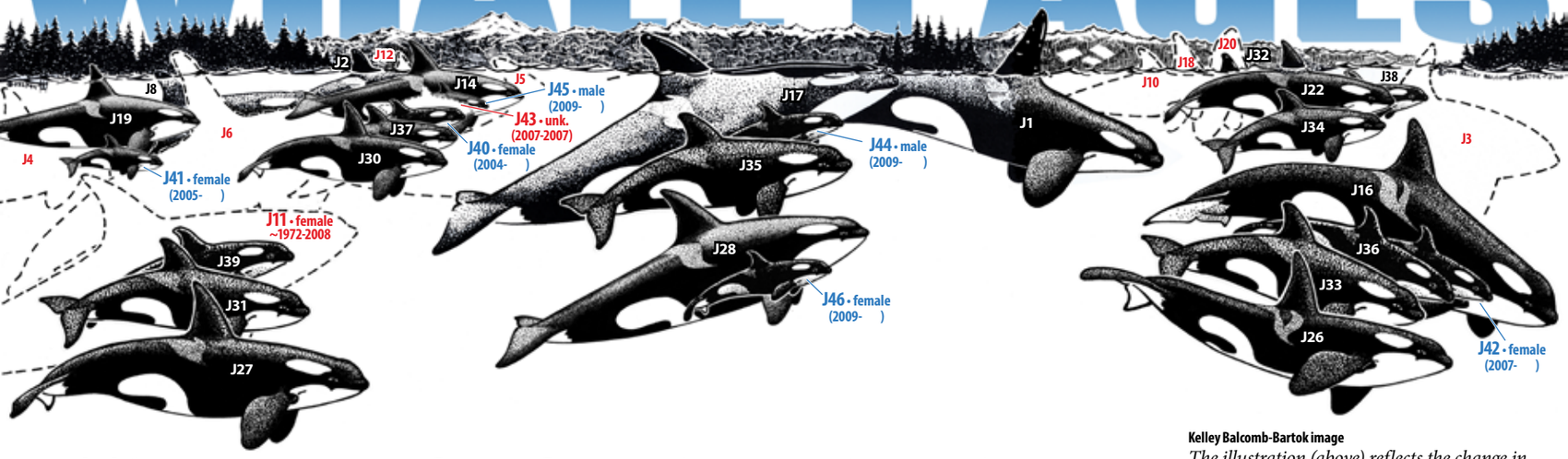
This informational message on our endangered orcas is the fourth of six sponsored in the Journal.

WHALE PAGES



Kelley Balcomb-Bartok image

The illustration (above) reflects the change in social structure of J-pod from 2005 to 2009. Over the period of five years seven new calves were born to J-pod. Of the seven new calves, one calf (J43) was only briefly sighted before going missing & presumed dead. During this same time period one adult female whale passed away (J-11), leaving three young orphaned whales behind (five year-old male J-39, ten year-old female J-31, and 14 year-old male J-27). The final number of J-Pod at the end of the 2009 census was 27 whales (up from 22 in 2004). Following the completion of the Center for Whale Research's Orca Survey census in 2009, the entire Southern Resident Orca population numbered 87 whales (down from 90 whales in 2006-2007).

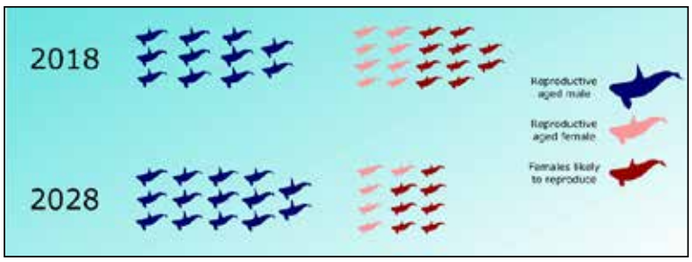
The Future for Southern Residents

The Southern Resident Killer whales are balancing on a knife edge and are at grave risk of extinction.

In this issue of the whale page we will look to the future and outline how our understanding of the past can help us to predict what the future holds for this vulnerable population.

The detailed data collected by Orca Survey since 1976 on the Southern Resident Killer whales is the most complete and longest running dataset of known individuals for any killer whale population in the world. The work of Orca Survey has recorded (amongst other things) all of the births and deaths in the population over the last 4 decades. This has provided information on over 200 unique individuals, over a hundred births and deaths, and 3,000 whale-years of data. During the time of Orca Survey the population has fluctuated with a minimum of 71 whales and a maximum of 98 whales. Since the peak population of 98 individuals in 1995 the population has declined to just 74 whales at the time of writing.

The value of the dataset collected by Orca Survey cannot be over-stated. The social and demographic dataset produced by Orca Survey over the last four decades provides the foundation for every study conducted on the Southern Resident killer whales. In particular, this data has allowed scientists to look back over the last four decades and measure key biological features of the population such as patterns of reproduction and mortality and how changes in the environment have impacted on these traits, especially changes in salmon abundance. From this analysis it is clear that the lack of salmon is the major factor threatening this population with extinction. In years documenting low Chinook salmon abundance, the SRKW population has higher mortality rates and lower reproductive success. In our analysis of factors that have driven variation in patterns of survival and reproduction, the abundance of salmon has always had disproportionately the largest impact. Understanding historical patterns of survival and reproduction is essential for us to look forward and predict what the population may look like in the future. One very significant challenge in the conservation of large mammals is that the rate of reproduction is so low. On average, females don't have their first calf until they are 17 years old, although they can reproduce earlier. Thus we can reasonably predict what the breeding population of female whales will be in 10 years. This can be calculated by simply looking at all the females in the population now (including the current calves, immature and mature females). Unfortunately not all individuals will survive over this time period and we can refine our calculations and apply a mortality rate to the population which is based on the historical rates of mortality. These simple calculations are shown in the figure and the results are striking. Given baseline mortality, we are on track to lose one third of reproductive females by 2028, from 18 individuals to 12. Even though all of these females will be of reproductive age, not all of the females will successfully reproduce. Since 1979, females in this age bracket have approximately an 11% chance of successfully reproducing in a given year. We can then roughly estimate that just over half of the females in this age bracket will give birth in a five-year interval (see figure). Another worrying factor for the future of this population is the change in sex ratio of reproductively age animals. There are currently 1.6 reproductive females to every reproductively aged male, but this is predicted to change dramatically by 2028, with less than 1 female for every male. As with many species males are the redundant sex; the reproductive bottleneck is the slow gestation and long inter-birth interval of females. While there may be plenty of potential fathers around, that potential will be wasted without enough mothers to fuel population growth.



As the task force prepares its report and strategy for the future of this population our hope is that it supports bold action to address the fundamental problem facing this population – the decline in Chinook salmon. Focusing on other factors, whilst politically attractive, as they are easily within reach and implemented, are likely to be as effective as putting a Band-Aid on a gunshot wound. We have learnt a great deal from the last four decades of Orca Survey, but the work of Orca Survey is far from complete. Continuing the monitoring of this population is essential to determine the success of any recovery effort that is implemented and also identify future emerging threats to the population. Long term studies like Orca Survey are themselves becoming extinct due to funding pressures. However, the scientific value of such studies increases disproportionately the longer that they continue. Orca Survey has so far followed animals for just over 40 years which is approximately ½ the total lifespan of a female. Just imagine what we will learn in 50 or so years' time when we have followed the oldest females from birth to death, if there are still whales to study by then.

– Center for Whale Research

The Journal of the San Juan Islands

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