Trophic impacts of invasive blue catfish in Albemarle Sound, NC

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Project team

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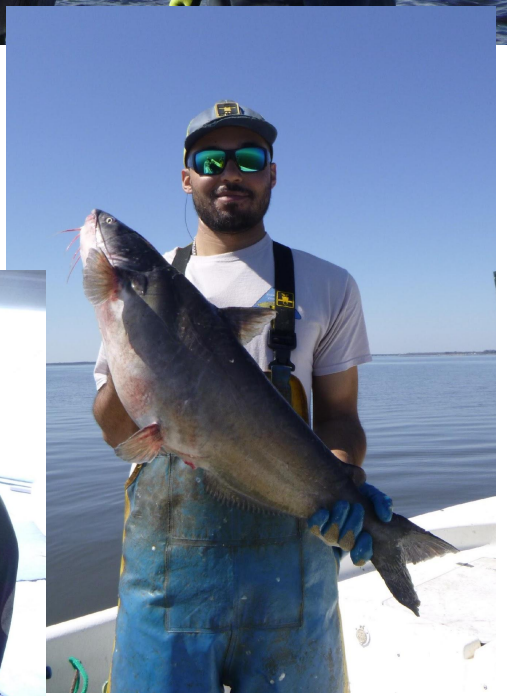
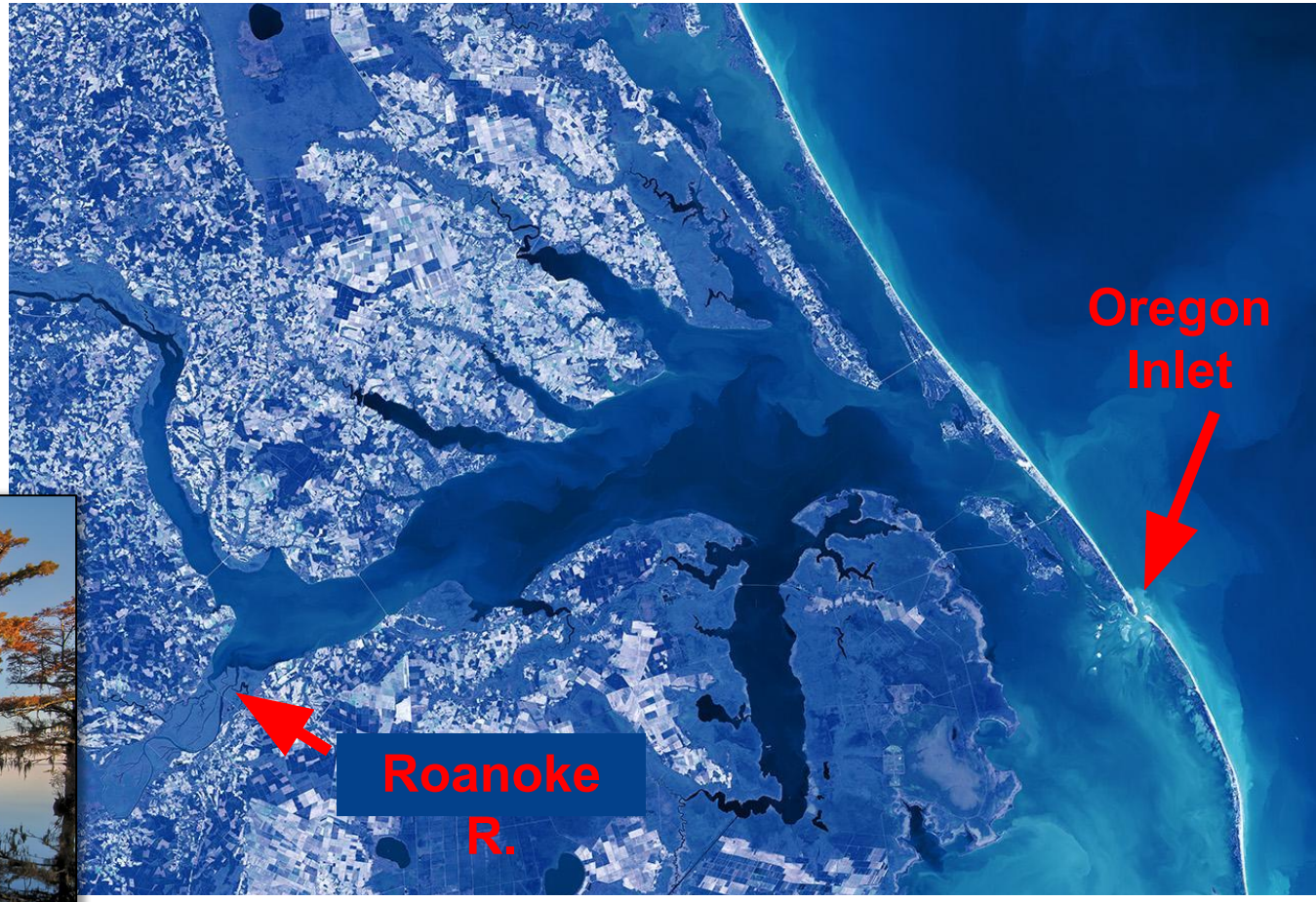


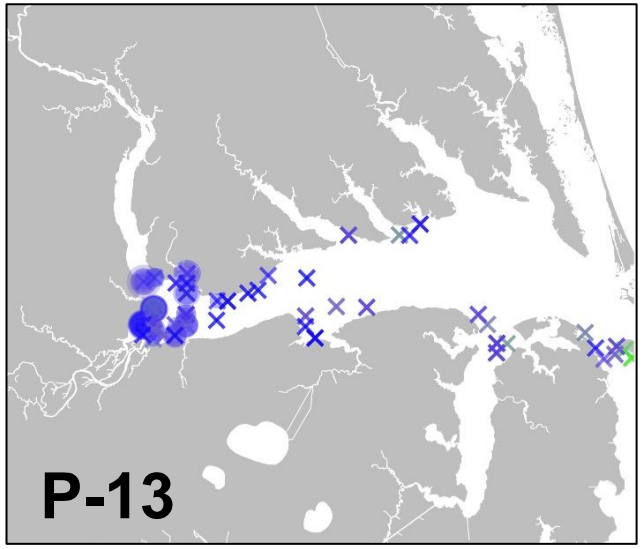
- FUNDING: NC Commercial Fishing Resource Fund (NCDMF); Albemarle Pamlico National Estuary Partnership (APNEP) & NC Sea Grant
- Thanks to NCDMF, Elizabeth City

Albemarle Sound Ecosystem

- Riverine ↔ open sound ecosystem
- Freshwater ↔ mesohaline
- Non-tidal (wind driven)
- Economically important fisheries
- Anadromous and protected species



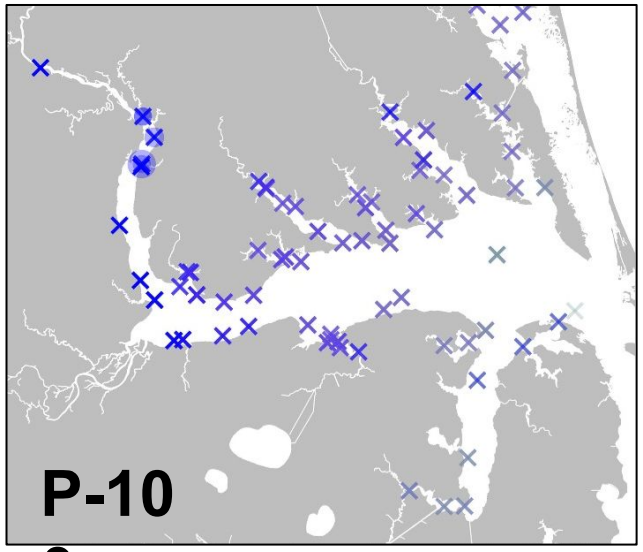
Blue catfish invasion history



2009

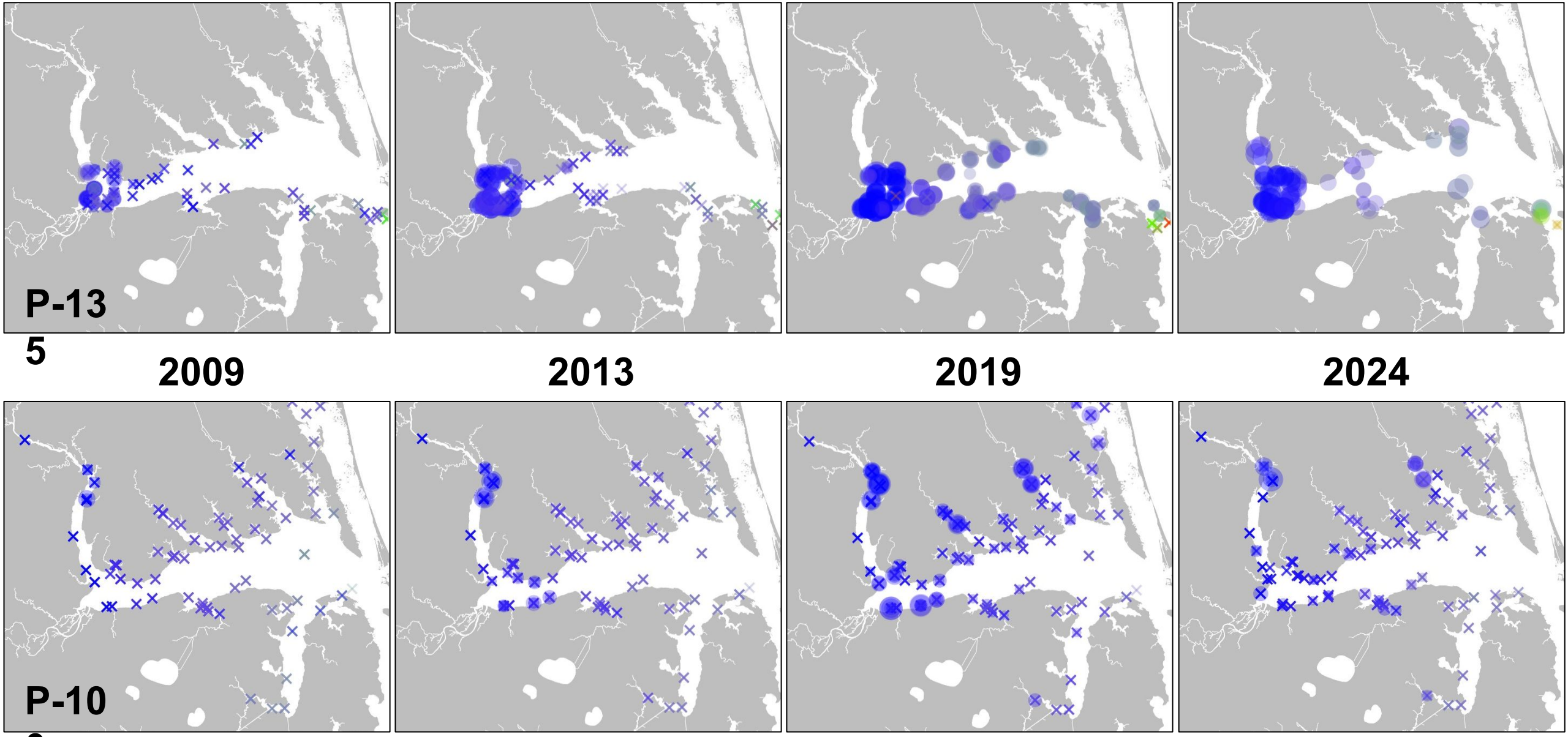
P-135
NC Division of Marine Fisheries
Winter gillnet survey

● *Positive blue catfish catch*
✖ *Zero blue catfish*

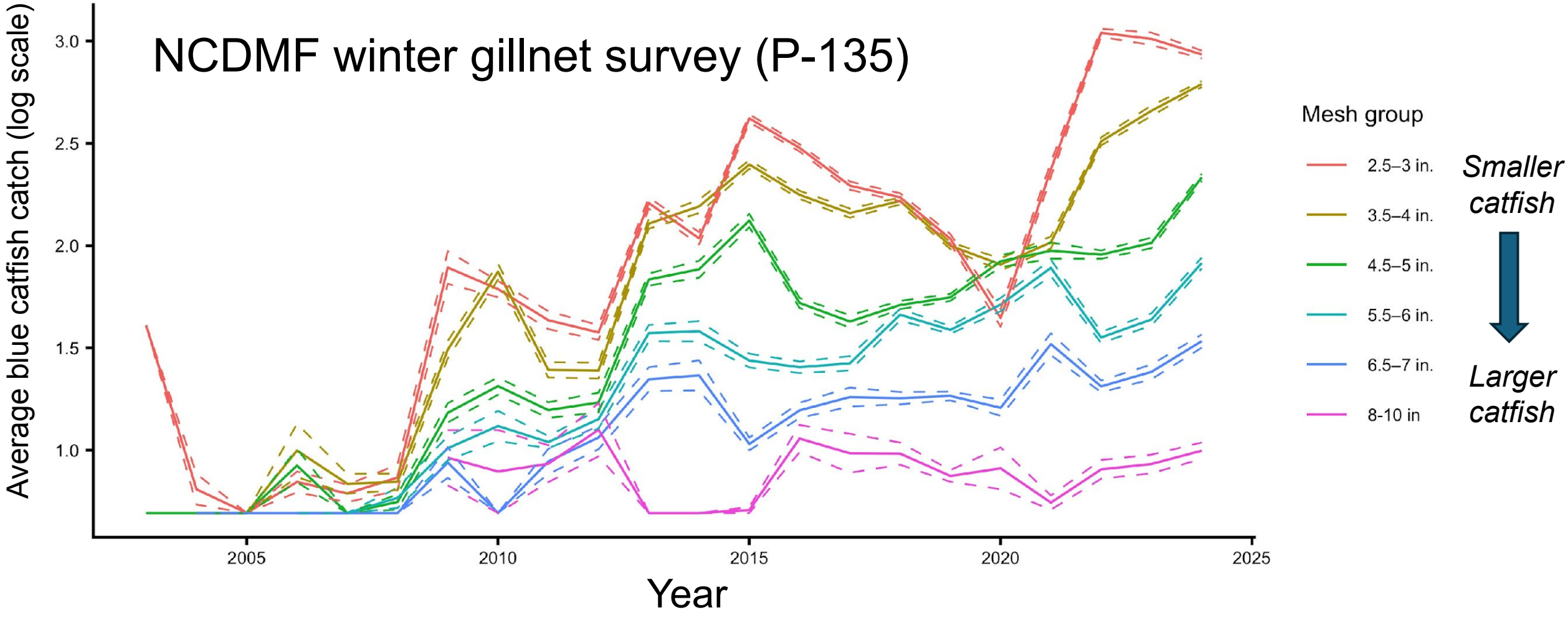


P-100
NC Division of Marine Fisheries
Summer bottom trawl survey

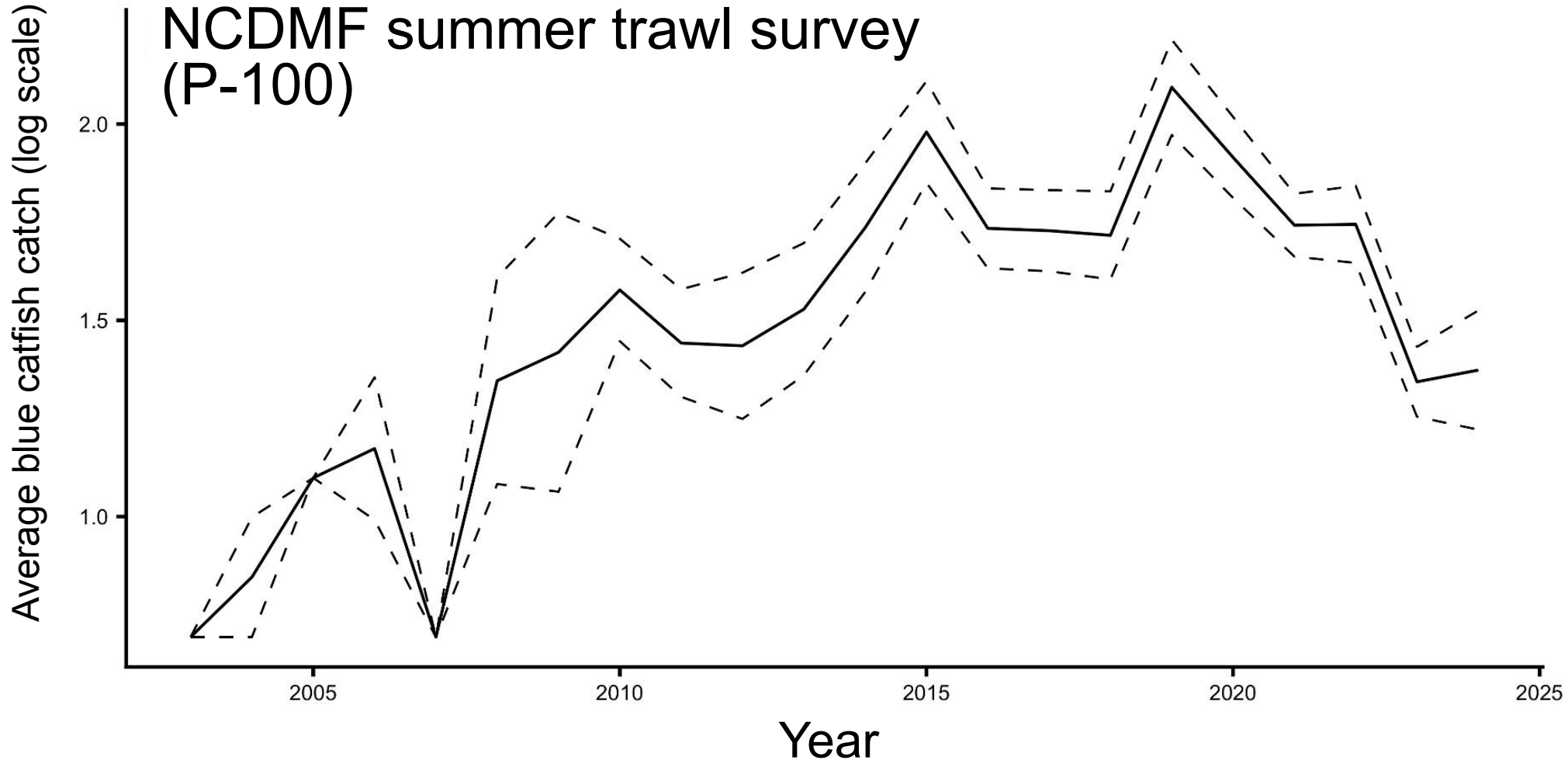
Blue catfish invasion history



Blue Catfish Invasion

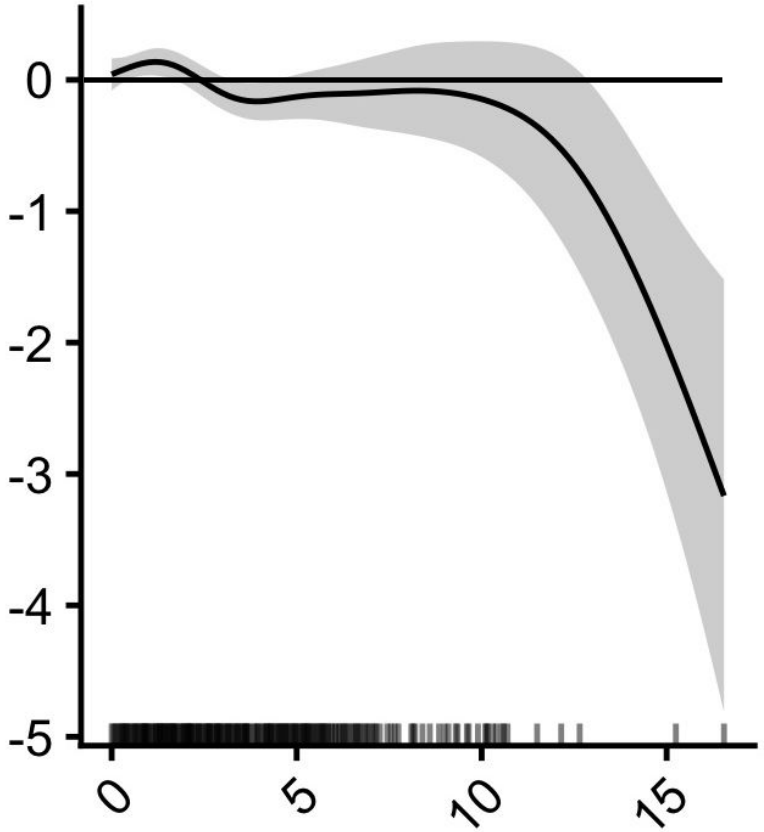


Blue Catfish Invasion

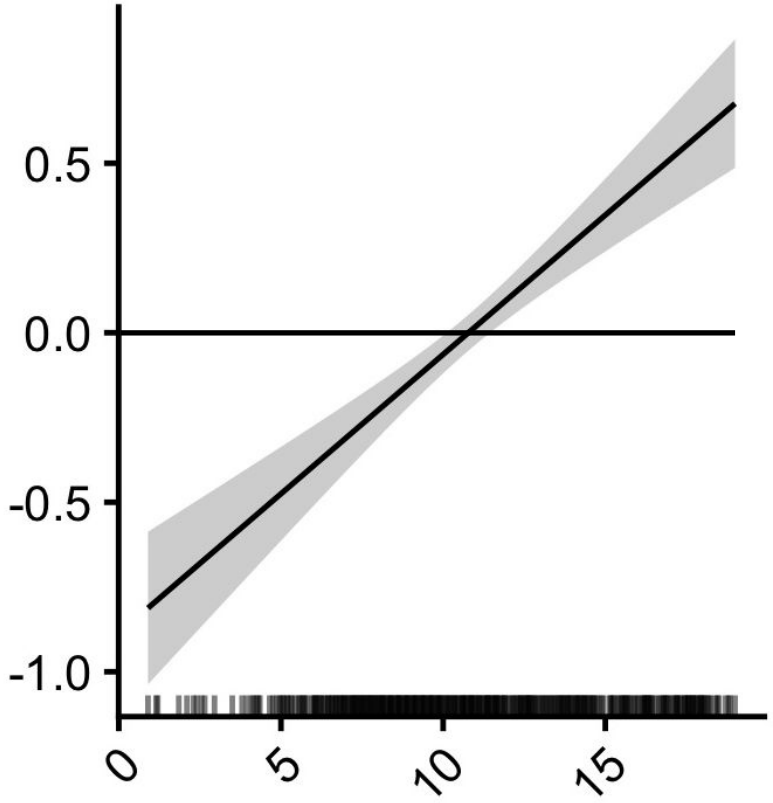


Relationships with environmental variables

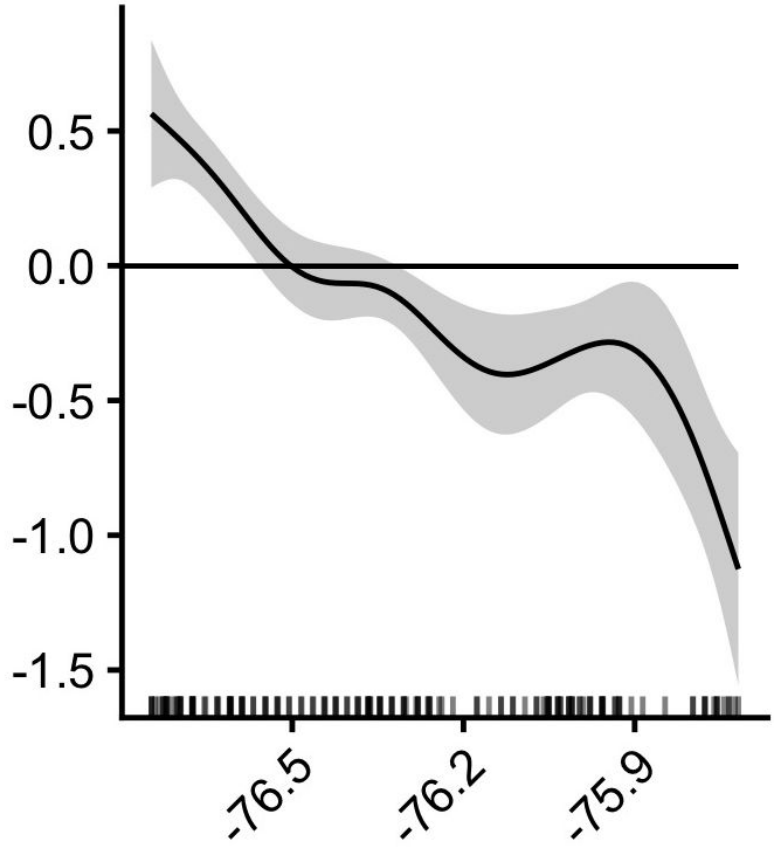
Generalized additive model of blue catfish abundance using P-135 data
Deviance explained: 42%



Bottom salinity (ppt)

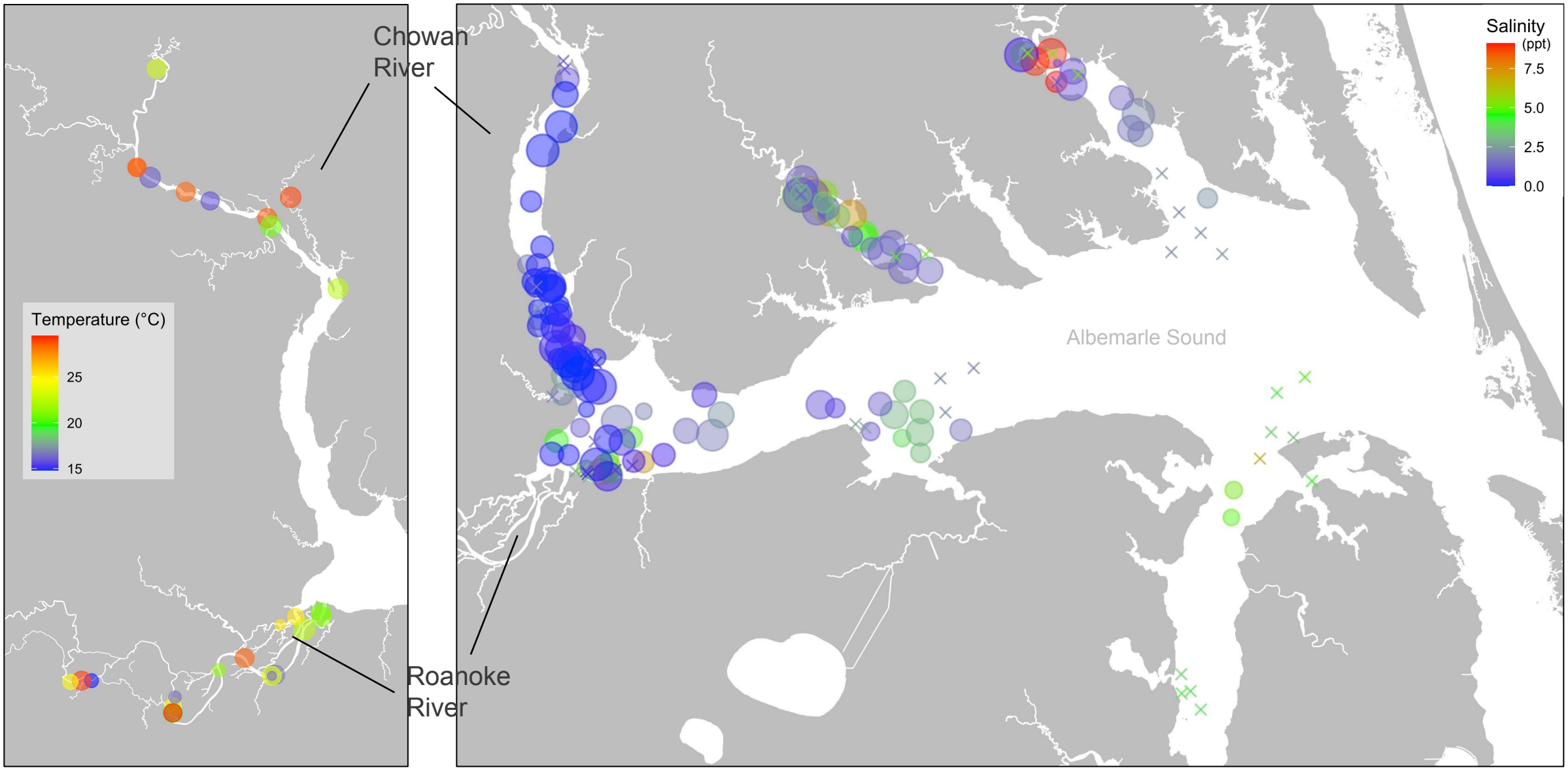


Bottom temperature (ºC)

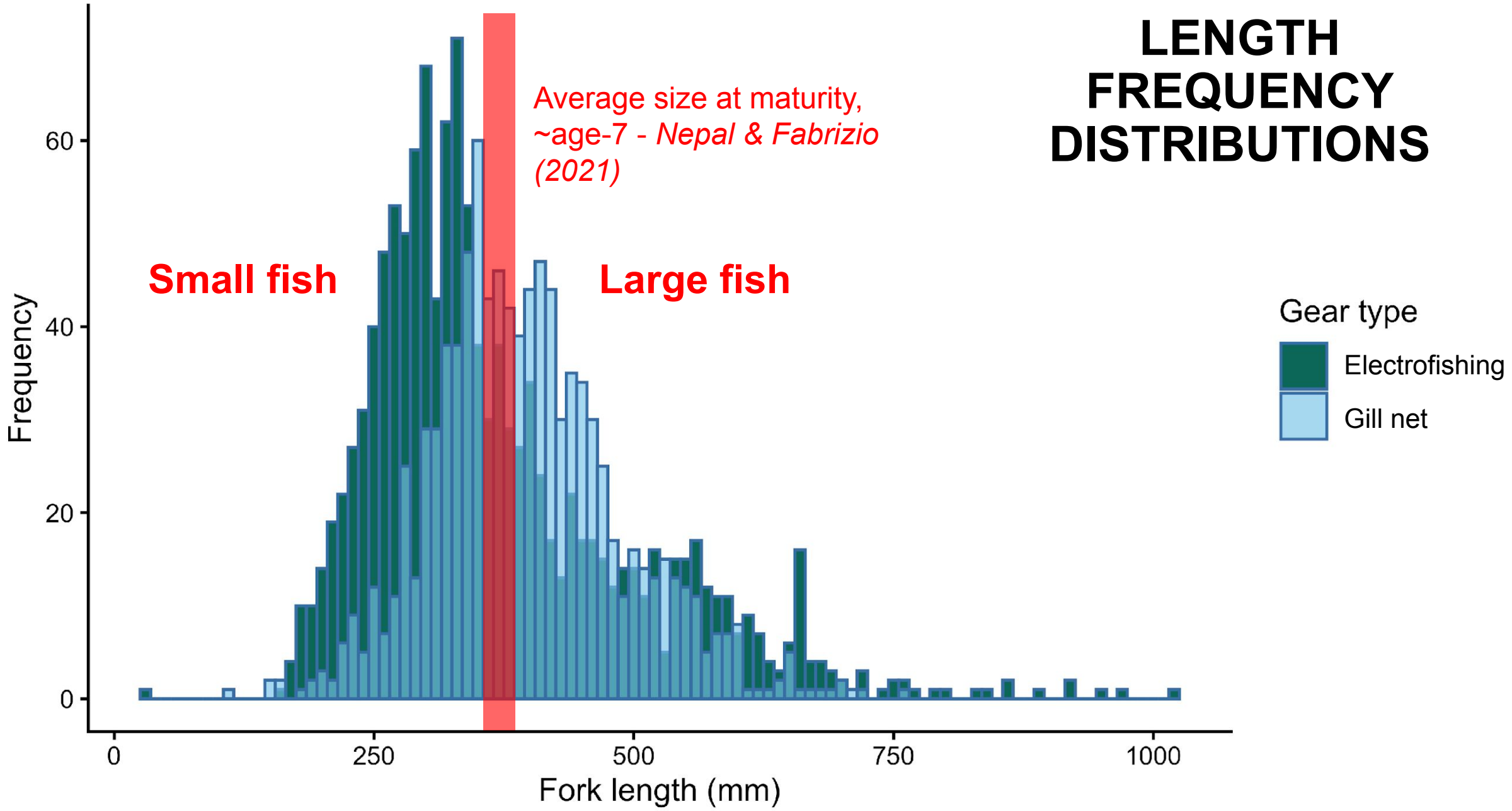


Longitude

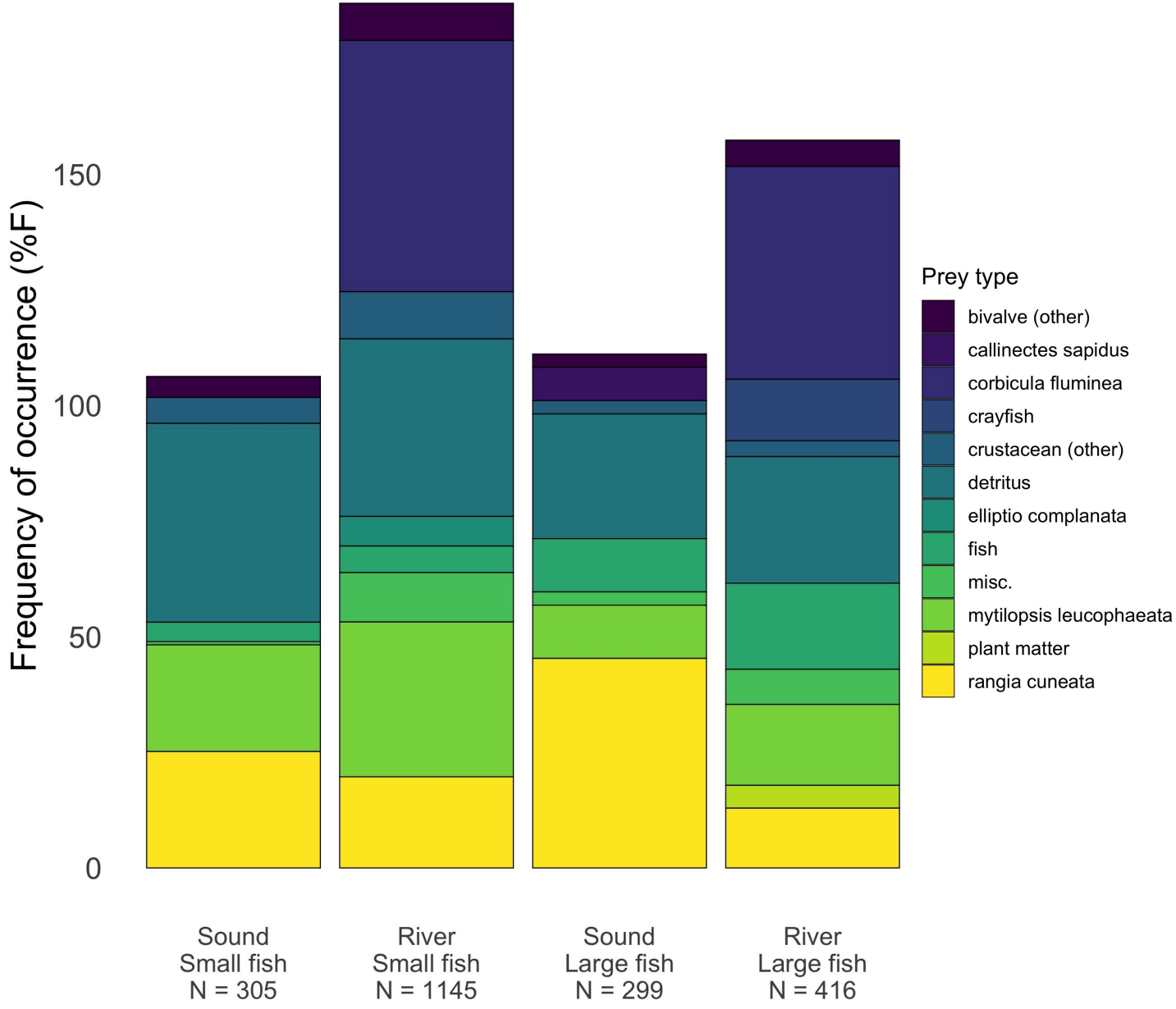
BLUE CATFISH DIET ANALYSIS


River—*electrofishing*
Sound—*gillnetting*
Chowan River
Roanoke River
Albemarle Sound
Temperature (°C)
25
20
15
Salinity
(ppt)
7.5
5.0
2.5
0.0

LENGTH FREQUENCY DISTRIBUTIONS

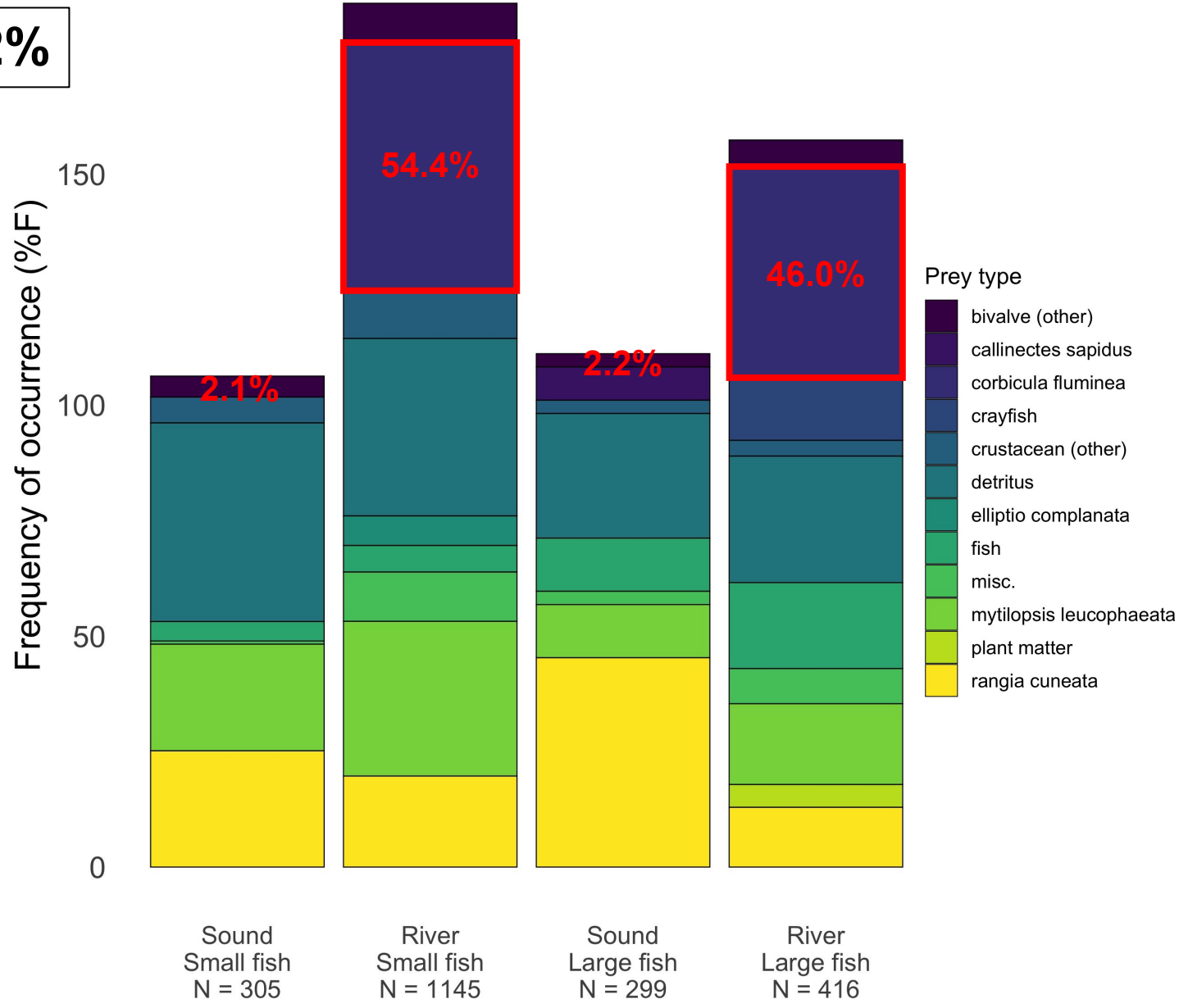


DIET


Frequency of occurrence (%F)
150
100
50
0
Sound
Small fish
N = 305
River
Small fish
N = 1145
Sound
Large fish
N = 299
River
Large fish
N = 416
Prey type
bivalve (other)
callinectes sapidus
corbicula fluminea
crayfish
crustacean (other)
detritus
elliptio complanata
fish
misc.
mytilopsis leucophaeata
plant matter
rangia cuneata

DIET: Bivalves 64.2%

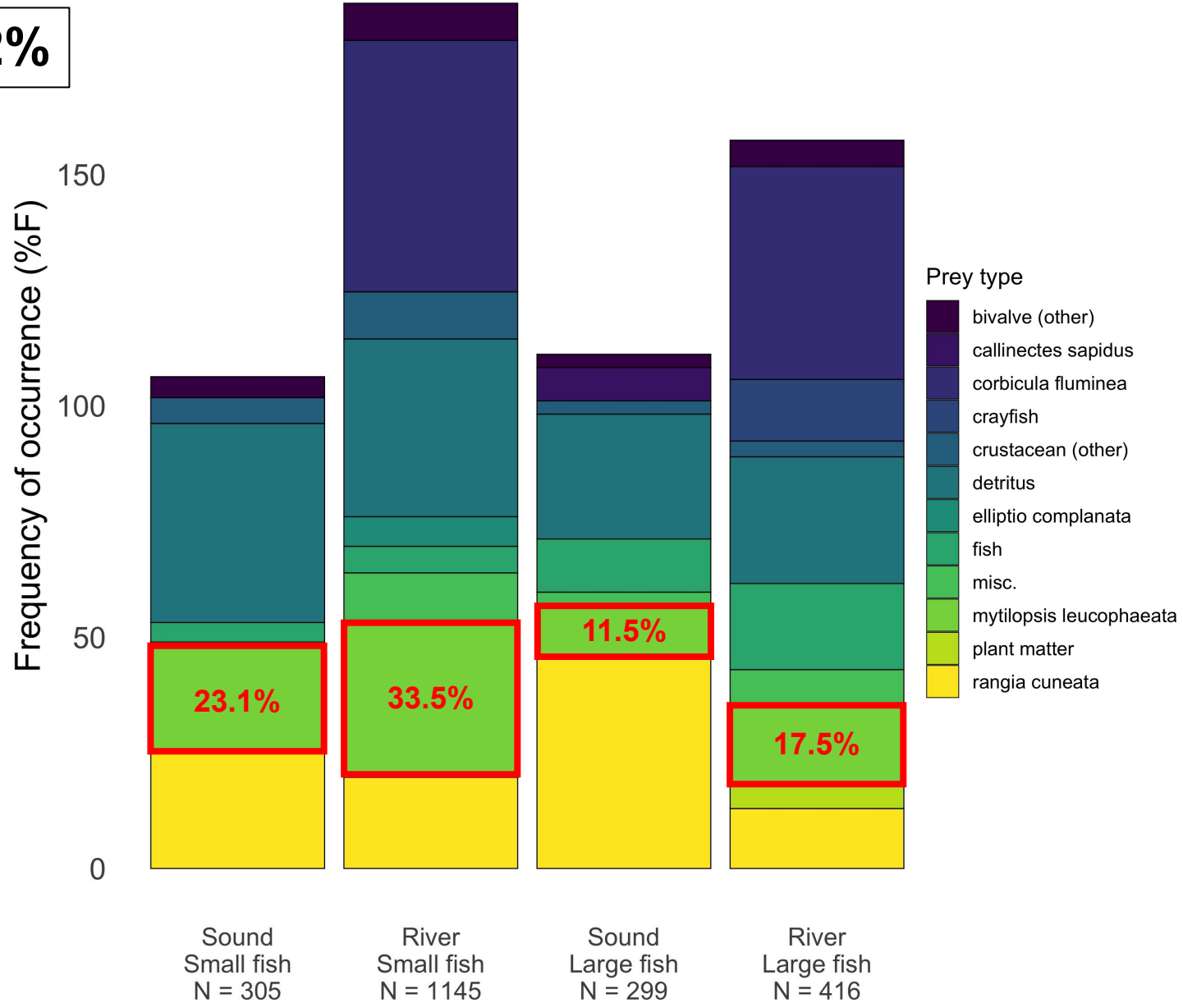
Asian clam
Corbicula fluminea
32.4%



DIET: **Bivalves 64.2%**

Asian clam
Corbicula fluminea
32.4%

Dark false mussel
Mytilopsis leucophaeata
24.3%

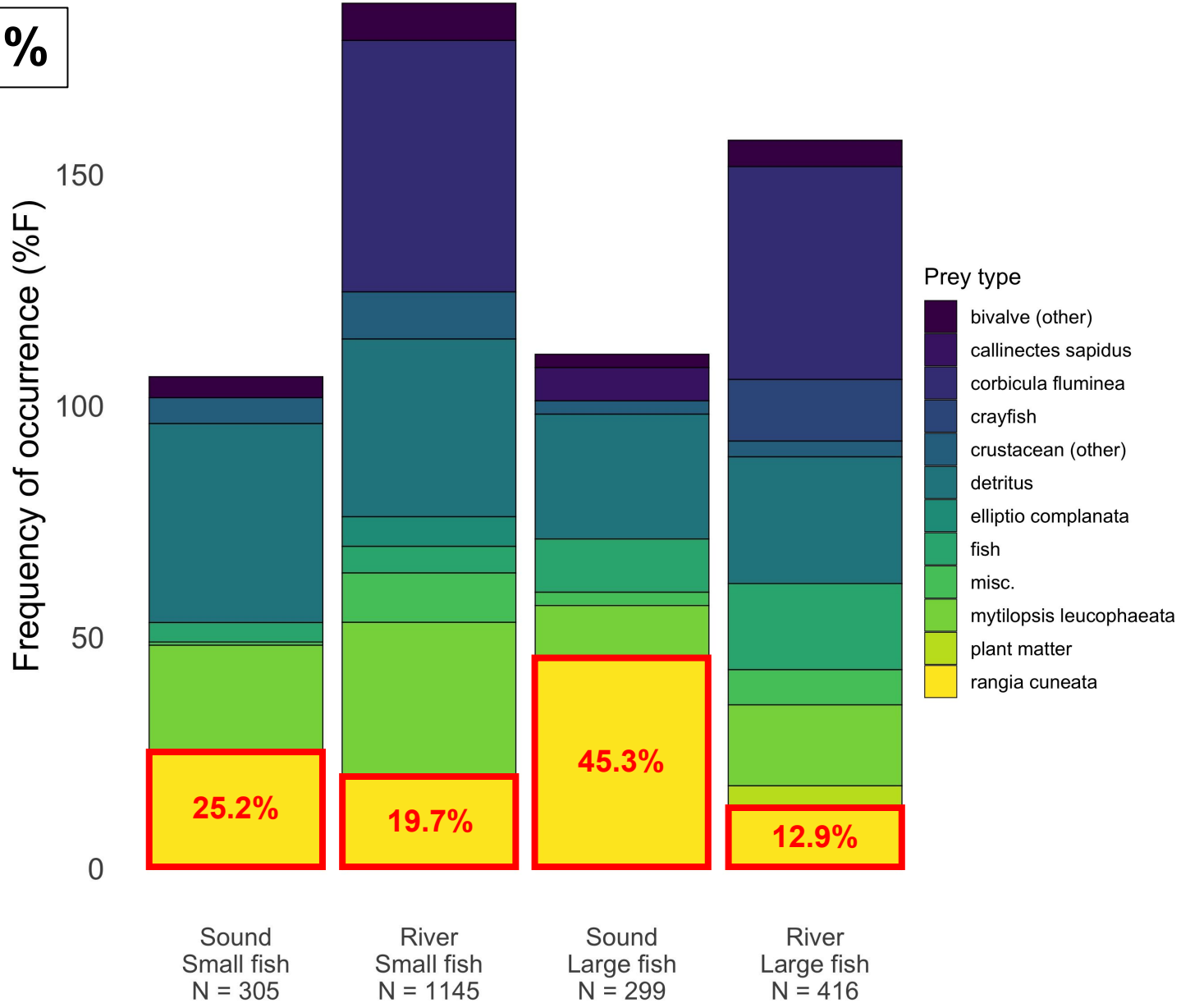


DIET: Bivalves 64.2%

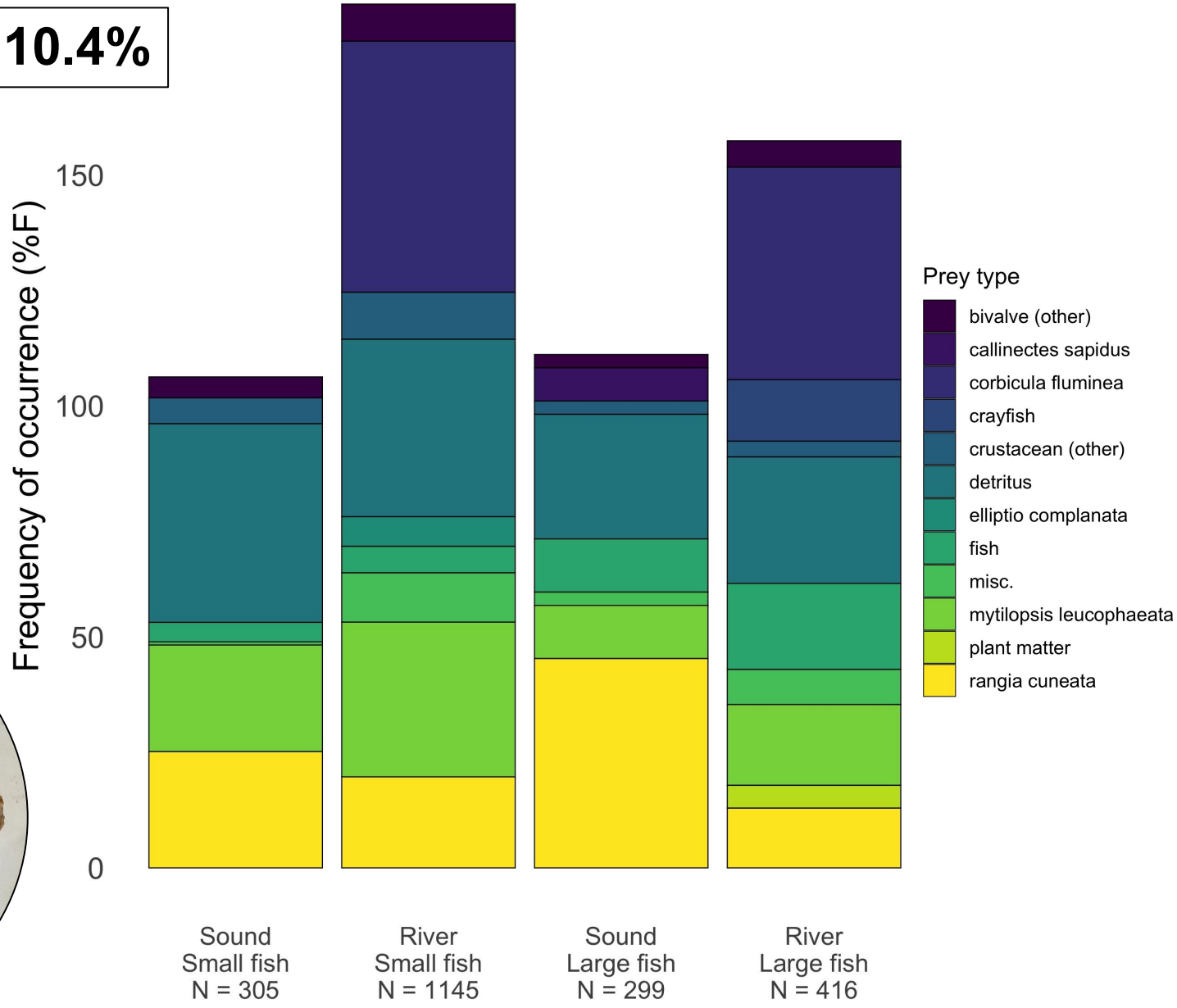
Asian clam
Corbicula fluminea
32.4%

Dark false mussel
Mytilopsis leucophaeata
24.3%

Atlantic Rangia
Rangia cuneata
24.6%



DIET: Crustaceans 10.4%

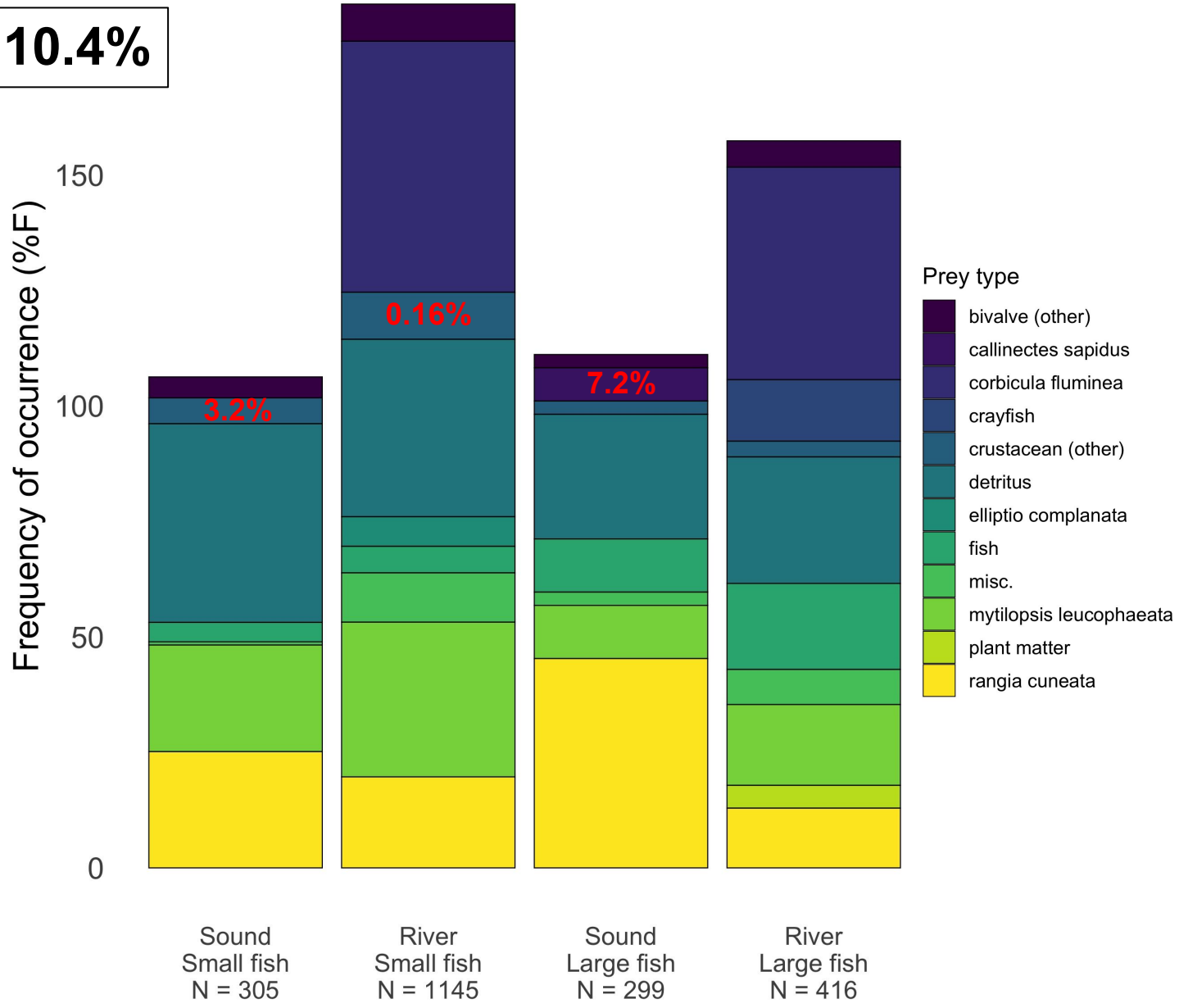


DIET: Crustaceans 10.4%

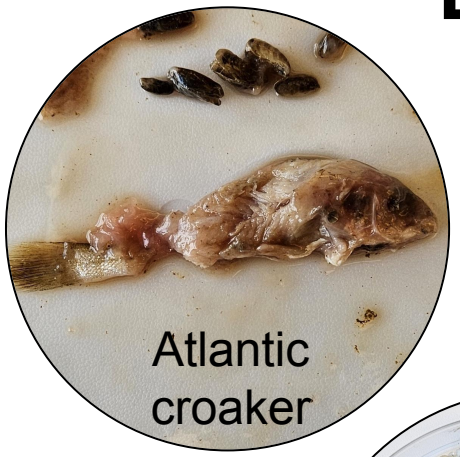
Blue crab

Callinectes sapidus

2.1%



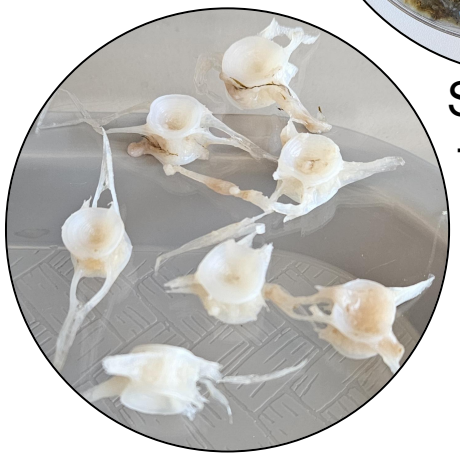
DIET: Fish 8.9%

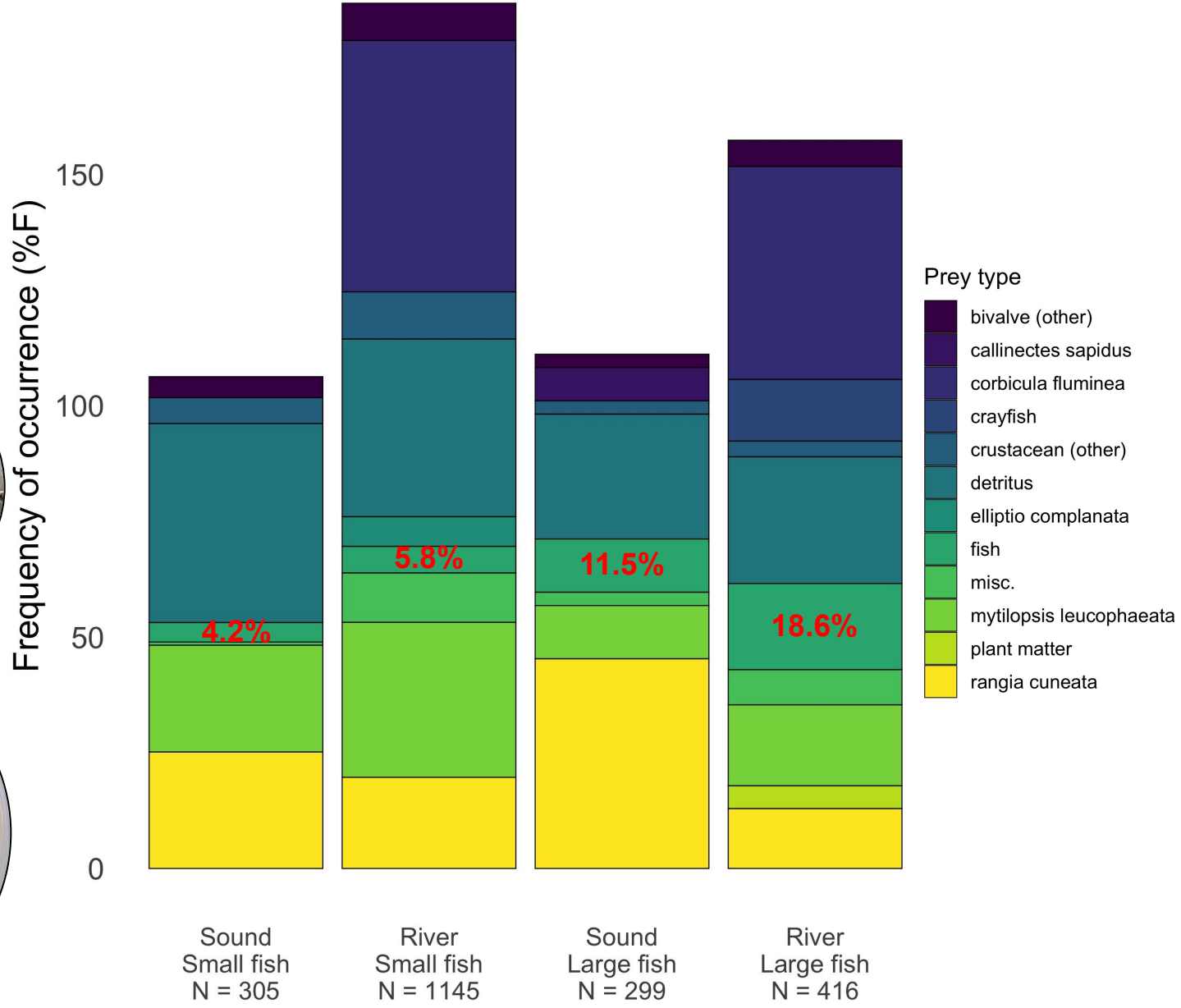

Atlantic
croaker


Atlantic menhaden


Southern
flounder


American eel




Frequency of occurrence (%F)
150
100
50
0
4.2%
5.8%
11.5%
18.6%
Sound
Small fish
N = 305
River
Small fish
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plant matter
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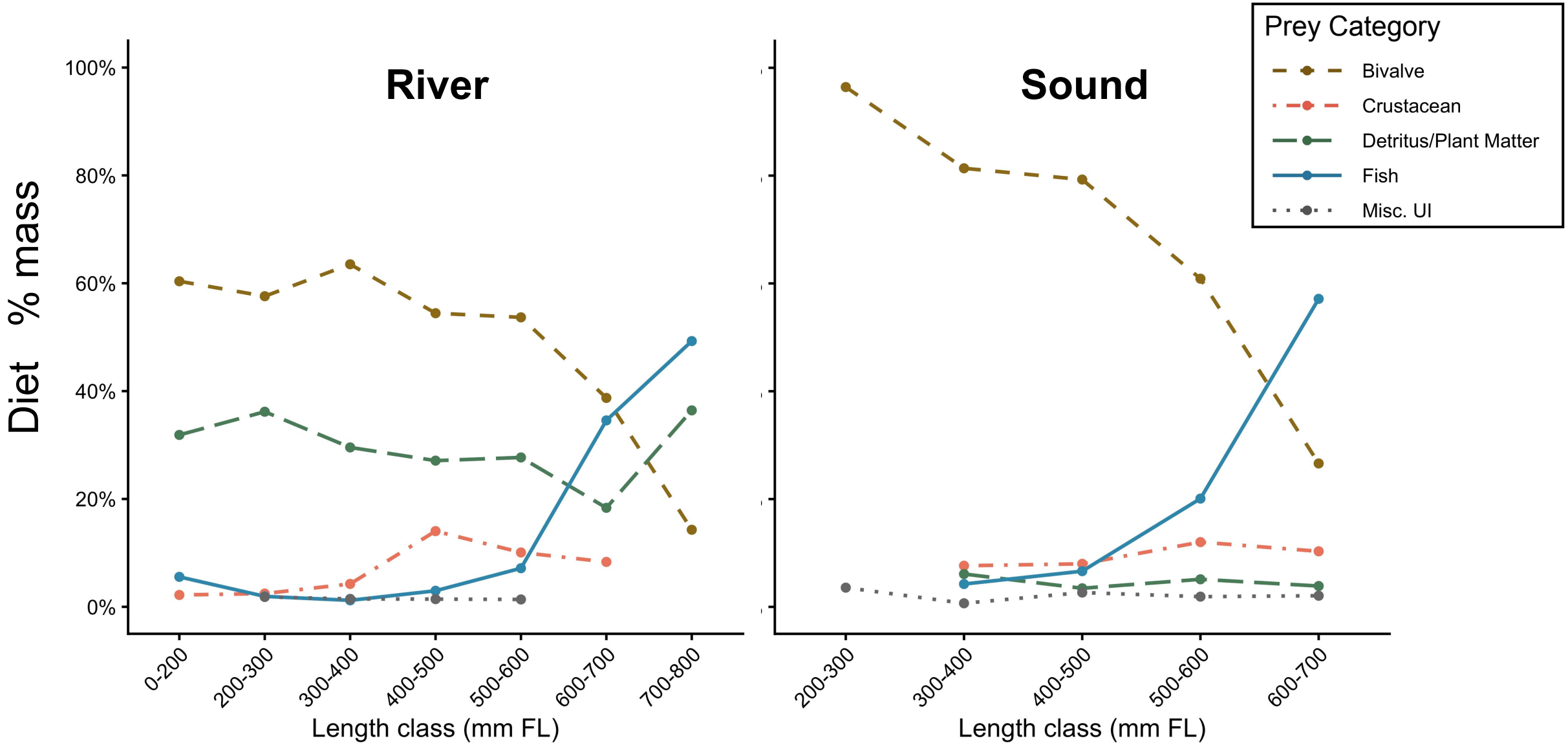
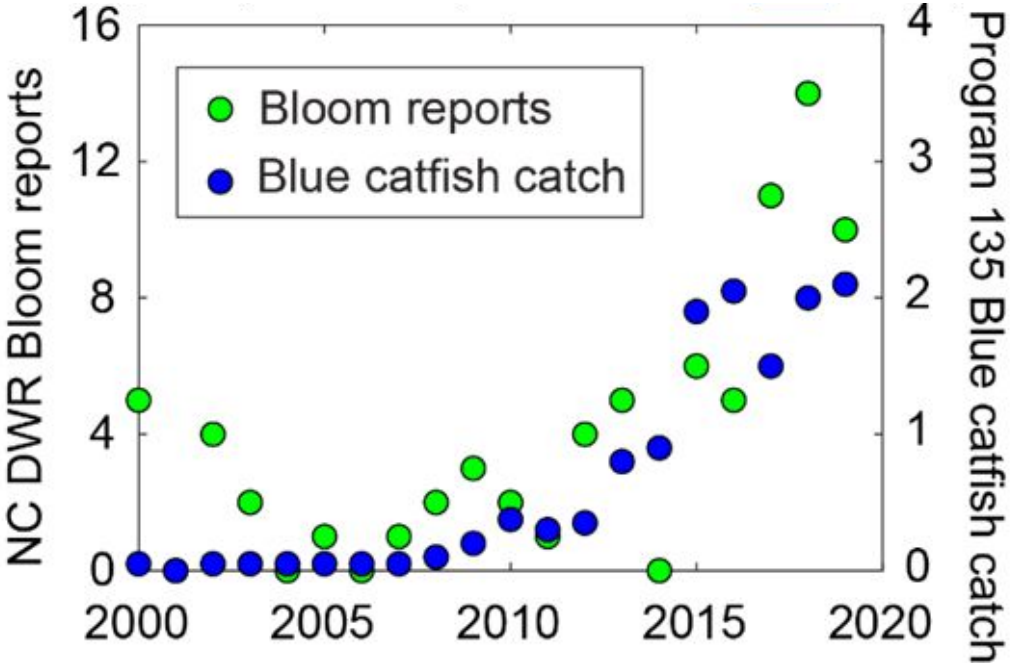
Ontogenetic shifts in diet



Implications

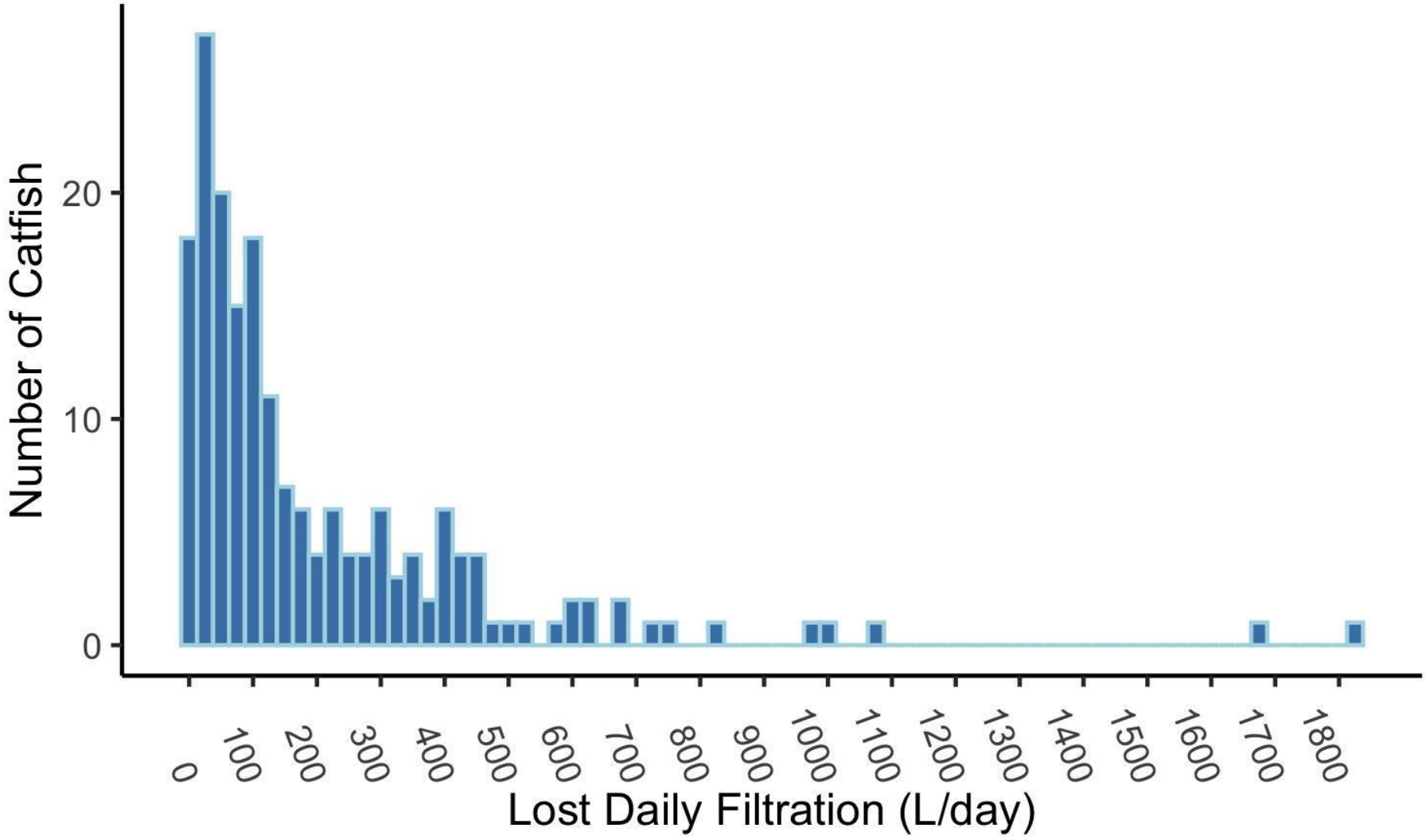
- Blue catfish are highly abundant in Albemarle Sound and rely heavily on filter feeding bivalves
- Are blue catfish causing a trophic cascade and impacting water quality?

Questions?

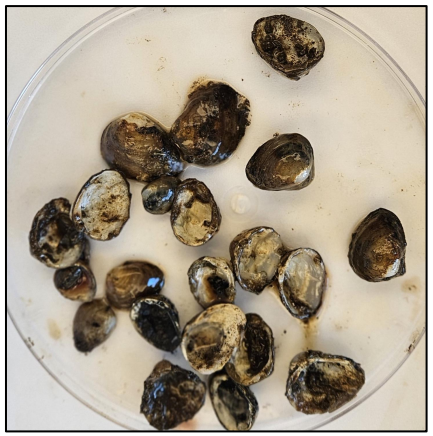


Blue catfish impacts on bivalve water filtration

- Average filtration rate impact = 191 liters per catfish
- Including fish without clams = 63 liters per catfish

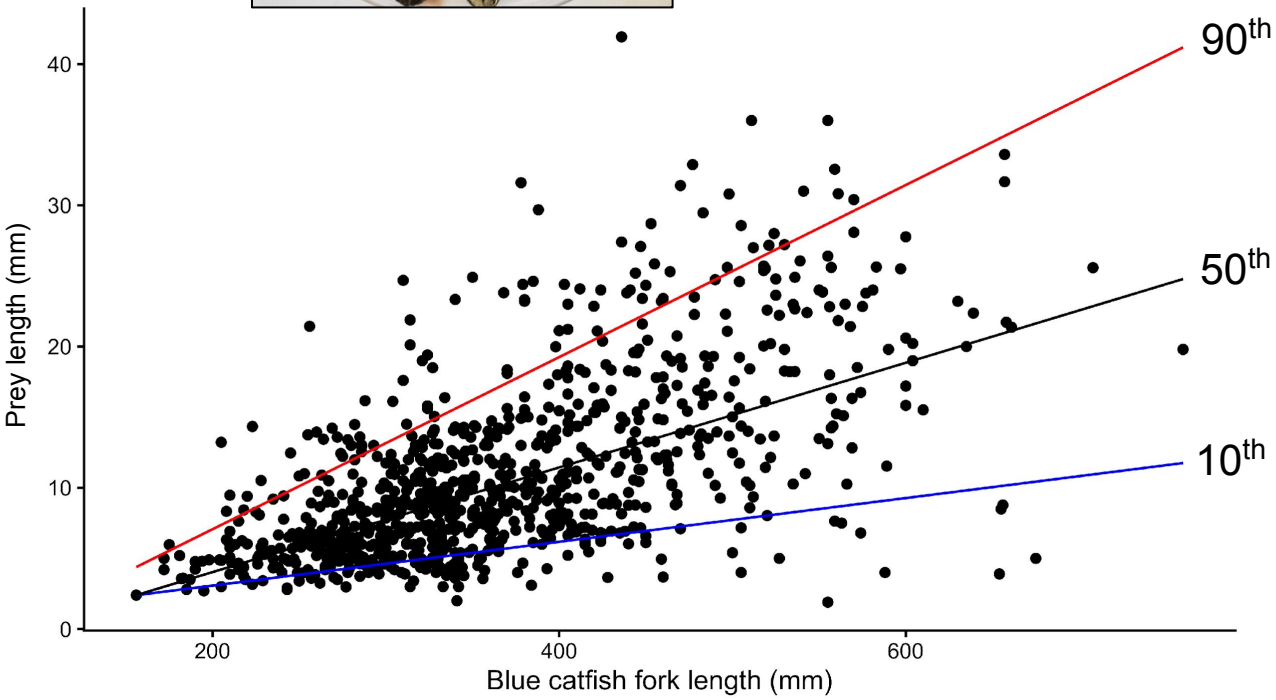


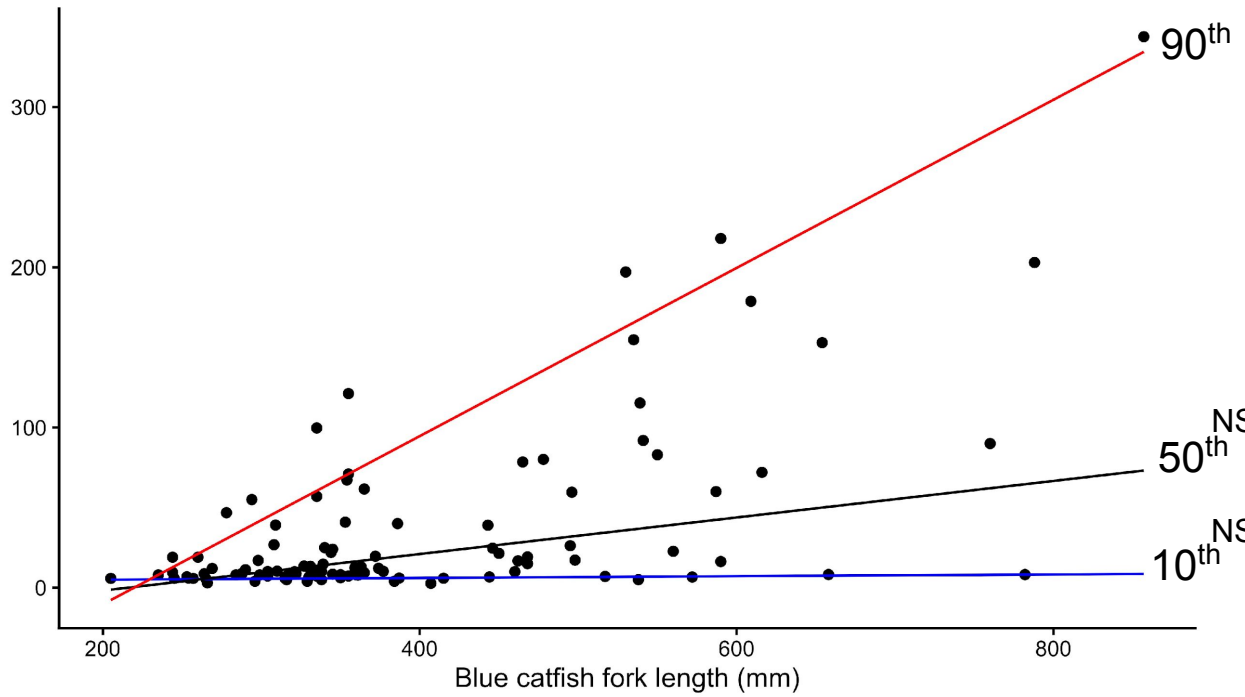
Ontogenetic shifts in diet



Bivalve prey

Other prey





Blue Catfish Commercial Landings