We would like to comment on the article, “Long Island Sound to lobsters: is this farewell?” published in the Fall/Winter 2018-19 issue of Wrack Lines. The article discussed the roles of pesticides, shell disease, and temperature, leaning heavily on a record-breaking 2 degree, 60-day increase in average temperature in 1999. We feel that the role of pollutants, particularly alkylphenols, was widely overlooked. Mounting evidence continues to show the endocrine disrupting effects of these chemicals in humans as well as a range of vertebrates and invertebrates. Our research has shown the widespread contamination by alkylphenols such as bisphenol A (BPA) and related compounds, derived from the breakdown of plastics, detergents, can liners, and paints among others, affecting lobster populations and other organisms of the Long Island Sound (LIS) ecosystems. Despite efforts on the part of academics, the insistence by the FDA and DEP that these chemicals are safe at current levels of exposure has made it difficult to maintain public awareness [11]. We believe this was a missed opportunity on the part of Wrack Lines to inform the public about the issues facing LIS.

Alkylphenols are a class of chemical compounds, all of which share a defining structural component (an alkylated phenol group), several of which have been shown to possess endocrine disrupting actions affecting the development of vertebrates and invertebrates. Our research has identified 6 of these compounds present at relatively high concentrations in lobsters and throughout the ecosystems of LIS and surrounding waters [2, 6, 8, 13].

One of the identified compounds is BPA, a common component of manufactured plastics and the focus of our colleague Dr. vom Saal. This past December Dr. vom Saal published a critique of the FDA sponsored project CLARITY-BPA. The paper cites Type II errors stemming from improper methods of BPA administration, the use of an insensitive model organism, and the disregard of relevant results by all parties [18]. His own experiments continue to identify the
methods by which low-dose BPA exposure disrupts fetal development [15]. Dr. vom Saal supports our views regarding the misrepresented safety concerns of BPA [17].

Our lab has focussed on the toxic and developmental disrupting capabilities of alkylphenols in invertebrates, focussing on the degree of contamination and direct effects on lobsters of LIS. Between 2002-2008 we collected 766 lobsters from LIS and nearby areas. On average, 33% contained alkylphenols in their hemolymph, up to 45% from some areas [6]. In a separate collection between 2002-2004, 36% of the inshore lobsters collected were contaminated, and 60% of the eggs of offshore lobsters had higher levels of contamination than in the blood of their mothers. Some of the contaminated lobsters contained alkylphenols in μg/g concentrations, well over three orders of magnitude above what was found effective to induce toxic and developmental disruptions in lobster larvae [8]. In adult lobsters, alkylphenols are competitively incorporated into cuticles, leading to weakened shells and a possible avenue for bacterial infection and shell disease which was reported in the Wrack Lines article “Long Island Sound to lobsters: is this farewell?” [10].

Despite significantly greater lobster contamination inshore (36% inshore, 6.7% offshore), the embryos of offshore mothers were significantly more contaminated than their mothers (60% embryos). Ovary maturation and reproduction take place in shallower waters where temperatures are warmer, and we hypothesize that eggs were contaminated during early development prior to the formation of their impermeable barrier and the mothers’ subsequent migration into an uncontaminated environment [8].

Furthermore, alkylphenols were found at high concentrations in the blood of lobsters captured in marine environments dilute enough to allow them to metabolize and filter alkylphenols out of their system readily. We believe organisms may concentrate these chemicals at low levels from the food chain (such as algae) and are subsequently passed up the
food chain to their predators at toxic concentrations. Needed clean-up procedures should be encouraged by your publication.

The widespread contamination of the LIS ecosystem and the inter-species toxicity of these pollutants is well established. We urge the contributing authors to include this research into future publications to help spread awareness about the current state of LIS and the toxic effects of alkylphenols such as BPA which are produced by companies which insist that these chemicals are non-threatening to the health of citizens, organisms, and the environment.

Signed by,

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