

### State of the Scientific Evidence –

Thank you madam chair. My name is Chelsea Rochman. I'm here with Ocean Conservancy, and am a professor at the University of Toronto. I have been researching plastic pollution for more than a decade. I was also the co-chair and editor of the last GESAMP report on Sources, Fate and Effects of Microplastics in the Marine Environment with Peter Kershaw. I wanted to respond to some statements about data and discuss the state of the science.

Today, there is no doubt there is global contamination of macro- and micro- plastics in marine and freshwater ecosystems across habitat types and including in remote locations. A recent study found 12,000 particles of microplastics per L of sea ice. We know that more than 800 species of wildlife have been documented to interact with plastic debris via entanglement or ingestion. In our laboratory, we sometimes find more than 100 pieces of plastics in a single fish. There is microplastics in our seafood, sea salt and recent research has found it in bottled and tap water. When I first learned about microplastics in drinking water, I was quite surprised. In our lab, we are now sampling water from local drinking water plants and we find microplastics from the source to the tap.

In regards to impact, plastics can have physical and/or chemical impacts on wildlife. Plastics are associated with a cocktail of chemicals from manufacturing and accumulate hazardous chemicals from nature.

Laboratory and field studies have demonstrated that macro- and micro- plastics can impact animals across several levels of the food chain. Large plastic items are ingested by wildlife and entangle hundreds of species, and can be the cause of death. A study last year demonstrated that plastic debris is correlated with disease in tropical coral reefs. Laboratory studies demonstrate that microplastics and their associated chemicals can alter development, survival and reproductive output of aquatic animals.

When it comes to human health, all we can say at this point is that we are exposed to microplastics. I am quite confident that I eat and drink microplastics. Scientists are working to understand the fate and effects of microplastics in our body. We know that particles less than 150µm can transfer from the gut of organisms into the liver and bloodstream. Still, we do not yet know whether this causes effects, which is because scientists have not yet conducted studies asking such questions about human health.

So, in summary we have a great understanding about contamination and a growing body of evidence about impacts to wildlife. We understand what several of the sources are, and are actively learning about the fate of this material in ecosystems and organisms. Yes, of course, we can and should do more research to standardize methods and make analyses more efficient, and we should aim to better understand sources, the fate of marine debris in the environment and effects to wildlife and humans. But, this is the nature of science – there will always be more questions to answer. For the purpose of action to reduce emissions of plastic into the ocean – I think we have enough information to act and to inform effective change that will benefit wildlife, people and the planet.

Over the last decade, hundreds of scientific studies have been published on marine litter. I feel comfortable saying that my scientific colleagues around the world would agree with the statements I have just made. I am also happy to chat to anyone in this room, and share scientific expertise, if people in the room have further questions about the science.