**Supplemental Information**

**Effects of Plastic Ingestion on Blood Chemistry, Gene Expression and Body Condition in**

**Wedge-Tailed Shearwaters (*Ardenna Pacifica*)**

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**Supporting Text**

*Heavy metals and organic pollutants.* Heavy metals, metals with density greater than 5 g/cm3, find their way into the environment both through natural means and as cause of human activity (Briffa et al., 2020). Weathering of earth’s crust, urban runoff, industrial waste, pesticides, sewage runoff and many other anthropogenic sources introduce heavy metals into the environment. Heavy metals are found in significant concentrations near areas of anthropogenic activity such as harbors and marinas (Bighiu, 2017). Conversely, these are also areas where there are significant amounts of microplastics (Claessens et al.2011). Heavy metals then attach to the surface of microplastics due to the strong physical interactions. In excess quantities, heavy metals are toxic to organisms (Furness & Monaghan, 1987).

 Organic chemicals, pollutants containing carbon bonded with other compounds, include persistent organic pollutants (or POPs) (Liu et al., 2021). POP’s are resistant to degradation and can bioaccumulate to toxin levels. Bioaccumulation refers to the accumulation of a contaminant in an organism. Similar to heavy metals, POPs can be traced back to both natural and anthropogenic activities. These activities include volcanic eruptions or synthesis of chemicals. POPs are known to be easily transported from the source and easily absorbed in a new environment (Ashraf, 2017). Due to the low solubility in water, they are also easily absorbed by microplastics (Verla et al., 2019). Some well-known examples of POPs include the insecticide DDT, PCBs (Polychlorinated biphenyls) and BPAs (Bisphenol A) (Verla et al., 2019).

*Wedge-tailed Shearwater (A. pacifica) Biology.* Wedge-tailed Shearwater are pelagic seabirds that are monogamous and are known to be natal philopatric. Shearwater pairs often form a long-term pair bond which lasts several years. They have extensive feeding ranges, with a mean maximum range of 615 km (Adams et al., 2020). Although not endangered, global

numbers are in decline. When it is not breeding season, Wedge-tailed Shearwaters take long migrations and use specific migratory routes that take advantage of the oceanic wind patterns (Schaffer et al., 2006) It has been documented that the birds sometimes make long dispersive movements (Weimerskirch et al. 2020).

*Science of plastic accumulation in the ocean*. Due to ocean circulation patterns, there are certain regions in the open ocean where there is a greater concern for ocean pollution, such as the Great Pacific Garbage Patch in the Northern Pacific that stretches from the west coast of North America (Cózar et al., 2014). These garbage patches form because of gyres, large systems of circulating water in the ocean. Five gyres in particular play an important role in circulating water around the globe: North Atlantic, South Atlantic, North Pacific, South Pacific and Indian (NOAA). Plastic congregates around these slow-moving whirlpools, forming massive areas of circulating plastic (NOAA).

*Gut sampling from the proventriculus.* The flushing technique empties out gut contents from the proventriculus of a bird, but we cannot be assured that it empties out gut contents from the ventriculus in Procellariids (Duffy & Jackson, 1986). Procellariids’ stomachs can be divided into two sections: the proventriculus and the gizzard. A lack of plastic content in the proventriculus often means that it is either regurgitated or emptied quicker than the gizzard (Nania & Shugart, 2021). This creates the possibility that the proventriculus of birds we sampled had been already cleared of plastic and we did not fully capture the plastic load.

*Challenges of gene expression with blood.* Using whole blood to create a genetic profile is a relatively new approach, especially in non-model organisms and livestock (Désert et al., 2016). Most gene profiles use tissue samples for a particular study because the composition and content of RNA, responsible for genetic activity that we are able to investigate, is specific to the tissue activity (Jax et al., 2018). Target tissues also provide information on specific adverse effects specially in response to toxic exposure (Lobenhofer et al., 2008).

The use of whole blood for genetic profiling is a rising and useful tool (Désert et al., 2016). It could be used as a new approach in conservation to assess the health status of natural populations of species in threatened status. Studies with whole blood transcriptome have quantified immune response in birds and identifying sex chromosome evolution in two rare species of kiwi birds (Désert et al. 2016, Ekblom et al. 2014, Ramstad et al. 2016, Sandford et al. 2012). It is worthy to note the importance of continuing to advocate for these procedures which may provide a less invasive way of conducting data collection.

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