



## Preliminary Necropsy Report for J32 Kenneth Balcomb, Center for Whale Research

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The first photograph that we have of J32 was taken in April 1996 when she was estimated to have been only a few months old... probably born in the winter of 1995/96. Her mother, J20, was fifteen years old at the time, and little J32 was her first and only known baby. Her uncle, J18, was nineteen years old at the time of J32's birth, and her aunt, (J22) was eleven years old. This entire extended family, known as a matriline, swam with their mother/grandmother, J10, who was the matriarch of this branch of the J pod family tree. The decade around the millennium was a difficult time for the J10 matriline – J32's mom (J20) died at the age of seventeen in 1998 when J32 was only two years old; her grandmother (J10) who took over her care died at the age of thirty-seven in 1999 when J32 was only three years old; and, her uncle (J18) died at the age of 23 in 2000. All died young relative to the average lifespan of 50+ for females and 29 for males in this species. Fortunately, auntie J22 at age thirteen gave birth to a baby (J34) in 1998, and provided orphaned J32 the required nurturing of a 'mom'. With that nurturing from grandmother and auntie, including perhaps a little milk, J32 made it through her infancy and into her teens to be a very vivacious young whale, full of energy. We have been expecting her to have a baby of her own, now that she had reached reproductive age, and she certainly looked pregnant (though somewhat encumbered) in recent photographs. She had previously looked pregnant in May 2011, but lost that fetus if indeed she had one. By May 2012, she looked skinny again until June 2014 when she again appeared to be pregnant. Regrettably, and without obvious warning, J32 died in early December 2014 with a near term fetus disintegrating in her uterus. The last photograph we have of J32 alive was taken on 29 November 2014 north of San Juan Island near Speiden Island, Washington State, USA.

The necropsy was conducted on Saturday 6 December 2014 at Comox, British Columbia, near the location where J32's carcass was found floating in the tide. Considering her relative freshness when found, she probably died late in the day on 3 December, somewhere in the Strait of Georgia north of Nanaimo, British Columbia.



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Dr. Stephen Raverty was the attending pathologist representing the Canadian government in an effort to determine the cause of death of this charismatic young whale. Coincidentally, Dr. Raverty was also the attending pathologist in the necropsy of uncle J18 at Boundary Bay, British Columbia in 2000. That young male was found to have died from a common but massive bacterial super-infection against which he apparently had no immune response. Surprisingly, in spite of his attaining a mature age, his testes were also not well developed leading to the suspicion that he may have had developmental issues related to high levels of hormone-mimicking contaminants discovered in his tissues that are known to cause such problems. Environmental contamination is a serious issue for these whales, and it is exacerbated during times of nutritional stress when their toxic blubber is metabolized to maintain body functions. It has long been known that these southern resident killer whales have extremely high levels of persistent organic pollutants (such as PCB's) that are bio-accumulated and stored in their blubber fats; and, it is also well known that these pollutants can cause immune-suppression, reproductive impairment and defects, brain deficits, and behavior disorders in humans and other mammals that have high circulating levels of these toxins. Whales are no exception, but it may take awhile before the effects are apparent because they are normally sequestered in the blubber fats for insulation and future energetic needs. These pollutants are released to circulate in the bloodstream when the whales' blubber fats are metabolized for energy when fresh food is scarce. It is like having a freezer full of tainted and freezer-burned food that you never have to eat unless there is nothing in the grocery store. When nothing else is available the bad stuff is taken out of storage and circulated for body needs.

In chatting with George Bates, who found and towed the carcass of J32 to shore, it seems that a neighbor told him of seeing the body drifting with the tide in the AM of 4 December. George tied onto the body in the afternoon and brought it to the beach just to the south of his launch ramp where he secured it for the night. It was there that Nick Templeman



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came along and photographed the dorsal fin and eyepatch area before dark. Nick was astute enough to put his camera under the whale to also photograph the left side of the saddle area that was on the down side; and, it was the latter photograph that indisputably showed the three white scratches on the saddle that identified J32, as if by bar code. One of George's neighbors said that there were many whales offshore of Bates Beach the previous day – 3rd of December. That observation fits well with our encounter of J pod being just north of San Juan Island on 29 November and no subsequent reliable reports of them in US waters or departing the Strait of Juan de Fuca. J pod is known to wander in the Georgia Strait for many days during winter months, presumably foraging for salmon, so their presence off Comox B.C. this time of year is not considered unusual.

Speaking of salmon, Paul Cottrell of DFO responded immediately to the news of the whale death and found Chinook salmon bones and scales being extruded from the anus of the whale when he arrived. He collected and saved these “diet samples” before the tide rose and partially submerged the whale during the night of 4 December. Paul is a good friend of George Bates, the owner of Bates Beach resort and a fishery biologist who retired from DFO several years ago. George immediately knew of the significance of retaining the whale carcass for necropsy. It was quite fortuitous that also has an excavator and a boat launch ramp available for the necropsy; and, it was great for me to be able to talk with him about Chinook salmon issues and recovery. He acknowledged that there have been problems with Chinook salmon management in the region, but he pointed out that fishermen had a pretty good year this year as evidenced by numerous photos of 15-30 pound fish and beaming fishermen clients on his wall. Bates Beach and resort is a salmon fishing lodge that was started by George's father in 1946 when one could catch a big Chinook any time of year right out in front of the launch ramp. There was probably a standing stock of two million catchable-size Chinook in Georgia Strait available year-round in those early years.



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With reference to the necropsy, the gross observation that J32's blubber layer was relatively thin and dry of oil is consistent with inadequate diet for an extended period, and there was very little fecal material in the intestines. Dr. Stephen Raverty said that there was blockage of the colon, but I did not observe that evidence because the colon was taken along with the uterus, vagina, ovaries, and anus in a complete "package" for analysis in Vancouver. Dr. Raverty also mentioned that his palpation of the uterus seemed "chunky", possibly due to the fetus disintegrating. Internally, the spleen was enlarged and there was an enlarged lymph node adjacent to the uterus, suggesting that there had been an issue of some duration. We will be interested in Dr. Raverty's official findings, but it appears that the fetus had died some time before the mother and it is the likely proximate cause of the mother's death due to difficulties in expelling it.

Aside from the spleen and lymph node, the remaining organs grossly appeared normal, but tissue samples were taken of everything for continuing analysis. The entire head was removed and carted away for freezing and subsequent delivery to Dr. Ted Cranford for CT scanning. The brains poured out in a gray liquid gravy mass when the head was severed, so I am not hopeful that much detail will be evident in the CT scans. The left side of the carcass was the down side from the time it was initially found, through the towing, and finally at rest on the launch ramp. Reddening of the down-side blubber was apparent on the left side of the carcass due to lividity by 6 December, and reddening of the gular region was also apparent – probably due to forcing of bloody fluid and tissue from the gaseous distention of the thorax and abdomen. These areas were white, not reddened, when the whale was first found on 4 December, so it is not likely they represent in vivo trauma. The genital region was also getting the force of increasing abdominal decomposition gas pressure, and afore-mentioned fragments of the disintegrating fetus were being expelled (see photos).



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The uterine “package” was put into a body bag and zipped tight, but within an hour it had expanded enough to part the zipper. Decomposition was obviously well underway. The mother had been dead for at least three days by the time the necropsy was finished in mid-afternoon on 6 December, and the fetus may have been dead for significantly longer. This is a very ugly situation for the population of southern resident killer whales – our beloved Orca. I think we must restore abundant healthy prey resources ASAP if these whales are to have any chance of avoiding extinction. The critical point for their recovery may already have passed. I hope not, but it will soon pass if we do not take immediate action.

There are only about a dozen reproductively viable females remaining in this population and very little possible recruitment to this cohort within the next few years.

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