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Research on Exposure to Plastic & Associated Chemicals

NCCOS Program Collaborations

Dr. Barbara Beckingham

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Masters of Environmental & Sustainability Studies

Graduate Program in Marine Biology

Main research collaborations with NCCOS scientists

Ed Wirth – Contaminant Chemistry Research

Wayne McFee – Coastal Marine Mammal Assessments

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Phthalate Chemicals in Marine Mammals & Humans

- Instrumentation lab directed by Ed Wirth
- Coordinated to set-up analytical method & run samples
- 2 undergraduates given hands-on experience with chemical analysis & insight into careers
- 1 publication/1 in-prep

AGU100 ADVANCING EARTH AND SPACE SCIENCE

GeoHealth

RESEARCH ARTICLE
10.1029/2018GH000146

Urinary Phthalate Metabolites in Common Bottlenose Dolphins (*Tursiops truncatus*) From Sarasota Bay, FL, USA

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Key Points:
- Phthalate metabolites were found in 71% of bottlenose dolphins sampled in Sarasota Bay, FL
- Monoethyl phthalate (MEP) and mono-(2-ethylhexyl) phthalate (MEHP) were the most common metabolites detected in bottlenose dolphin urine
- Bottlenose dolphins in Sarasota Bay, FL, are susceptible to phthalate exposure

Supporting Information:
- Supporting Information S1

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Plain Language Summary For the first time, phthalate metabolites have been detected in the urine of wild bottlenose dolphins. Parent phthalate compounds are common additives to plastics and other products. In humans, phthalate exposure is linked with hormonal and reproductive issues; however, health effects in dolphins are currently unknown. Because dolphins are sensitive gauges of their surroundings, detection of phthalate exposure in these dolphins suggests some level of environmental contamination. Additional research is needed to determine the source of their exposure and whether phthalates may negatively impact dolphin health.

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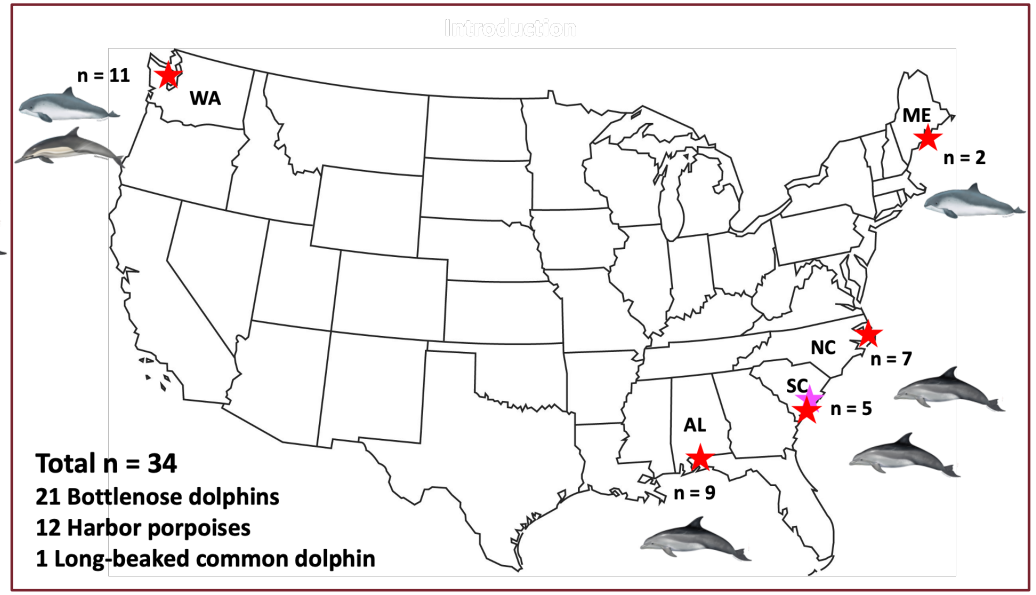
1770

Exposure of marine/estuarine species to microplastic

- Collaboration with Wayne McFee to understand interaction of marine mammals with plastic debris
- Microplastic an "emerging contaminant of concern"
- Undergrads interning with Wayne gain real work experience
- 2 CofC Marine Biology Graduate Students co-advised on theses
  - Francesca Battaglia ('19)
  - Tessa Pfeifer ('20)
  - >6 scientific presentations
  - 1 publication accepted/in review & 1 in-prep

- First work in North American dolphins & porpoises
- First ID of tire wear particle in marine mammal gut
- Observed macro-> micro
- Effort to harmonize methods for microplastic detection in biota specifically marine mammals
- Effort to understand exposure drivers and contribute to risk assessment



(Tessa Pfeifer thesis, 2020)

Water Quality Research

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Environ Monit Assess (2012) 184:343–359
DOI 10.1007/s10661-011-1972-3

A long-term monitoring study of chlorophyll, microbial contaminants, and pesticides in a coastal residential stormwater pond and its adjacent tidal creek

Marie E. DeLorenzo · Brian Thompson · Emily Cooper · Janet Moore · Michael H. Fulton

ELSEVIER

Journal of Environmental Management 88 (2008) 43–52

Journal of Environmental Management

www.elsevier.com/locate/jenvman

Water quality and restoration in a coastal subdivision stormwater pond

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Check for updates

Stormwater Ponds in the Southeastern U.S. Coastal Plain: Hydrogeology, Contaminant Fate, and the Need for a Social-Ecological Framework

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In lowland coastal regions of the southeastern United States, stormwater ponds are being built as the "green infrastructure" best management practice of choice for addressing the hydrologic changes associated with rapid urban and suburban development. In addition to dampening storm flows, stormwater ponds may provide pollution control and other ecosystem services. However, ponds are not native to this landscape. This review summarizes what is known about the effectiveness of these engineered ponds, which take many shapes and forms, in the context of hydrology, contaminant fate, and management. Research needs are identified and include evaluating pond performance and redesign options more comprehensively and applying a social-ecological framework for the future of stormwater pond management.

Keywords: stormwater, pond, green infrastructure, urban development, coastal plain, best management practice

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Questions?