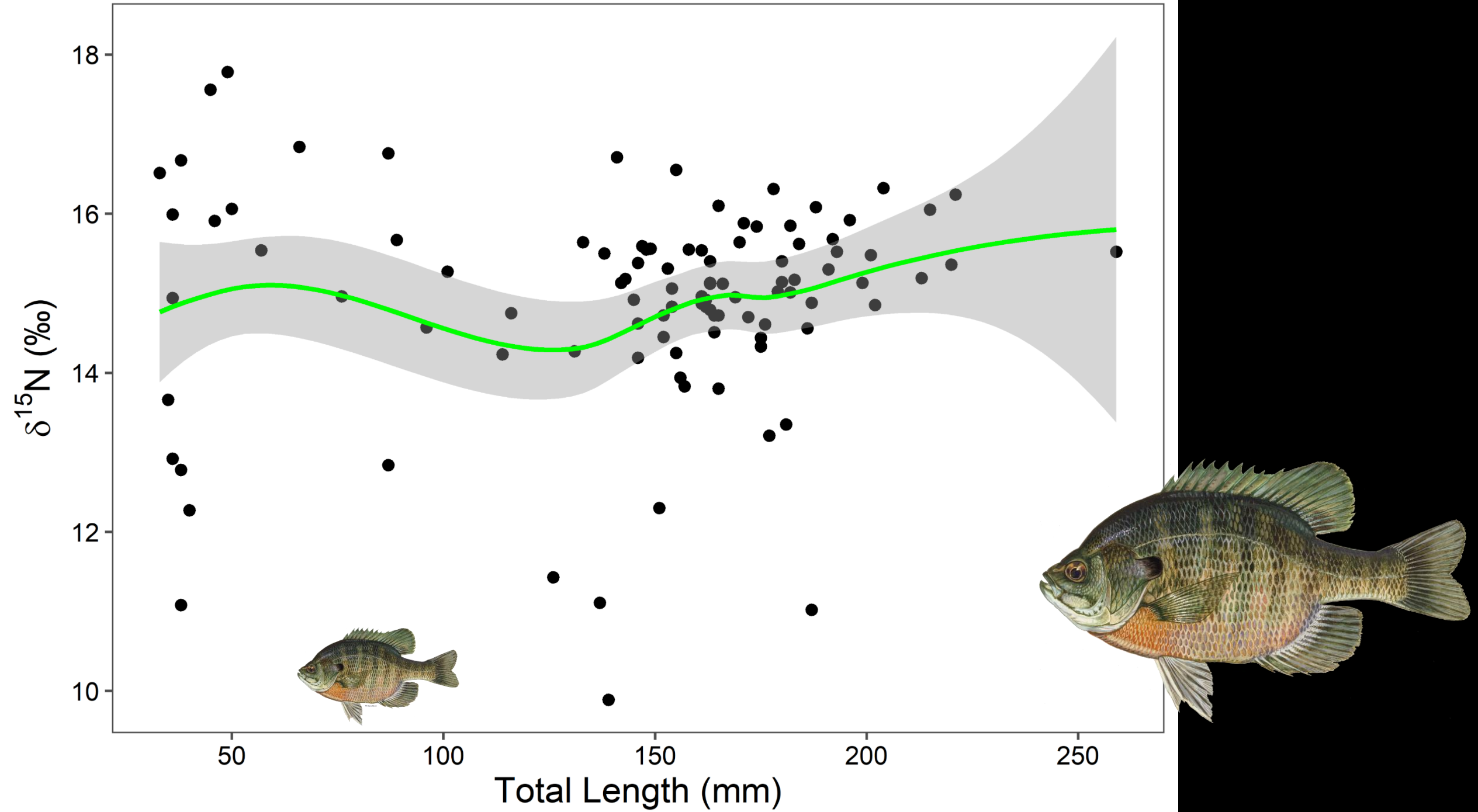
Questions?

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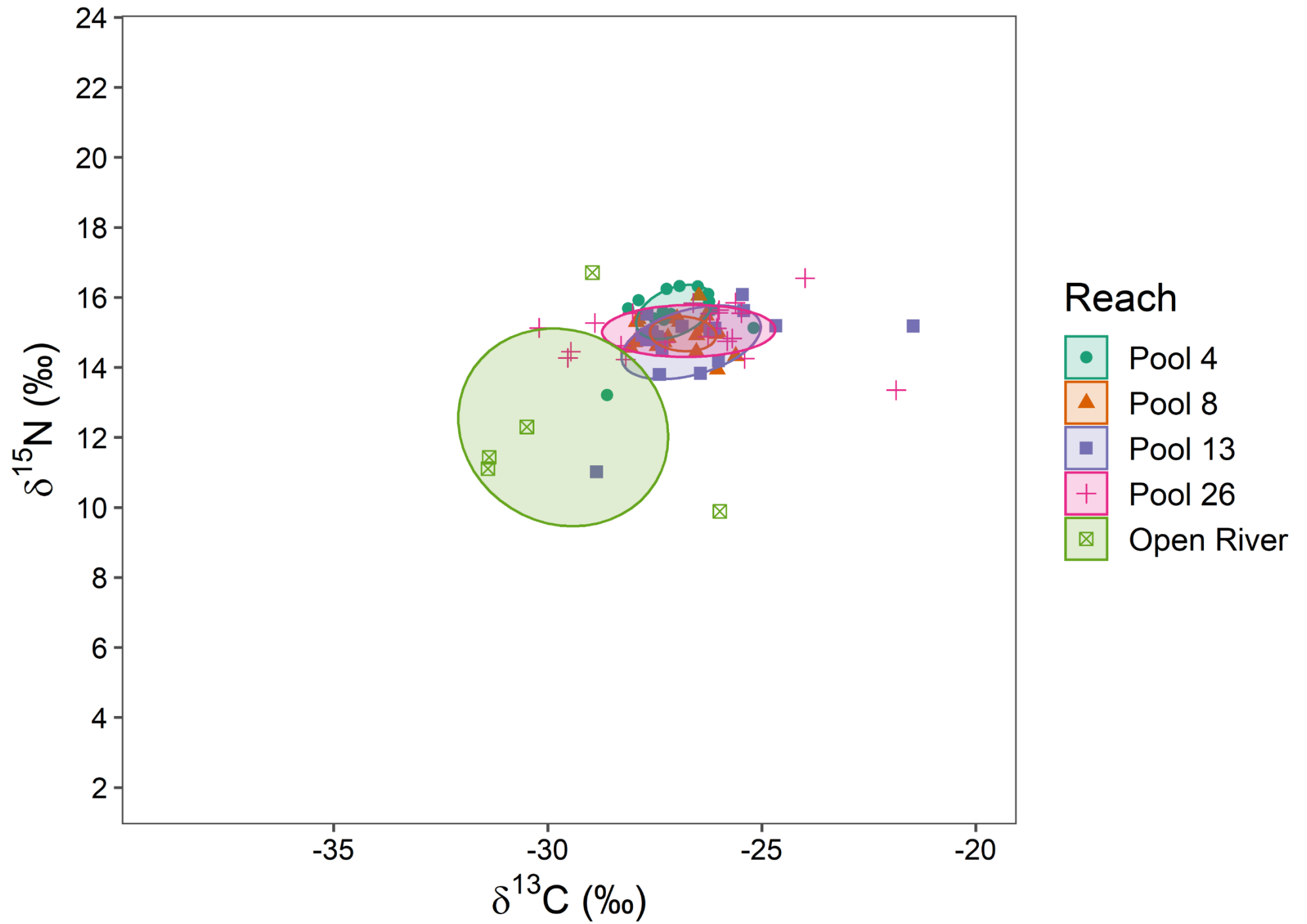


Niche width

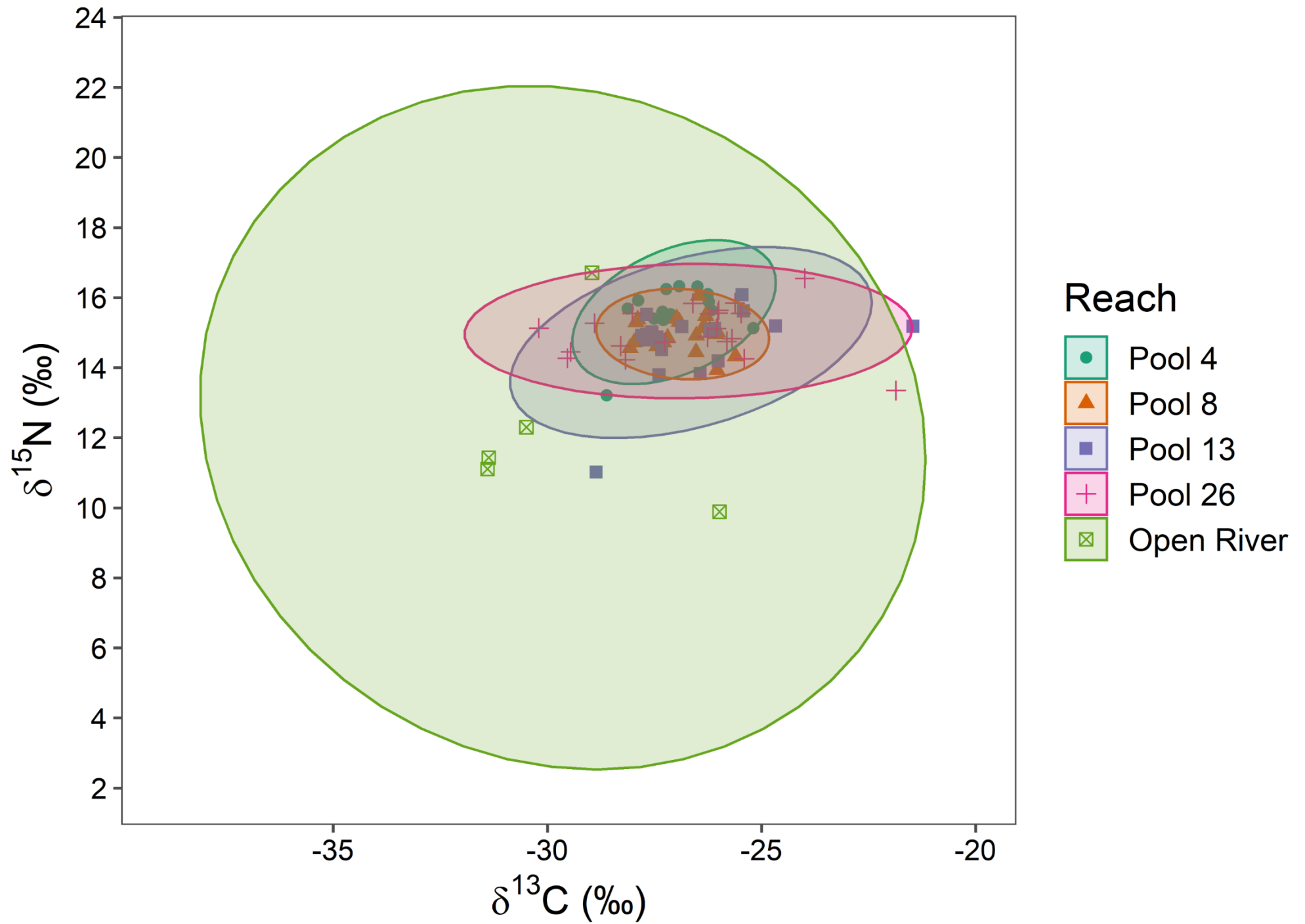




**<100 mm
removed
core niche**

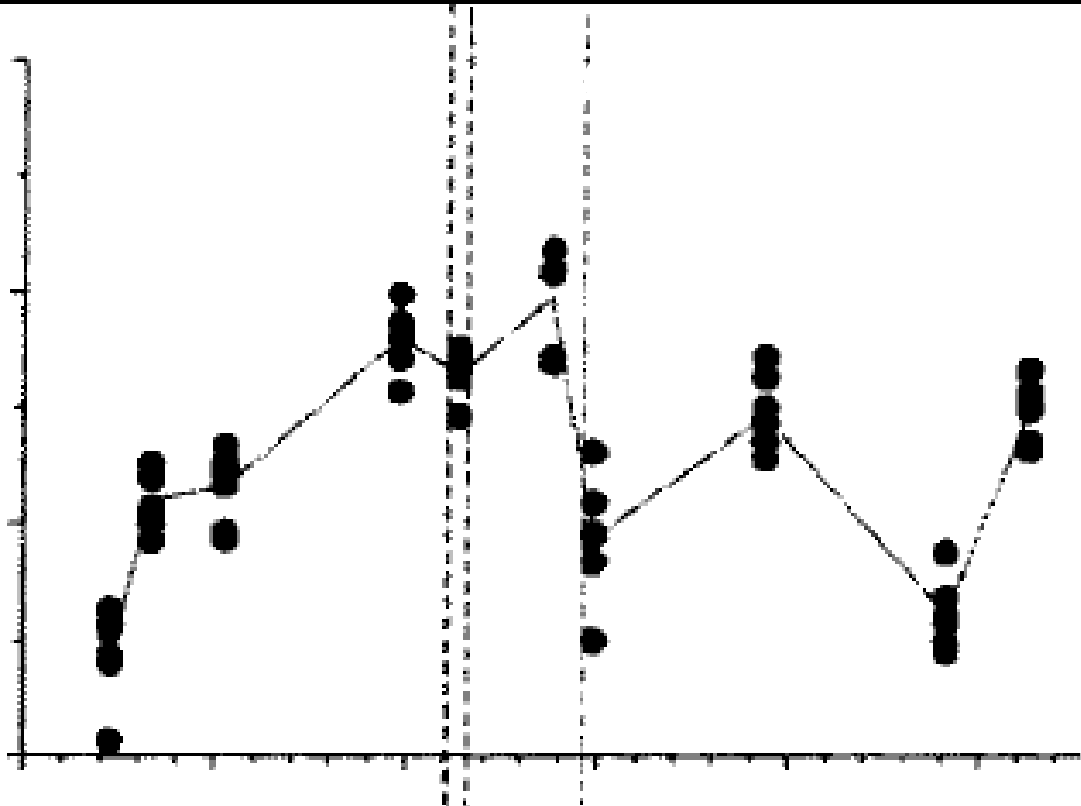


**<100 mm
removed
niche width**



$\delta^{13}\text{C}$ (‰)

IL



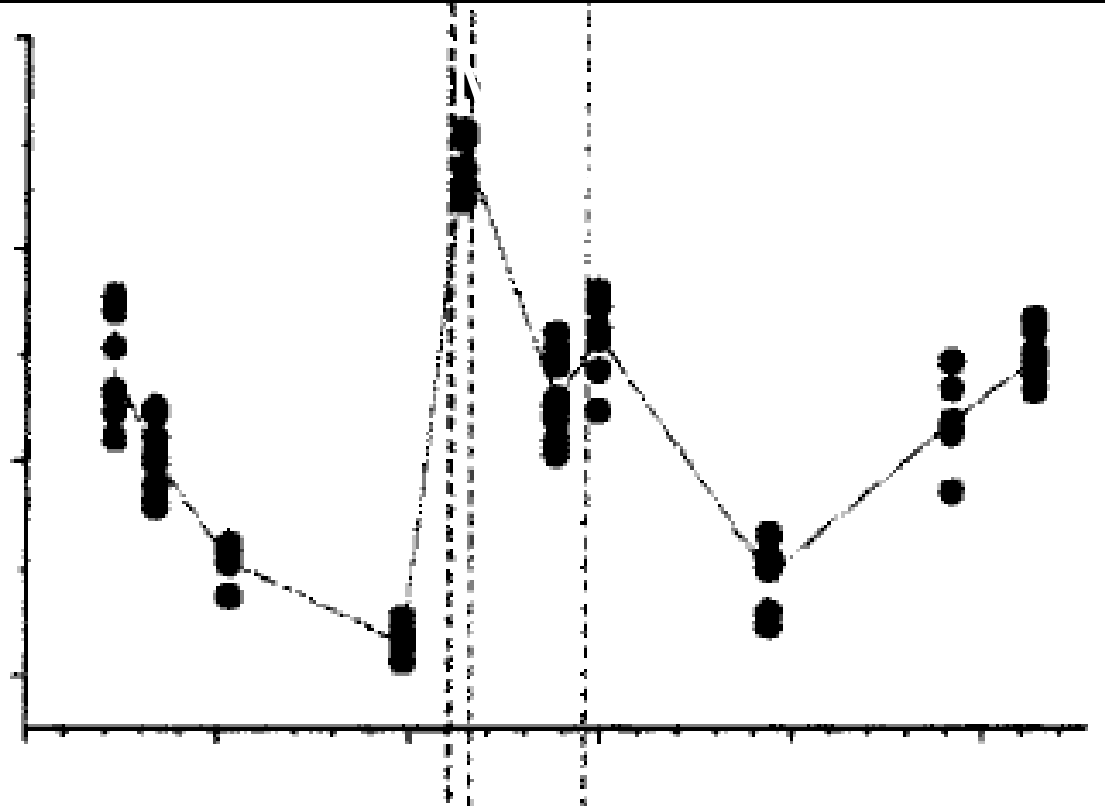
Pool 4

MMR



$\delta^{15}\text{N}$ (‰)

IL



Pool 4

MMR

