Memorandum of Facts regarding Orca Demographics

To: Federal Agencies involved in Restoration of the population called Southern Resident Killer Whale (SRKW), listed as Endangered under the ESA
From: Ken Balcomb, Senior Scientist, Center for Whale Research
Date: 13 November 2018

I have conducted research on the "Southern Resident" population of killer whales (Orcinus orca) in the eastern North Pacific Ocean and adjacent inland marine waters since 1976, following the ending of captures of these animals for the public display industry. Approximately fifty killer whales had been removed from this population in a ten year period prior to my research and seventy remained. I have kept records of all births and deaths determined for this population from April 1976 to date. There are currently seventy-four individuals alive in this population, however the more meaningful statistic is the total number of individuals of breeding age in the population and their fecundity.

Killer whales being natural top predators in the food chain have a reproductive strategy that is k selected – relatively stable populations with relatively low numbers of offspring produced. We have determined that a Southern Resident Killer Whale (SRKW) female can produce a single offspring at three year intervals (18 months gestation + approximately a year of lactation), however the average viable birthing interval during the early years of our study was five years among breeding age females (approximately age 10/early teens to about age 40). In contrast, the average viable birthing interval for this female cohort in the recent decade is about ten years. These animals do not have a birth control program – conceptions may occur at any time of the year, though they typically occurred during seasons of high food abundance and social activities involving the entire population (historically during summer months). It followed that typically the births would happen eighteen months later during winter months, after a second summer of high food abundance.

The current problem with this population is that there are only about 27 reproductive age females and collectively they have not produced **any** viable calves in the recent three years. Also, approximately half of the calves in the five years prior to then have died. We know from fecal hormone studies, and from morphometric studies, that not all females known to be pregnant are producing viable calves – approximately 75% of conceptions are now aborted, as compared to about 40% calf mortality/abort early in the study. And, many of these females are now approaching menopause. There is the additional problem of male fertility success – two males have fathered almost all of the viable calves born in this population, and one of these males has since died. Although killer whale males may produce sperm in their mid-teens, the successful matings are from mature older males age 24 or older. The calf sex ratio has been heavily biased toward male offspring, and most have many years to go before social maturity. These unpleasant trends in fecundity and bias must be remedied immediately to avoid SRKW extinction.

All indications are that this population is oscillating around carrying capacity of the supporting ecosystem, and the carrying capacity has been reduced by human activities including habitat issues for the supporting salmon populations. I should emphasize that the SRKW and other RKW populations in the eastern North Pacific Ocean are obligate predators upon salmonids, particularly the larger species such as Chinook (Oncorhynchus tshawytscha) whose natural populations are also listed as Endangered under the ESA. The situation is a classic predator/prey relationship, with an added problem that when prey resources are reduced the whales must metabolize their blubber for energy, and their blubber is where a lifetime of lipophilic legacy contaminants are stored and then released in toxic bursts during food deprivation episodes. Some of these compounds act as hormone mimics and derail natural development processes in mothers and calves – leading to immune deficiency, miscarriage, nervous system disorders, and male bias of offspring, etc.

If we want to “recover” the SRKW population we must recover an abundant supply of healthy natural prey resources. Federal policies that encourage natural salmon restoration will help this recovery, and federal policies that do not allow for natural salmon restoration will fail for SRKW recovery. From an analysis of all watersheds potentially supporting natural Chinook populations in the western United States, I concur with government documents that recovery of the Snake River populations of Chinook (Spring/Summer/Fall) offers the greatest abundance of SRKW prey increase in the shortest possible time frame. We are perilously close to the point of no return for the SRKW and both natural wild and hatchery stocks of Chinook from the Snake River basin. I urge all federal agencies to act immediately to save them by restoring the Lower Snake River to its natural flow beginning this winter.

Respectfully Submitted.