Blue Catfish Diet in Maryland

Smithsonian Environmental Research Center

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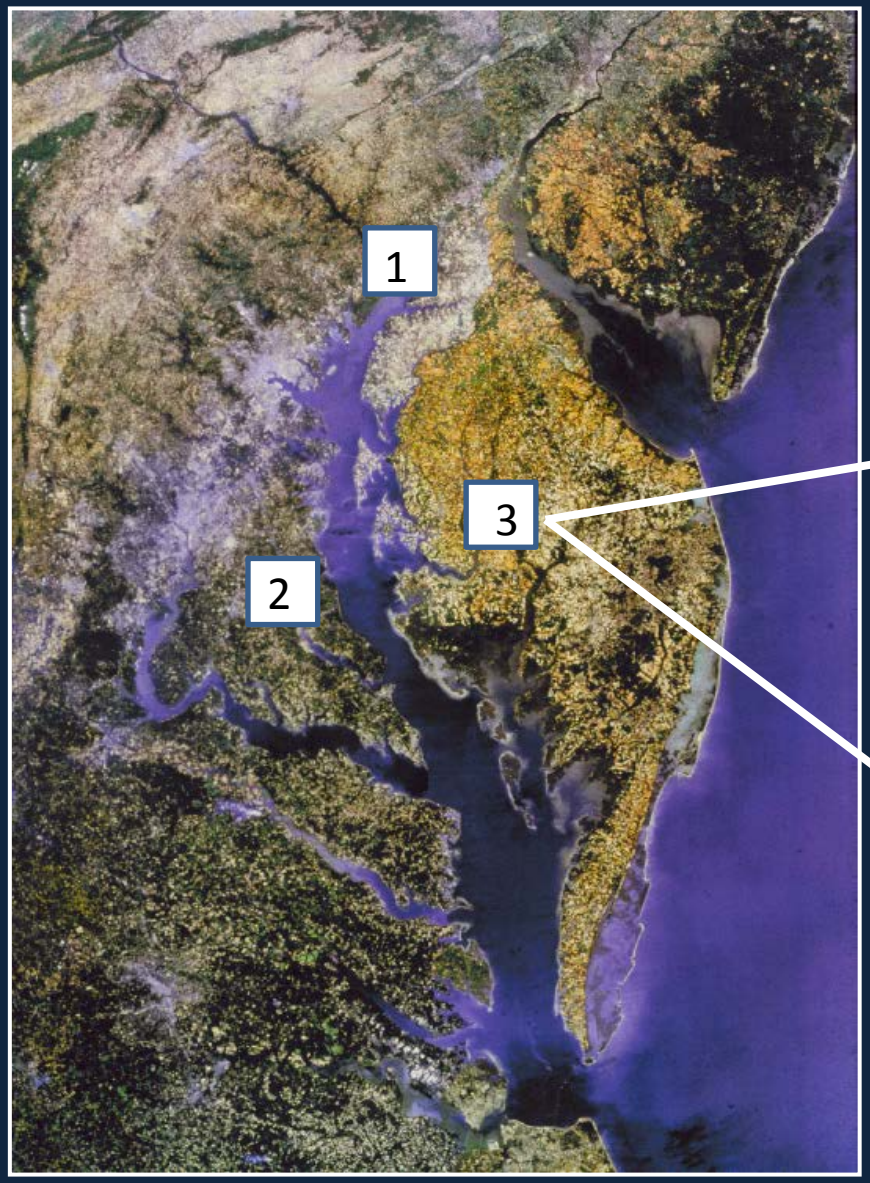
Methods: Study Sites in the Chesapeake Bay



1. Upper Bay - Susquehanna Flats and Swan Creek
2. Patuxent River
3. Nanticoke River / Marshyhope Creek

Each site is broken into quadrats for randomized sampling

Catfish Processing

Measure and weigh

Dissect catfish

Stomach contents:

-Identify invertebrates

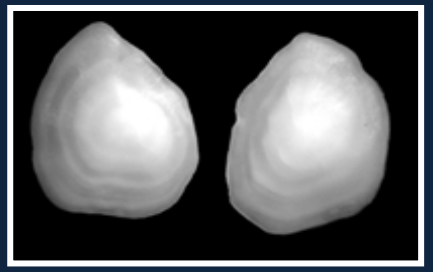
-freeze fish

-score, weigh contents

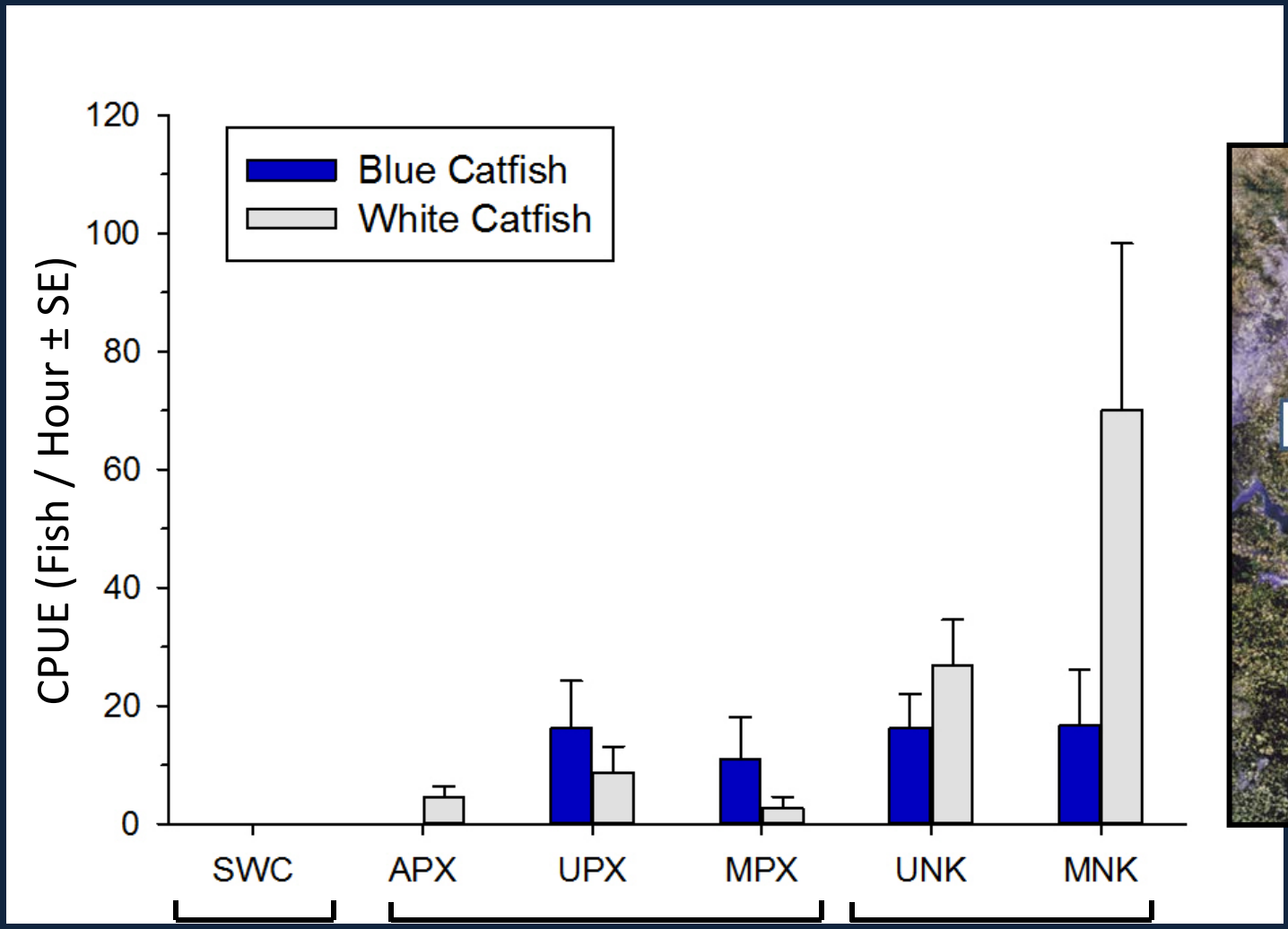
Extract otoliths

Tissue Samples:

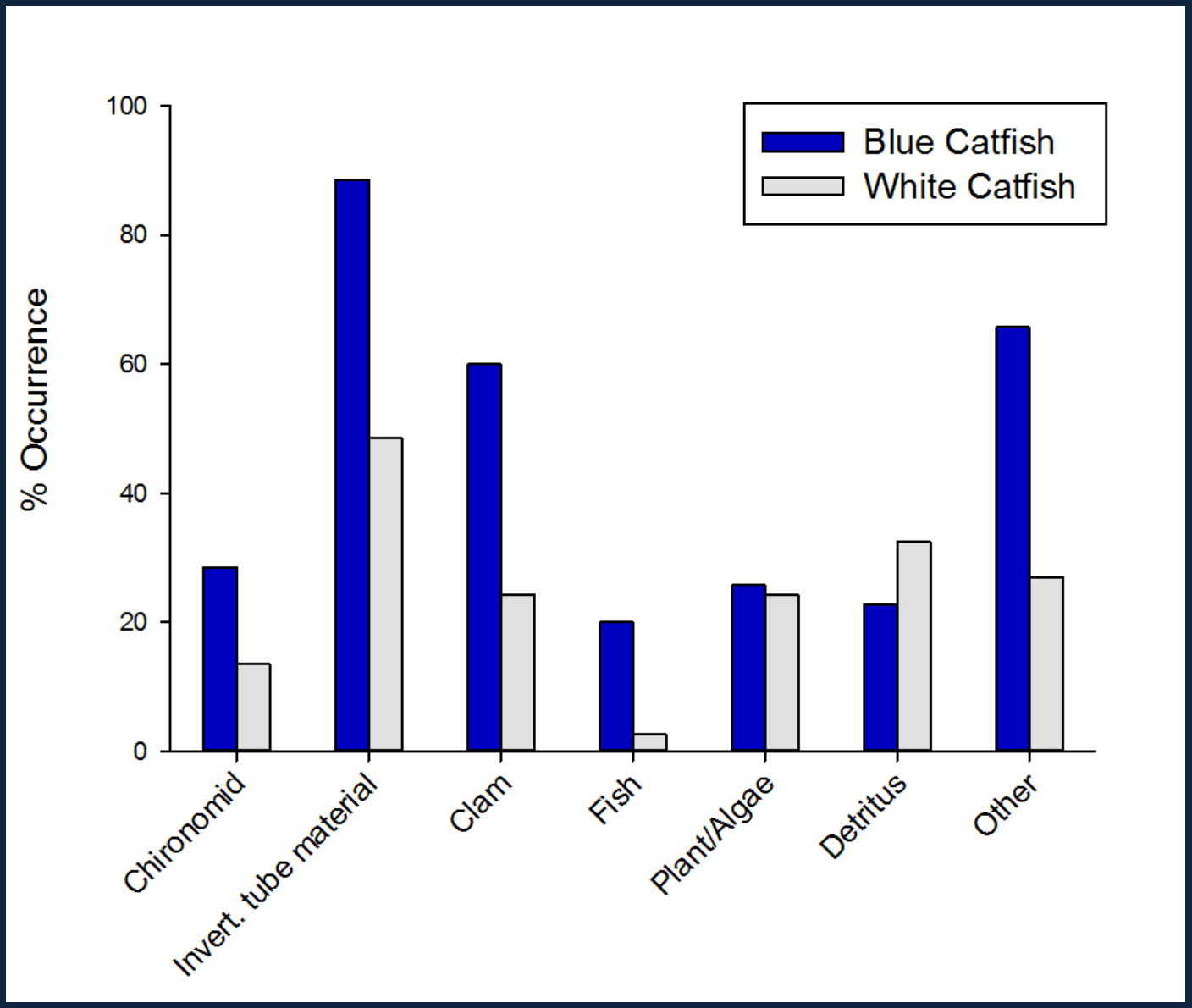
-Stable isotopes



White and Blue Catfish CPUE



Percent Occurrence of Prey Items



Genetic Barcoding Pilot Study

Morphology?

Fresh or Frozen

Extraction
Amplification
Sequencing

156 fish prey items

- 12 to species using morphology
- 140 to species using genetic barcoding

Barcoded Fish Prey

Clupeids

Alosa aestivalis	6
Alosa mediocris	4
Alosa pseudoharengus	2
Alosa sapidissima	8
Brevoortia tyrannus	15
Dorosoma cepedianum	23

Cyprinids

Notropis hudsonius	9
Carassius auratus	2

Moronids

Morone americana	28
Morone saxatilis	1

Centrarchids

Lepomis gibbosus	5
Lepomis macrochirus	9
Micropterus salmoides	1

Ictalurids

Ameiurus nebulosus	4
Ictalurus furcatus	15
Ictalurus punctatus	17

Other

Anguilla rostrata	2
Anchoa mitchelli	9
Etheostoma olmstedi	14
Fundulus diaphanus	1
Micropogonius undulatus	1

Chesapeake Bay Barcode Initiative

~ 315 fish species in Chesapeake Bay

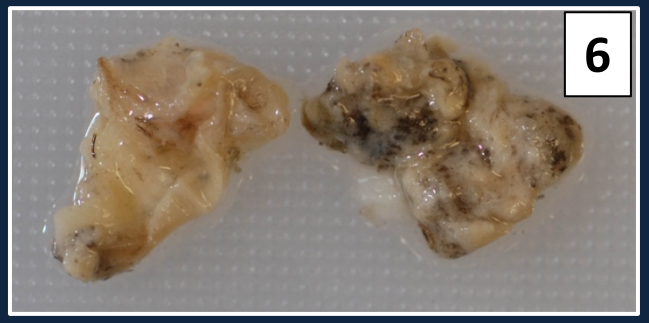
To date, >200 species

Classes:	3
Orders :	24
Families:	54
Genera:	100

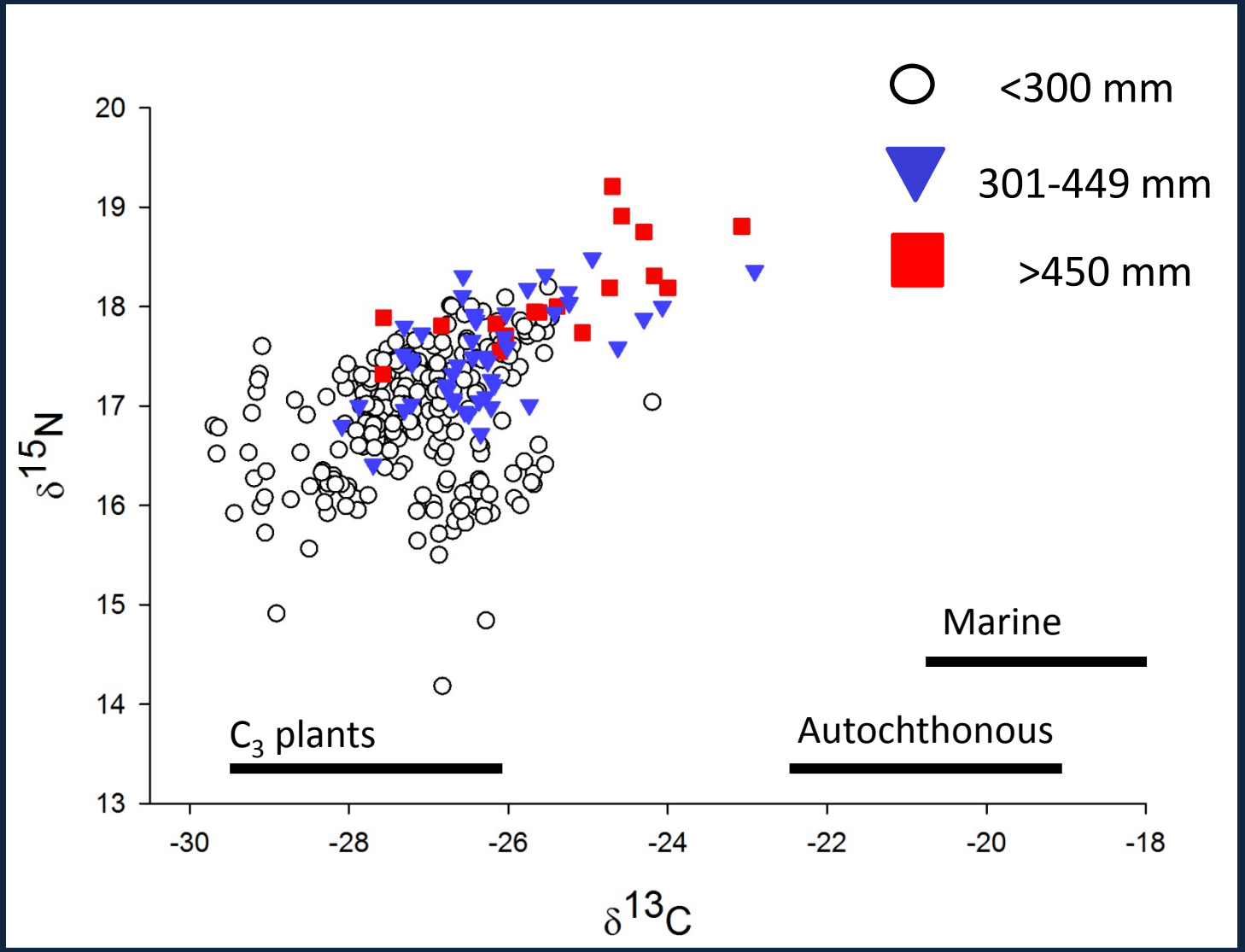
Most potential blue catfish prey items have been barcoded

How does digestion affect barcoding success?

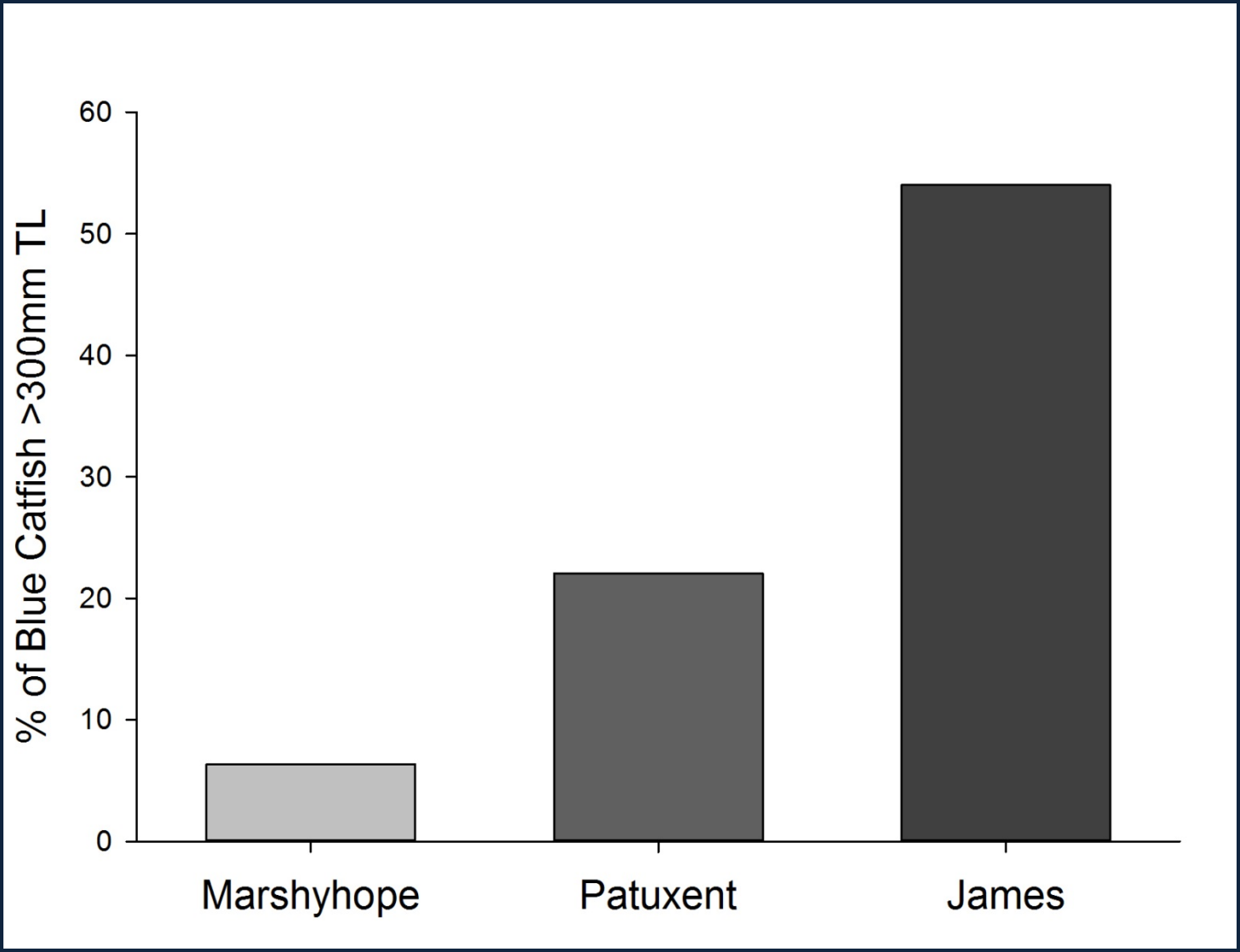
Classification	Score	% Success
Whole fish, pristine	1	100
Whole fish, slight digestion	2	91
Whole fish, moderate digestion	3	100
Fish tissue on spine	4	100
Spine/bones with some tissue	5	84
Loose tissue	6	72
Unidentified material	7	40

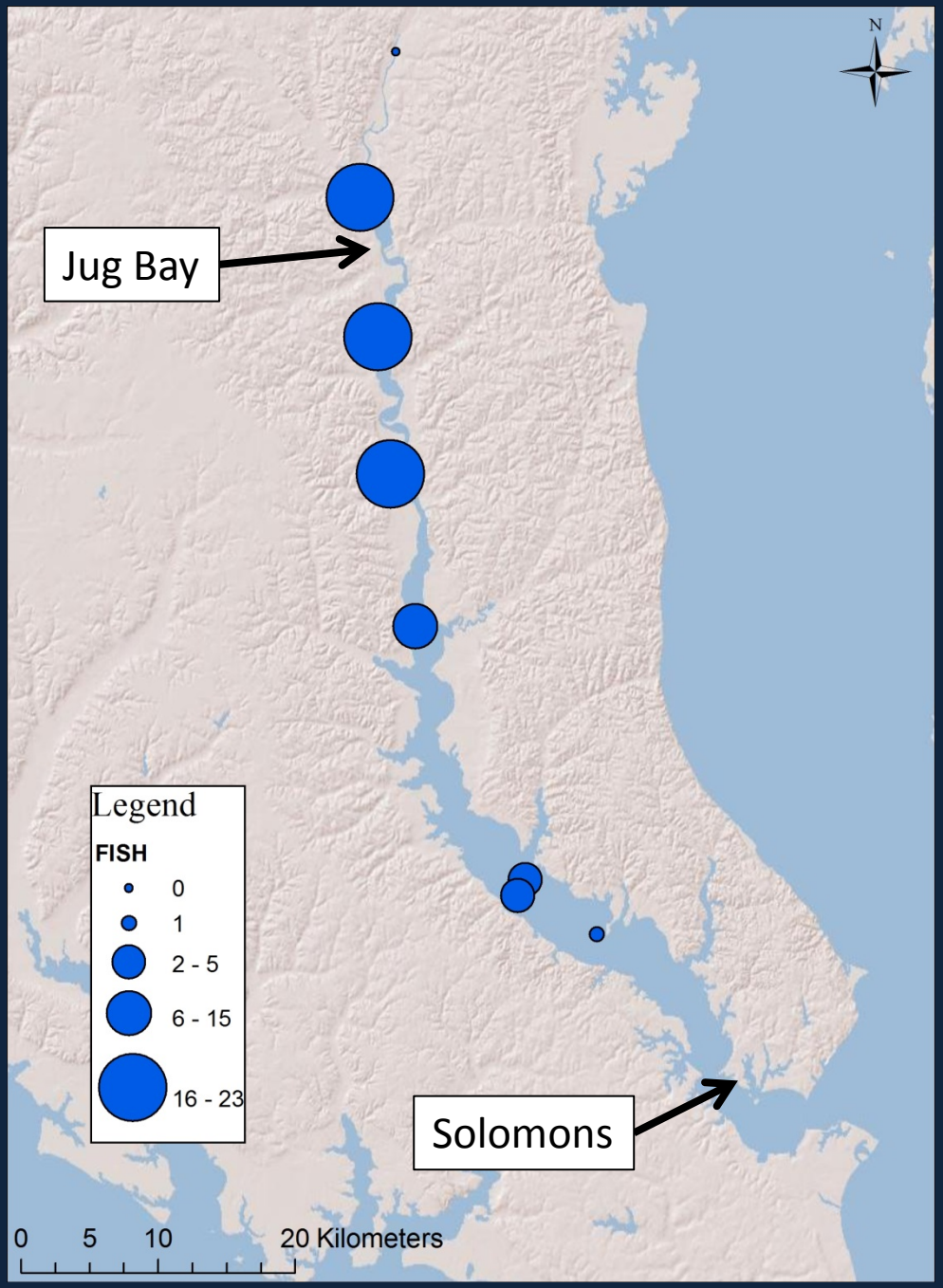


Stable Isotope Analysis



Percent of Blue Catfish >300 mm TL





Habitat Use

Blue catfish tracked using acoustic telemetry

Majority of time spent in deeper freshwater and oligohaline areas

Two occasions when 50% of tagged fish moved 20 km downstream

Conclusions

- Shift to piscivory beginning at ~300 mm TL
- The proportion of fish >300 mm is lower than in Virginia rivers
- Genetic barcoding has aided identification of managed species in stomach contents
- Habitat use data suggests predation impact greatest in tidal freshwater and oligohaline areas