

Environmental Metabolomics and Biomonitoring of Contaminants of Emerging Concern in Wild Eastern Oysters from Georgia, USA Estuaries

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Reference: McDowell RJ, CA Pruitt, RA Bahn (eds.), *Proceedings of the 2015 Georgia Water Resources Conference*, April 28-29, 2015, University of Georgia, Athens.

Abstract. Georgia has approximately one-third of the salt marshes in the eastern United States. Salt marshes provide essential habitats and nursery grounds for the majority of Georgias economically vital fish and shellfish populations. As coastal zone populations increase, anthropogenic sources of pharmaceuticals and personal care products (PPCPs) will be an increasingly complex problem. PPCPs can exert adverse effects on physiological systems at ng to μg concentrations, putting organisms in these sensitive estuarine areas at risk from prolonged exposures. PPCPs were quantified in water, suspended solids, sediments and oysters (*Crassostrea virginica*) collected from native oyster beds near Brunswick and Sapelo Island, GA. Sample sites were selected based on their proximity to anthropogenic sources of PPCPs (wastewater treatment plants and/or septic sites) and included one reference site at each estuary. Target analytes included 25 PPCPs in the following classes: selective serotonin reuptake inhibitors, hormones, beta-blockers, angiotensin II receptor blockers, fibrates, antihistamines, stimulants, anti-epileptics, cancer medication, anti-inflammatories, analgesics, personal care products, illicit drugs and six pesticides. Analysis by LC-MS/MS detected analyte concentrations in the low ng/g to low $\mu\text{g/g}$ range in oyster tissues. Chemical analysis of suspended solids, sediments and water samples and metabolomics analysis of tissues samples is ongoing. Metabolomic analyses will characterize the physiological responses of oysters to local anthropogenic inputs and environmental conditions. This research will create a more holistic picture of the presence, distribution and population level impacts of PPCPs in estuaries at Brunswick and Sapelo Island, Georgia.