# Microcystins in Estuarine Food Webs: A Global Synthesis

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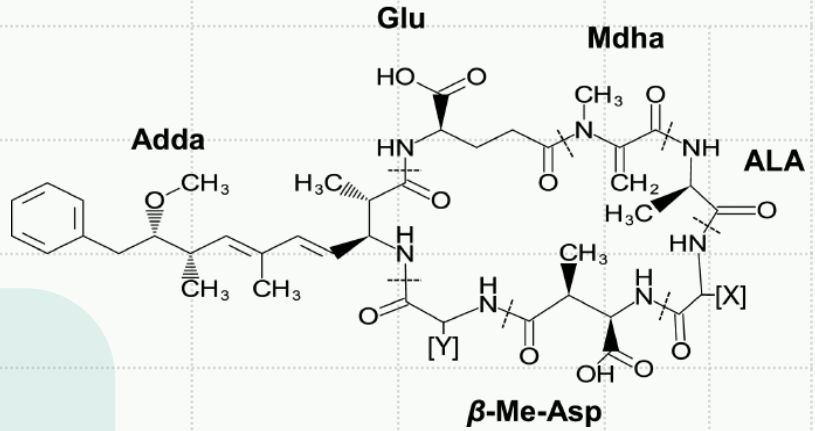
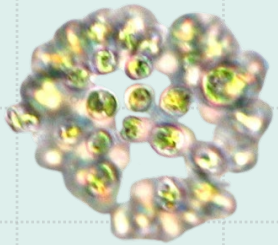
# ISSC Biotoxin Committee Knowledge Gaps:

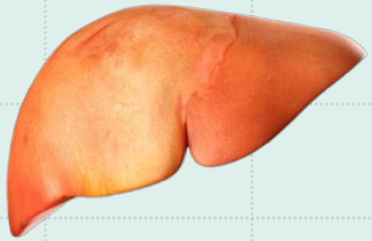
- Validated method for detecting freshwater toxins in molluscan shellfish
- Toxicity equivalency factors for MC variants, beyond MC-LR
- Guidance levels for freshwater toxins in molluscan shellfish
- Levels of concern for freshwater toxins in molluscan shellfish
- Understanding of accumulation and elimination rates of freshwater toxins in molluscan shellfish
- Understanding regarding bioavailability and toxicity to humans
- Understanding of acute versus chronic exposure

# What are Microcystins (MC)?



Hepatoxic freshwater toxins



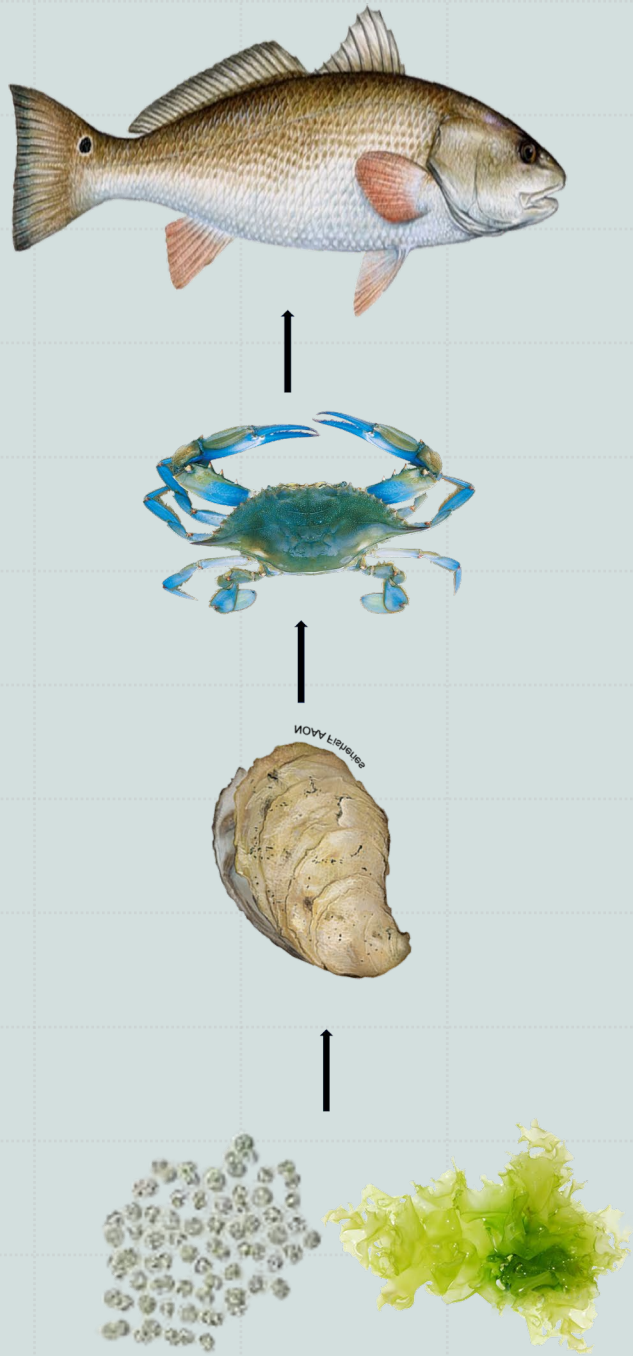
Hepatocellular carcinoma, kidney and liver damage hemorrhaging, tumors, and death

World Health Organization

WHO TDI 0.04 ug/kg (0.018 ug/lb) body weight

# Movement through Ecosystems

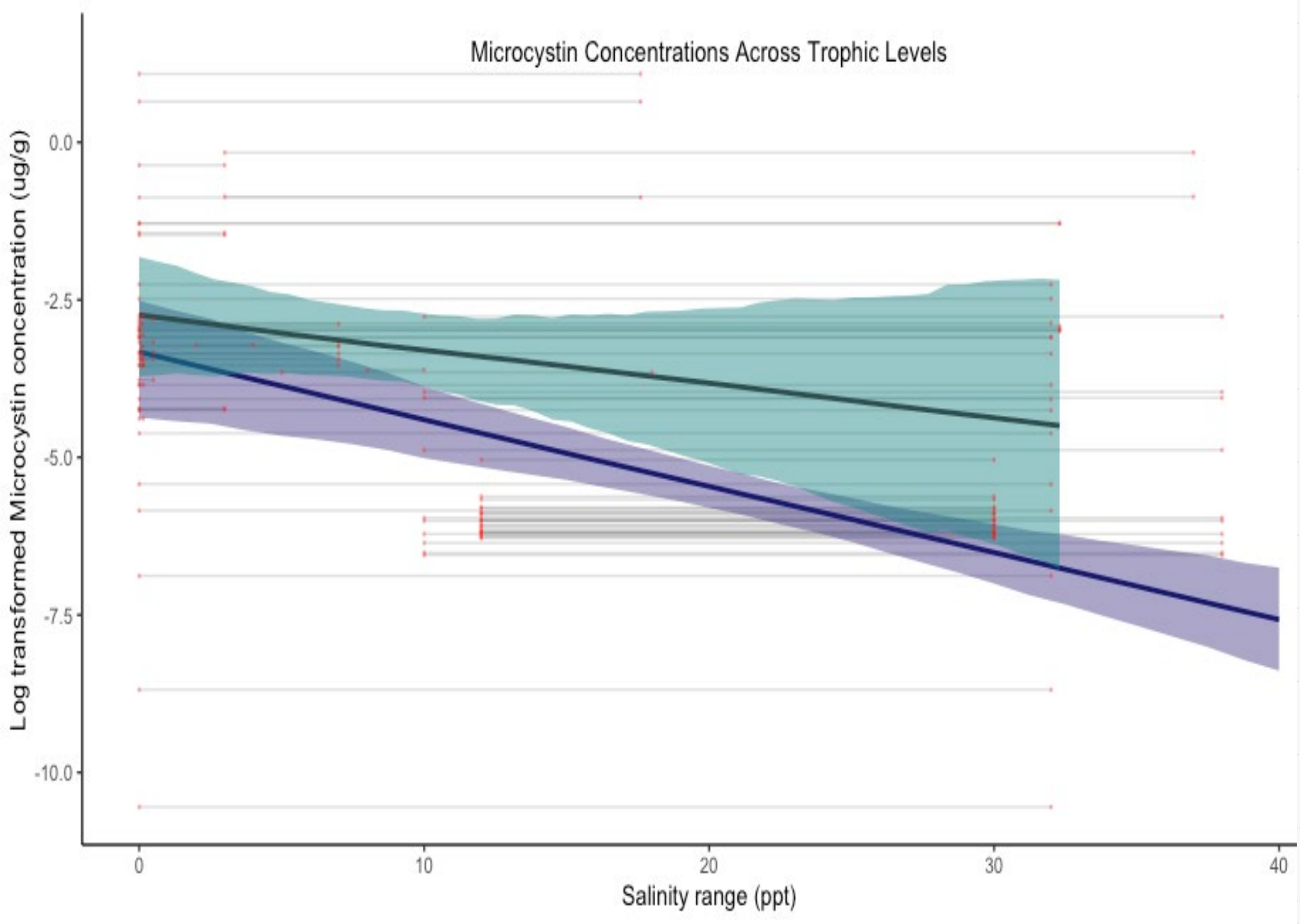
- Downstream transport
- Eutrophic waters
- Rainfall
- Climate Change
- Salinity ranges



How are Microcystin concentrations changing within trophic levels as we move down estuary?

# Methods

- *In-situ*
- Salinity range
- Trophic level
- Tissue/muscle MC concentration




Mussels

Gizzard Shad (Juvenile)

European Perch (Juvenile)

Redbreast Tilapia

Adult Gizzard Shad

Bleak

Bogue

Threadfin Shad

Roach

Carp

Bream

Atlantic Menhaden

Blue Catfish

Sabre Carp

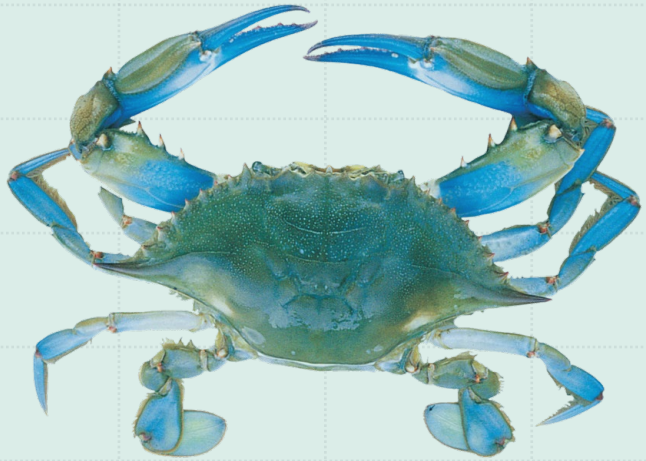
Blue crab

Mackerel

Pikeperch

# Relevance to North Carolina

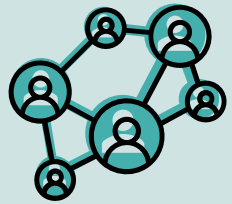
- Large salinity gradient, higher risk upstream
- Impact to commercially valuable species
- Limited microcystin presence compared to locations with differing geomorphology
- No consistent monitoring programs



# Implications for NC Resource Managers


High uptake and slow depuration times may influence growing area closures

Geospatial relationships impact seafood consumption advisories



Potential for state and region wide monitoring program

Baseline monitoring for tissue and water