Progressing the work of the IWC Conservation Committee on the impacts of (chemical) pollution on cetaceans

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1. Background and justification (Scientific Committee recommendations)

According to the 2019 Report of the Sub-Committee on Environmental Concerns, there are several SC recommendations that are relevant for the development of a CC workplan because they refer to (i) monitoring and mitigation of chemical pollution and its effects on cetaceans, (ii) effects of other stressors which may by exacerbated by exposure to chemical pollution or (iii) actions which could provide new data on exposure to chemical pollution:

- Mass stranding and unusual mortality events should be reported to the Scientific Committee in the Annual Progress Reports;
- We need to identify potential mitigation measures for reducing exposure of cetaceans to polychlorinated biphenyls (PCBs) in particular and persistent organic pollutants (POPs) in general;
- Given the long recognized vulnerability of beaked whales to acoustic impacts, wherever possible, stranding events, especially mass strandings, should be thoroughly investigated;
- The focus session on *Brucella* and *Morbillivirus* organised for SC68B should be expanded to include *Toxoplasmosis* and *Herpes* viruses in cetaceans.

The SC also welcome information that would address some of the knowledge gaps on cetacean host-pathogen interactions identified by Di Guardo et al. (2018), as follows:

- Characterization of the cell receptors which permit the entry of pathogens to infect host tissues;
- Effects of pollution-related immunotoxicity on the expression profiles of the cell receptors for pathogens such as cetacean morbillivirus;
- The development of pathogenetic infections in cetacean individuals which are T helper 1-dominant vs. T helper 2-dominant (in humans, T helper 1-dominant individuals are less likely to develop AIDS when infected with HIV than are T helper 2-dominant individuals);
- Effects of pregnancy-associated reduction in immune response on the infectious potential of specific pathogens;
- Usefulness of cetaceans and their pathogens as models for human disease.

A preliminary review of at-risk populations suggests that they may include the following:

Small cetaceans:

- Yangtze finless porpoise (*Neophocaena phocaenoides asiaeorientalis*): highly disturbed habitat due to chemical pollution, noise and debris
- Hong Kong humpback dolphin (*Sousa chinensis*): living in the most contaminated bay in the world
- Washington (USA) killer whales (*Orcinus orca*): high levels of PCBs, reproductive impairment
- Chilean dolphin (*Cephalorhynchus eutropia*): impacts of salmoneras (antibiotics, others)
- Mediterranean short-beaked common dolphin (*Delphinus delphis*): likely declining, high levels of PCBs, living in a contaminated sea?
- Mediterranean bottlenose (*Tursiops truncatus*) and striped (*Stenella coeruleoalba*) dolphins: high levels of PCBs and other contaminants

- Franciscana dolphin (*Pontoporia blainvillei*), FMA1 and FMA2, SWA Atlantic: small populations under high threat from fisheries and coastal development, declining, critically endangered
- Guiana dolphin (*Sotalia guianensis*): high levels of incidental catches, recent cetacean morbillivirus (CeMV) outbreak caused unprecedented mass mortality in the coastal populations of SE Brazil, **clinical signs continuously observed (several dolphins emaciated, severe skin lesions)**, role of chemical pollution in immunosuppression.

Large whales including Large Whale Unusual Mortality Events (LWUME): :

- South West Atlantic right whales (*Eubalaena australis*): not recovering
- South East Atlantic right whales off Brazil (*Eubalaena australis*): likely declining off SE Brazil due to coastal degradation, noise, pollution, lack of suitable habitats
- Oceania Humpback Recovery Plan: to be considered
- Sei whales (*Balaenoptera borealis*) in southern Chile/Argentina: recorded largest mass mortality registered in a baleen whale species ever
- Eastern North Pacific population of grey whales (*Eschrichtius robustus*): unusual mortality event along the coast from Mexico through Alaska in 2019, possibly linked to malnutrition and ship strikes
  https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events
  http://www.marinemammalcenter.org/about-us/News-Room/2019-news-archives/gray-whales.html

2. Proposed elements of a Conservation Committee workplan

The proposed work would include the following tasks:

1. While avoiding duplication of work by the SC it would be useful to review published evidence of effects of chemical pollution on cetaceans, e.g. in relation to PCBs and reproduction / immuno-competence, quantitative information on effects including risk assessment results, and experimental evidence (e.g. results for seals are relevant).
2. Review information on the geographical distribution of threats due to chemical pollution, possibly following the Jepson et al. (2016) approach of identifying hotspots in Europe (for PCBs these include western and central Mediterranean Sea and SW Iberia, the Gulf of Cadiz and Strait of Gibraltar, coastal waters off SE Brazil, SE Asia (Hong Kong and China Sea).
3. Identify those species and populations most at risk from effects of chemical pollution based on conservation status and the importance of threats (from chemical pollution and cumulative), distribution and other evidence. The evaluation may include both formal risk assessment results, where available, and expert judgement. At-risk populations and species may include:
4. Review information on existing protection from chemical pollution, e.g. legislation and agreements, competent authorities, and success and efficacy of implementation, in relation to all identified threatened populations, prioritising as appropriate.
5. Define the role of the IWC CC in addressing chemical pollution and identifying appropriate working methods and structures to achieve this, e.g. Working Group(s). This might include:

- Developing proposals for new and improved management actions, mitigation measures and legislation to address threats to cetaceans from chemical pollution

- Reviewing existing collaborations with external bodies and where appropriate establishing new contacts and dialogue other bodies working in the field (e.g. SMM, ECS, ASCOBANS, ACCOBAMS, ICES, PICES, CIESM, OSPAR) and of course coordinating with the IWC SC initiatives on chemical pollution
- Developing measures to enhance the efficacy and successful implementation of new/improved management measures and legislation, e.g. through public engagement and lobbying of relevant governments and other competent authorities and influential bodies.
- Developing mechanisms to ensure that IWC recommendations are acted upon (be they directed at IWC member countries or external bodies)

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