Ongoing and proposed forage-relevant research

Update on mysid research in Chesapeake Bay and an introduction to proposed benthic indicator research

Forage Action Team biannual meeting

Wednesday, August 21, 2019

Ryan Woodland

Ongoing and proposed forage-relevant research

<u>Project/proposal co-PIs and collaborators:</u>

Mysid distribution and relative abundance across spatial, temporal and environmental gradients

Hongsheng Bi (CBL), Elizabeth North (HPL), Danielle Quill (CBL *grad student*)

Fecundity and genetic differences of Neomysis americana *in two tributaries of Chesapeake Bay*

Louis Plough (HPL), Oliver Autrey (MSU *undergrad*)

*Benthic biomass size and trophic spectra as ecological indicators in Chesapeake Bay (**proposed – MDSG 2019**)*

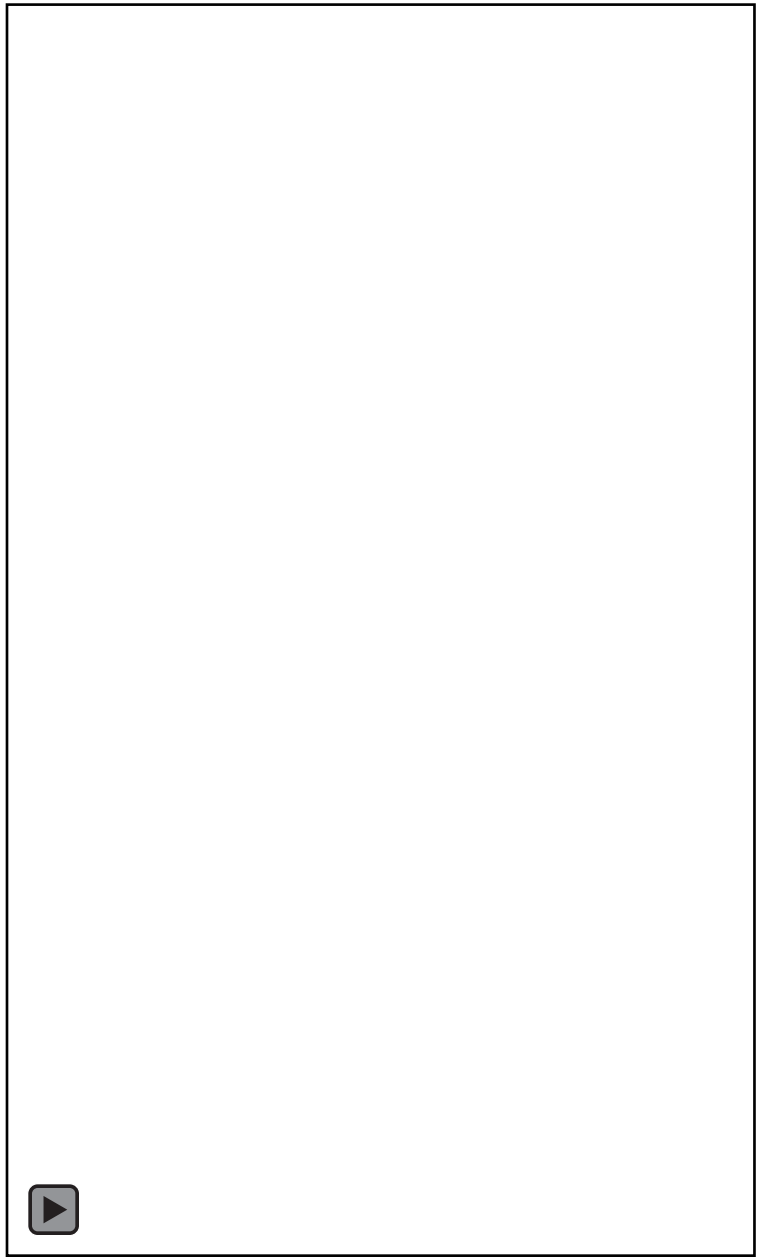
Lora Harris (CBL), Dong Liang (CBL), Ed Houde (CBL)

Mysid research

Distribution and abundance of mysids project

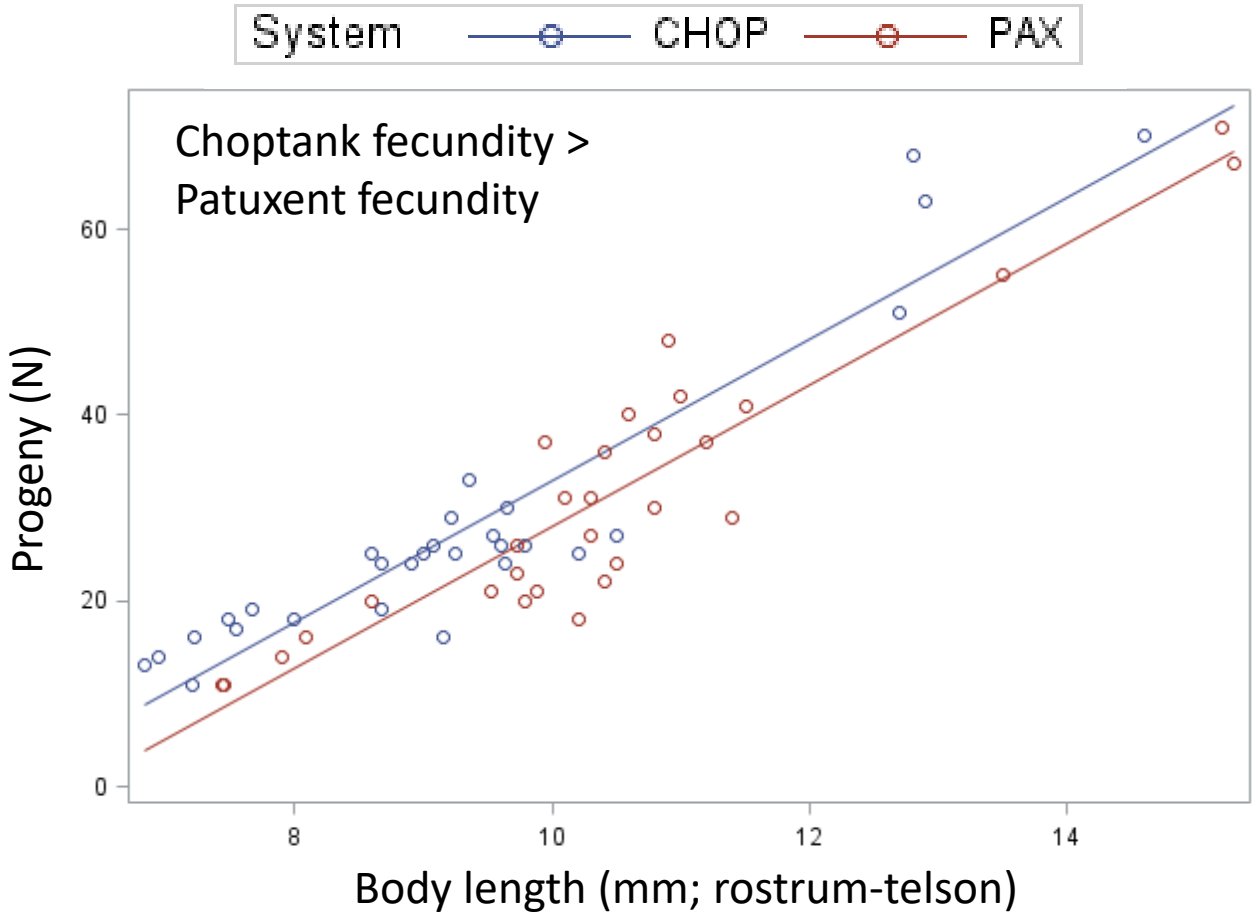
- Field work: May – September cruises (2018 completed, 2019 continuing)
- Laboratory sample processing ongoing
- ARIS image sample processing delayed but initial results are promising

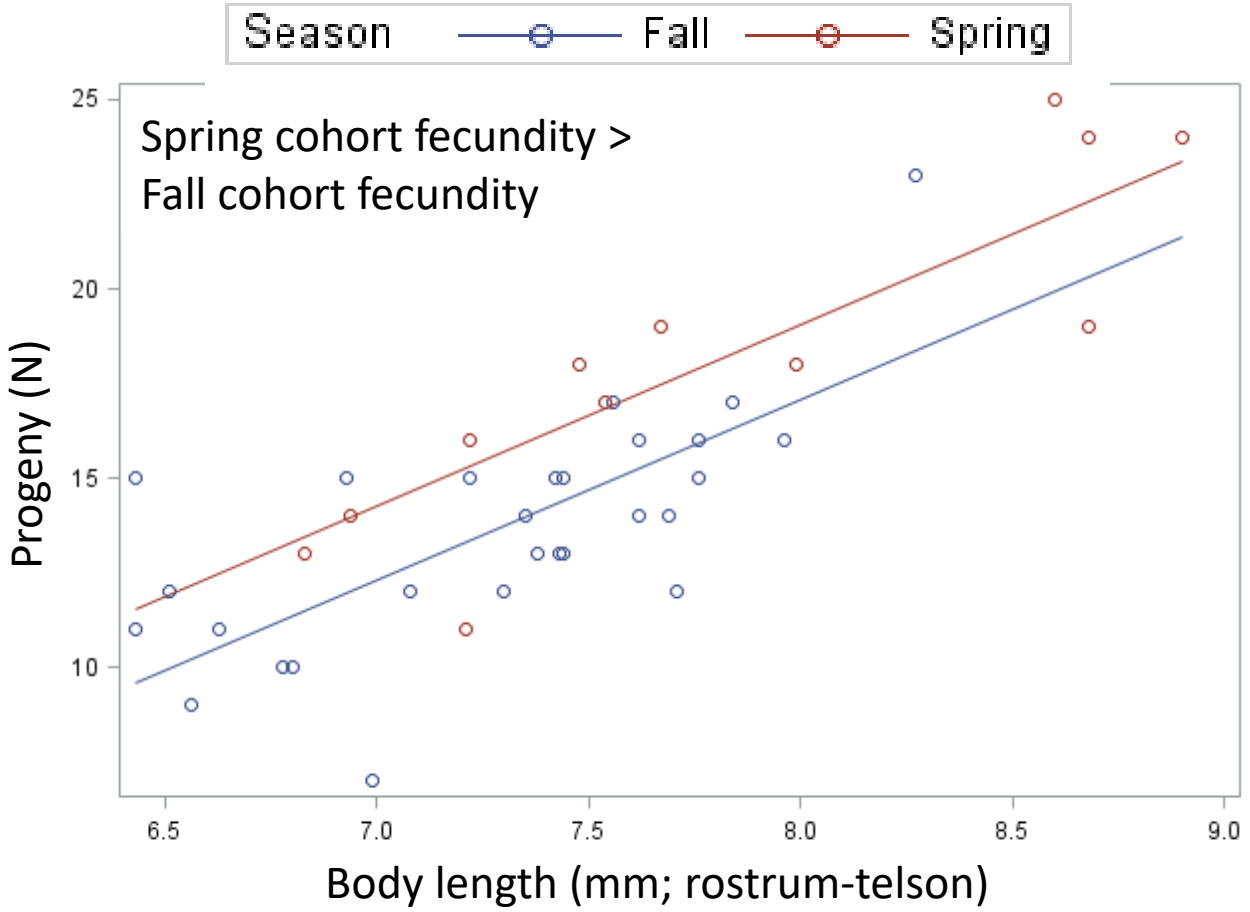
- Focus on Patuxent and Choptank Rivers
  - Explore mechanisms underlying historical anecdotal evidence of higher abundance in Choptank R.



K. Lankowicz (Bi lab) 2018 ARIS video

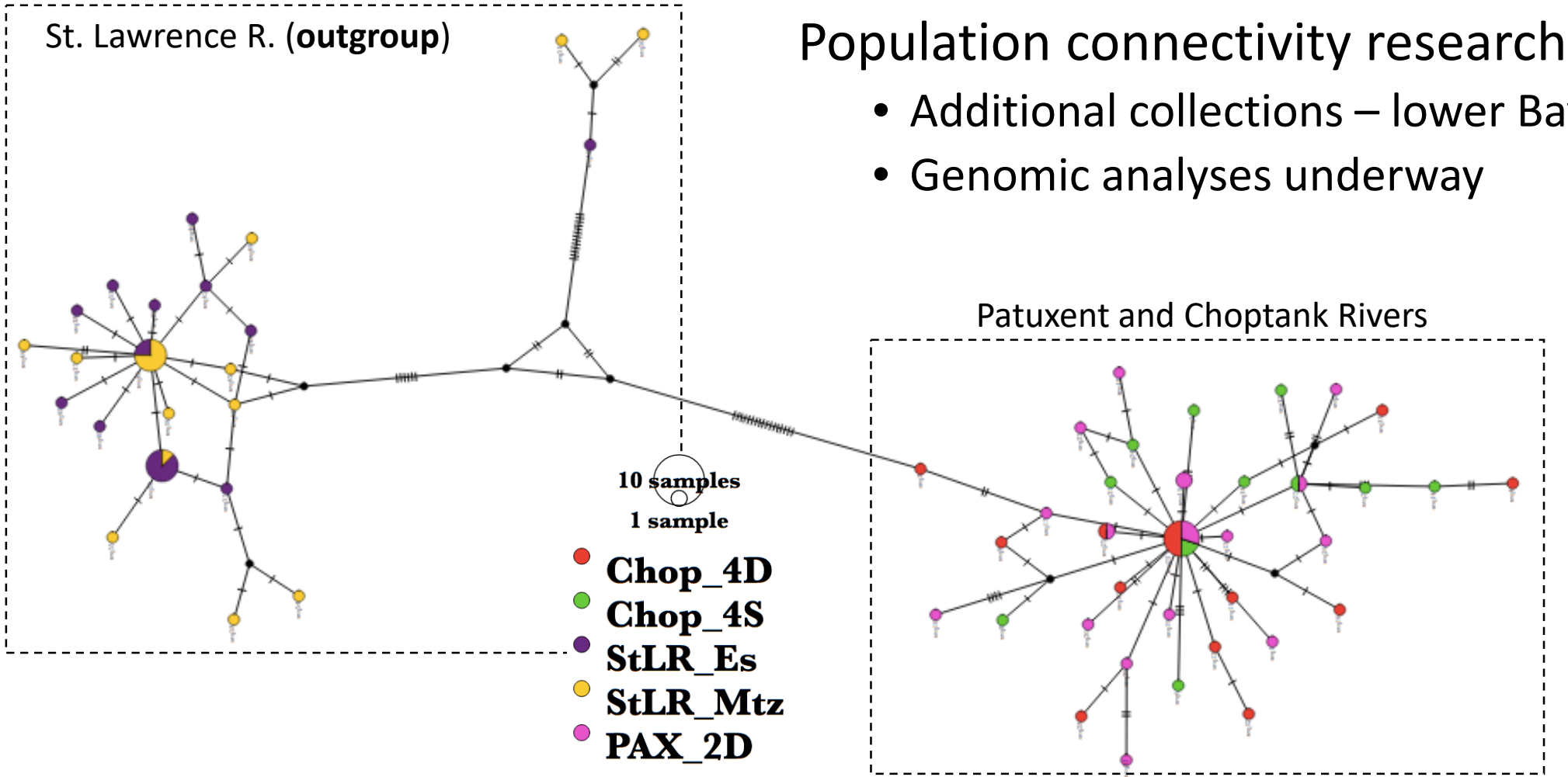
Mysid (*N. americana*) fecundity – spatial and temporal differences





Autrey et al. 2019 MDSG REU project

Mysid (*N. americana*) population connectivity – no evidence of PAX vs. CHOP genetic differences



Population connectivity research continuing

- Additional collections – lower Bay, coastal bays
- Genomic analyses underway

Autrey et al. 2019
MDSG REU project

Benthic indicator research

Current proposal – MDSG 2019

- Develop and assess derived metrics of benthic assemblage as indicators of community status

- Metrics derived from benthic biomass size spectra and biomass trophic spectra
  - Spatial scope: baywide
  - Temporal scope: 1980’s to present
- Data sources
  - CBP Benthic long-term monitoring survey
  - Water quality monitoring survey
  - Other data sources (e.g., NOAA National Climatic Data Center, USGS)

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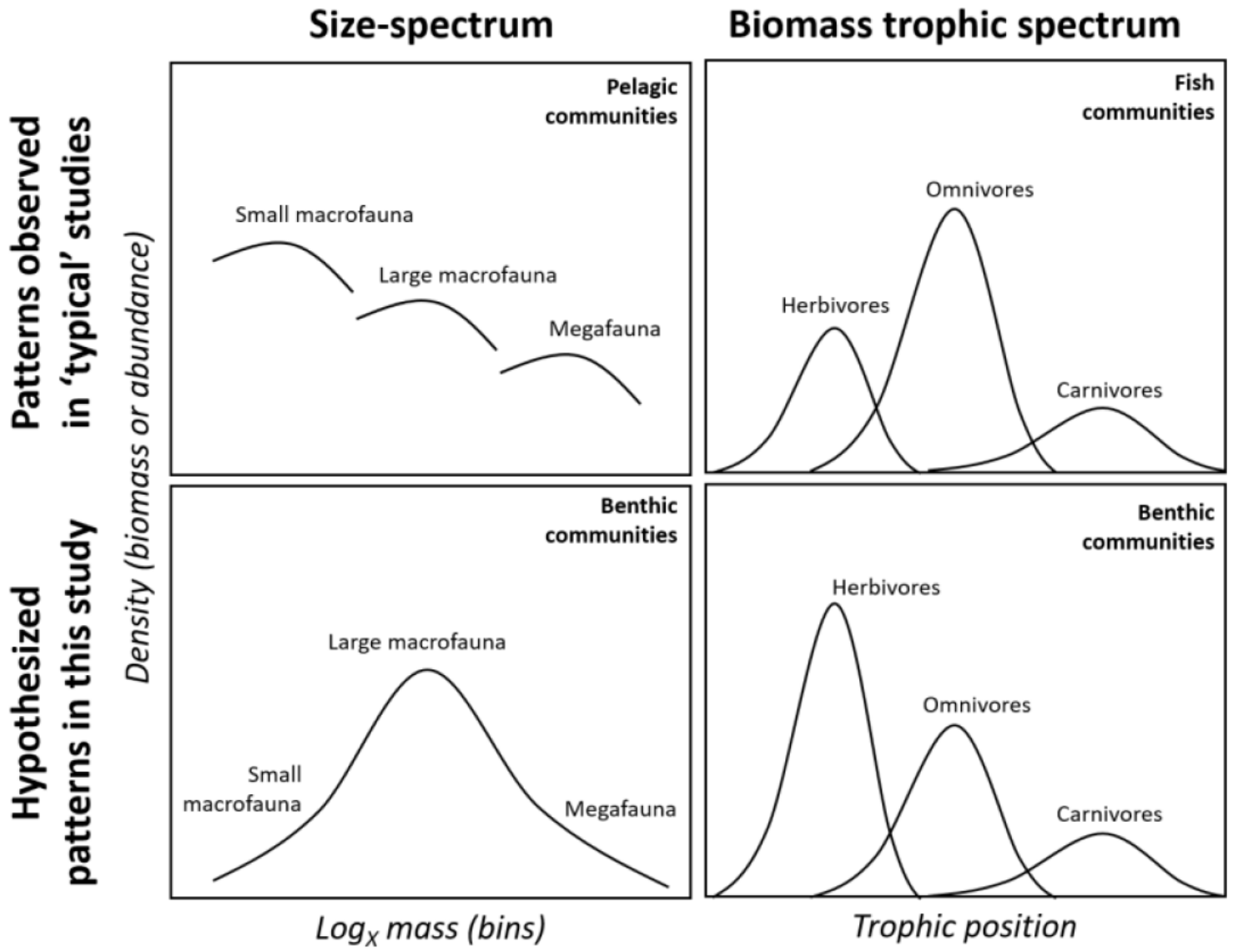

Figure 1. Conceptual diagram demonstrating size- (left panels) and biomass trophic-spectra (right panels) patterns often reported in the literature (upper panels) and specific to this dataset (lower panels, hypothesized based on sampling gear and faunal composition). General size-based functional groups (small/large macrofauna, megafauna [size spectra]) and trophic functional groups (herbivores, omnivores, carnivores [biomass trophic spectra]) are provided as examples only.

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Ongoing and proposed forage-relevant research

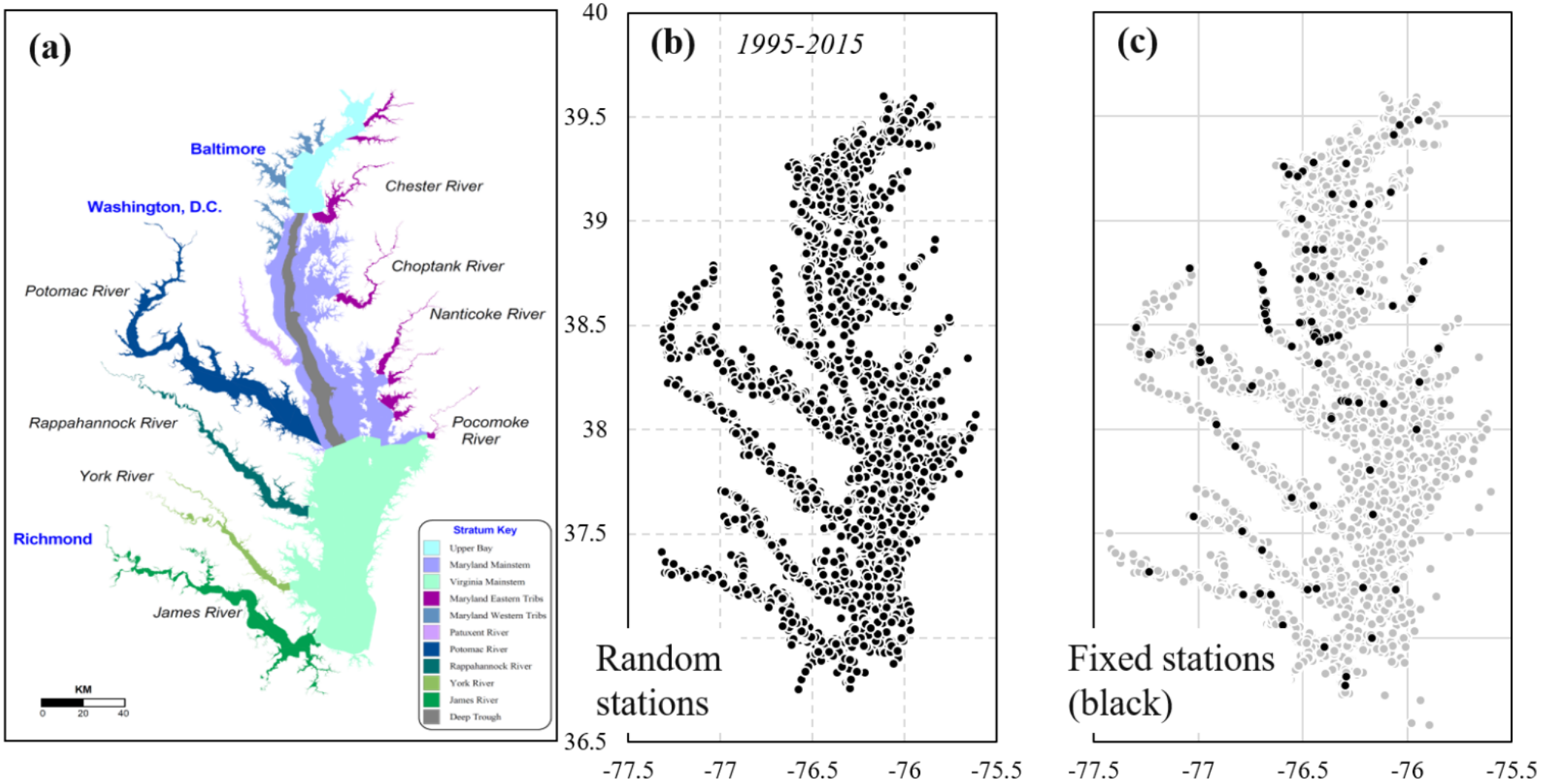

Figure 3. Chesapeake Bay Long-Term Benthic Monitoring Survey regional strata (a, figure from Versar [baybenthos.versar.com]). Spatial coverage of the sampling locations from the random component of the survey from 1995-2015 (b) and the fixed station component (c).

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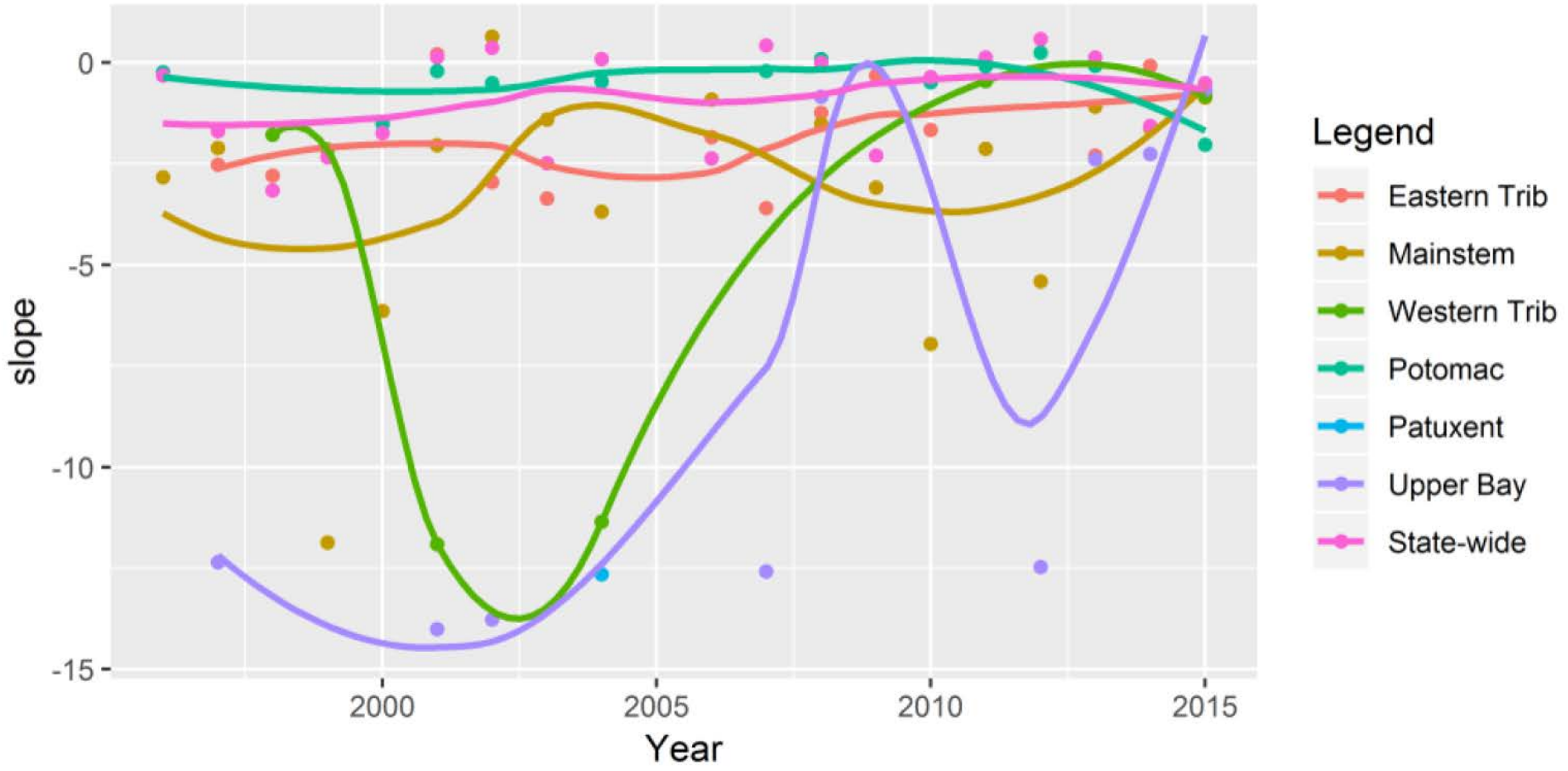

Figure 4: Design-based estimates of slope of the biomass size spectra of benthic data from the random station component of the CBP benthic survey using logarithmic base 2 size bins and applied at the regional scale. Temporal trends and spatial differences are apparent in this preliminary assessment of the potential for the size spectrum approach to yield interpretable patterns.

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Benthic indicator research

Goals

- Development and testing of derived metrics
- Comparison of spectral metrics with established benthic community metrics (e.g., B-IBI)
- Findings potentially useful for variety of GITs, including Fisheries, Habitat and Water Quality

Current status

- Notification expected by mid-late September 2019
- If successful, stakeholder workshop will be held early to solicit input from management agencies

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