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Re: *People for the Ethical Treatment of Animals, et al., v. Miami Seaquarium*, Case No. 15-cv-22692

This is my report, prepared pursuant to Rule 26(a)(2) of the Federal Rules of Civil Procedure, regarding the conditions of a captive orca whale sometimes known as "Tokitae," or "Toki" and known to the public as "Lolita," held at the Miami Seaquarium in Virginia Key, Biscayne Bay, Florida. Pursuant to the requirements of Rule 26, I have studied the material listed below regarding this case.

Background and qualification

I am a marine scientist and have researched *Orcinus orca*, commonly known as the orca or killer whale, for more than two decades.

I have a Bachelor of Science degree in Zoology (1990, Massey University, New Zealand), a Master of Science degree in Marine Science (1992, Auckland University, New Zealand), and a Doctorate in Environmental and Marine Science (2000, Auckland University, New Zealand), the latter of which I specialized in the study of orca.

My research focuses on their daily behaviours, foraging behaviours and the social interactions of the individuals as they travel extensive distances on both a daily and seasonal basis. I have conducted research on orca, in the wild, in various locations around the world, including (alphabetically): Antarctica (both at the Peninsula and in the Ross Sea), Argentina, Iceland, New Zealand, Papua New Guinea, Russia (Kamchatka) and the United States. I have observed and/or collected data on orca from areas including Australia, Canada, Chile, Fiji, Honduras, Indonesia, Namibia, Norway, Portugal, Tonga, South Pacific and South Africa. Specifically, on a number of occasions I have also observed, and collected data on, the orca found around the San Juan Islands of Washington State, USA, which has included the orca of Tokitae's population. In

my role as a scientist, I have observed many different orca cultures including their social affiliations, foraging and other culture-specific behaviours.

I regularly enter the water with the animals to observe and document their daily behaviours, foraging behaviours and the social interactions. As far as I am aware I am the only person the world to regularly conduct in-water scientific research on wild orca.

I have also observed orca in captivity in (alphabetically); Argentina, Canada, France, Japan, the Netherlands, Spain and the United States (including all four U.S. facilities which currently hold captive orcas), and other species of cetaceans in captivity in Argentina, Australia, Japan, the Netherlands, New Zealand and the United States.

I have published 19 peer-reviewed scientific papers specifically focused on or pertaining to orca (Annex 1), a report about the captive conditions in which a young orca was held while in captivity in the Netherlands (Visser and Hardie, 2011) and a further report about the same captive orca after she was moved to another facility in Spain (Visser, 2012). I have also published peer-reviewed scientific papers on other species of cetaceans in well-respected journals (Annex 1). I have additionally published non-peer-reviewed articles in publications including New Zealand Geographic and BBC Wildlife Magazine. My curriculum vitae is attached (Annex 1).

I have testified as an expert at trial, in the Administrative and High Courts of the Kingdom of the Netherlands regarding the court cases for the captive orca, known as Morgan. The cases were heard on 03 August 2011, 07 November 2011, 01 November 2012 and 03 December 2013.

I am familiar with the conditions of Tokitae's captivity at Miami Seaquarium (MSQ) and have observed her captive environment, in person. On 7 & 8 June 2013, I attended three of MSQ's "Killer Whale and Dolphin" shows and on 4 & 5 July 2015 I attended four shows (two on each day). During each performance I observed Tokitae before, during, and after the performances (pre- and post-show the MSQ limits the amount of time during which the public can be in the stadium area (and view the tanks), to approximately ten to fifteen minutes). I observed Tokitae from various angles and positions in the viewing area—including immediately adjacent to the tank and different locations in the bleachers—in order to obtain a comprehensive picture of her conditions.

I have also analyzed the literature regarding Tokitae's capture and the conditions of her captivity at MSQ, including but not limited to scientific papers, and I have reviewed various photographs and video footage of Tokitae at MSQ. I have also viewed the video recording of the plaintiffs' 20 January 2016 site inspection of MSQ (for which I have created a log of her behaviour; Annex 2) and the following documents produced by MSQ in this litigation: [Bates# MSQ0000332-R through MSQ0010543].

Within those documents, although the orca in question is referred to by the MSQ publicly and in their advertising as 'Lolita', on their Behaviour Records she is listed as 'Tokitae' and in their Animal Training Protocol booklet [Bates #MSQ0009799]. She is also referred to as 'Toki' in various documents, such as the Micrim Labs reports [e.g., BATES #MSQ0000778-R]. There is a

lack of consistency in the records – for instance within the documents [BATES #MSQ0001232 through to #MSQ0001577] (i.e., 346 pages) only 42 (roughly 12%) are listed with a name that is similar to Tokitae (i.e., they state 'Ms Toki'), whilst the remainder list the animal as one named 'Ms Gypsy' (which is a female, based on a vaginal sample submitted [BATES #MSQ0001233]). It may be that 'Gypsy' is the same animal as Lolita, Tokitae, Toki or Tok, but this is not indicated on the records.

However, of note (and explained in more detail below) is that the Medical Records which *are* labeled as belonging to Tokitae ('Ms Toki'), do show an inordinate number of organisms which have been cultured from her (n = 39, minimum) and this level of infection is extremely disturbing. Such a plethora of bacteria, fungi and viruses are an unreasonable number when put into the context of the published scientific literature regarding pathogens noted in orca (both in the wild (n = 5) and those orca other than Tokitae, held in captivity (n = 17)), (details given below). This excessively high number of pathogens is a clear indication that Tokitae is not in an environment that is beneficial to her well-being.

Due to previously scheduled overseas work in remote areas (with extremely limited internet access, e.g., Antarctica), I was only able to access the Bates records from the 3rd of February 2016 and as such have not had time to review all of the records in full detail. However, of those that I have examined in detail I was disturbed by the amount of missing documents (e.g., the Behaviour Records for the week 22-28 June 2015, all of the Behaviour Records for the month of December 2015).

Furthermore, there was redaction applied to some of the documents (such as the Animal Training Protocol booklet [Bates #MSQ0009799] and the Behaviour Records e.g., see [BATES #MSQ0003683]). The poor quality of hand writing in many of the Behaviour Records also precluded the understanding of some of the information contained within (e.g., see Wed 19 August 2015 [BATES #MSQ0003680]).

Overview

Tokitae is a member of the critically endangered Southern Resident Killer Whale (SKRW) population. She is the lone survivor of capture operations in the 1960s and 1970s during which at least 11 SRKWs died and 36 others were seized for exhibitions. This type of orca is known as a 'Resident' ecotype, which specializes in feeding on salmon. The SRKW are distinct from other orca populations physiologically, ecologically and behaviourally. Studies have shown distinctions in mitochondrial DNA, physical appearance, ecology, acoustics, behaviour, culture and social organization between SRKW and sympatric Transient, Offshore and Northern Resident killer whale populations (*inter alia*; Hoelzel et al., 1998; Barrett-Lennard, 2000; Ford & Ellis, 1999; Bain, 1988; Baird, 1994; Baird & Stacey, 1987; Baird & Dill, 1996; Bigg et al., 1987; Guinet, 1990; Morton, 1990; Barrett-Lennard et al., 1996; Baird et al., 1992).

As of 2016 Tokitae is approximately 20ft (~6 m) long and she weighs approximately 7,500 pounds (3402 kg) (her weight is estimated by the MSQ using morphometric algorithms) as cited from Defendant's Amended Answer (DE22) at ¶ 40. This is because no measuring scale is installed at MSQ.

Harm and harassment inherent to Tokitae's captive environment

I. Opinions Related to the Inadequate Size & Depth of the Tank

For nearly 45 years, Tokitae has been housed in an oblong-shaped barren and basically featureless tank. At its longest point the tank is 80 ft (24 m) across, whilst at its widest point it is only 73 feet (22 m) across (Annex 3). A large, solid concrete platform/stage barricades and divides the tank into a 'show' (front or 'A' section) and a smaller 'rear' ('B') section (Annex 3). The platform/stage is approximately 45 ft (13.7 m) by 5 ft (1.5 m) and is slightly curved, leaving openings of approximately 10 ft (3 m) on either side of the platform/stage, each of which can be closed by gates. The platform is offset toward the east perimeter of the tank (creating what is typically designated as the rear of the tank, due to the stadium entrances being located on the western side). It thereby divides the tank into the two areas of the tank designated above. The rear 'B' section of the tank is smaller than the 'show' ('A') area, measuring only approximately 45 ft (13.7 m) x 34 ft (10 m). Although a section of the 'stage' hangs out over the footer of the platform, the underwater part of the construction is solid and as such obstructs any movement in the East-West directions and reduces any straight-line path that may have been possible. Furthermore, by its very nature it dramatically reduces the spatial dynamics of the tank.

Tank 'A' has a maximum depth of 20 ft (~6 m), which is *only* achieved near the center of the tank. The depth decreases from the midpoint out towards the sides of the tank, to where it is only 12 ft (3.6 m) deep all around at the shallow perimeter. This sloping perimeter zone is 10 ft (3 m) wide (USDA whale stadium pool dimensions # IV (undated) with hand drawn details of cross section on left edge of page) [BATES PETA001626]. Therefore, the average depth is much less than 20 ft (~ 6 m) —the approximate length of Tokitae. Unfortunately, even this 20ft depth is not always maintained and there are multiple Behavioural Records which clearly indicate that the water levels drop enough that the trainers note this in the logs, e.g., some examples include;

Monday 15 Dec 2014 "*H2O ↓ [down arrow] 2ft all day*"
Tuesday 16 Dec 2014 "*H2O ↓ [down arrow] to top of windows all day*"
[BATES # MSQ0003570]
Tuesday 23 Dec 2014 "*H2O ↓ [down arrow] all day*"
Wednesday 24 Dec 2014 "*H2O ↓ [down arrow] overnight*"
[BATES # MSQ0003568]
Monday 26 Jan 2015 "H2O ↓ [down arrow]"
[BATES # MSQ0003736]
Monday 02 March 2015 "*Gated in A overnight "H2O dropped*"
[BATES # MSQ0003726]
Friday 17 April 2015 "* Slept in A H2O ↓ [down arrow] overnight"
Saturday 18 April 2015 "*H2O down overnight"
[BATES # MSQ0003715]

Furthermore, in the Health Record Summaries there are also multiple entries with regards to dropping the tank water levels for various reasons, such as to bring in or take out Pacific white-sided dolphins or to administer injections to Tokitae, for example;

"Planning on doing painting in the pool, water will be a lower for Toki" (9-4-01) [BATES # MSQ0003752-R]
"Was active when water was lowered" (9-5-01) [BATES # MSQ0003752-R]
"Water level was lower for several days for pool work" (1-12-06) [BATES # MSQ0003763-R]
"Pool B dropped for the new lags" (4-21-09) [BATES # MSQ0003768-R]
"Drop the pool again for another shot" (3-1-11) [BATES # MSQ0003774-R]
"We planned to do another drop" (3-2-11) [BATES # MSQ0003774-R]
"Pool drop" (11-14-11) [BATES # MSQ0003776-R]
"Pool drop" (1-30-13) [BATES # MSQ0003780-R]
"Pool going down" (3-5-13) [BATES # MSQ0003780-R]
"Pool drop" (9-16-13) [BATES # MSQ0003783-R]
"Whale pool drop" (11-4-13) [BATES # MSQ0003784-R]
"Behavioural pool water lower" (2-21-14) [BATES # MSQ0003785-R]

The water level issue has also been documented in a video online (undated, but based on clothing of the era is approximately *circa* 1980's). The video undisputedly shows a dramatic difference in water level between the day it was taken and the plaintiffs' site inspection (Annex 4).

Given that orca have been recorded diving regularly between 656 ft and 984 ft (200 m - 300 m) (Matkin et al., 2012), with a maximum depth of over 1312 ft (400 m) (Matkin et al., 2012) in Alaska, and 2518 ft (767.5 m) at Prince Edward Islands, Southern Ocean (Reisinger, et al 2015), it is abundantly clear that the tank Tokitae is held in is far too shallow to meet even her most basic biological needs. It is only logical, given this scientific evidence, to also ascertain that even the 20-ft maximum depth of this tank cannot remotely approximate a habitat that caters to the natural behaviours and adaptations of this species. Furthermore, it should be noted that dive rates do not change significantly with age or sex (Baird et al., 2005) (e.g., a three-year-old male orca was recorded diving to 148 m, and a three-year-old female was recorded diving to 135 m, while the maximum recorded depth was 264 m (Baird et al., 2005), therefore this tank was not even sufficient when Tokitae was first moved into it). Thus, as Tokitae's tank is only as deep, at its deepest point, as she is long and it is substantially shallower than that over its average depth. This tank is, without a doubt, too small for her (or any orca). Not only is she unable to dive at all, but she is also deprived of the ability to hang or swim vertically in the water without touching the bottom of the tank. She can be seen in a number of points of the video from the plaintiffs' site inspection (e.g., see ANNEX 5-B (Camera B - closeup) file name AA000509 @ 2:22 & 2:37, attempting to lift her head high out of the water, but has her tail flukes on the bottom of the tank. Hanging and swimming vertically in the water column are natural and species-typical postures and behaviours of orca.

Because of the diminutive size and poor design of the tank in which she is kept, Tokitae cannot travel in a straight line for more than 60 feet (taking into account her body size). Even at its longest point, the tank is only 4x her body length and the swimmable width only 1.75x her body length. The solid platform inside Tokitae's small tank further obstructs and encroaches on the already limited space available within the tank and dramatically reduces the spatial dynamics of

the tank. This platform requires Tokitae to make continual and substantial corrective adjustments to what should be normal movements and behaviours, in order to avoid colliding with the platform and walls. She is completely unable to turn naturally or swim freely and such a undersized tank necessarily results in relative inactivity.

The video recording made by the plaintiff on the 20th of January 2016 included approximately 6.5 hours of 'daylight' recordings, made between sunrise at 07:09 and sunset at 17:55 hrs. A description of Tokitae's movements, which could be clearly distinguished during those times, was entered into a spreadsheet (Annex 2). This included Annex 2-A (Camera A-wide angle (typically, fixed position on tripod, view of complete tanks and some of the bleachers); Annex 2-B (Camera B-close-ups, often following Tokitae), Annex 2-C (# of partial and complete tank perimeter laps, from video on Camera A). The latter always erred on the side of generosity towards the amount of distance that Tokitae was recorded as moving. For example, if she moved less than ¼ of a perimeter lap, she was recorded as moving the full ¼, or if she moved diagonally across tank A, she was recorded as moving ½ a perimeter lap.

The keeping of orca in small tanks is known to induce physical and psychological manifestations of stress (Jett & Ventre, 2011). This includes stereotypic 'bobbing', 'head swaying' and logging behaviours, such as those I have observed in Tokitae (e.g., see video log Annex 5, video clip A014C254_160120Y7 which is 43 minutes long; she was observed having very short submergence time and logging was the primary behaviour. Likewise for video clip A014C255_160120R9 which is 30 minutes long and in which, apart from very short times of submergence and one instance of lifting her head and head-bobbing, she logged for the duration of the recording). This is completely abnormal behaviour and logging of such durations have never been recorded in the scientific literature for wild orca.

Such abysmal tank conditions significantly disrupt an essential and basic behaviour pattern: an orcas' biological need to swim long distances. I have personally recorded orca travelling, uninterrupted (i.e., without changing their behaviour), in a straight line for distances of over 20km (10.79 nautical miles) (Visser, unpublished data). Other researchers have recorded orca traveling large distances on a daily and seasonal basis, including *inter alia*, one orca travelling a distance of 460 miles (740 km) in six days (i.e., 76 miles/123 km per day) (Matkin et al., 1997); two orca travelling 2030 miles (3,267 km) from Kodiak, Alaska, to Monterey, California, in just 77 days (i.e., 42.4 km per day); and an Offshore orca (an ecotypic form found off the Pacific Northwest) was shown to travel a one-way distance of at least 2755 miles (4,435 km) (Dahlheim et al., 2008). Two ecotypic forms of orca have been documented moving from Antarctic waters into warmer waters. Durbin & Pitman (2011) documented Type B orca travelling a round trip (Antarctica, Brazil, Antarctica) of 5075 nautical miles (9400 km) in just 42 days (i.e., 120 miles/223 km per day), whilst Type C orca were documented travelling 3545 miles (4,900 km) from to North of New Zealand in only 22 days, equivalent to a daily distance of 138.5 miles (223 km) per day (Eisert et al (2015). Based on the longest-lasting satellite tag, the orca travelled a total distance of *ca.* 4,700 nautical miles (8,700 km) in 32 days, equivalent to 169 miles (272 km) per day (Eisert et al (2015).

Orca have been demonstrated to have the optimum shape in terms of "fineness ratio" and streamlining (with a fineness ratio of 4.5) (Williams, 2008) and are adapted for swimming

extended distances and durations. The 'casual' swimming speed of wild orca averages 3.6 m/sec (Williams, 2008) and average speed speeds of 6 m/sec (Baird and Goodyear, 1993) and 6 knots (11.3 kmh^{-1}) (Eisert et al (2015) have been recorded. Specifically, SRKW orca populations have been documented travelling at speeds of over 20 km/h (Ford, 2008) with a mean travelling speed of 10.4 km/h (Ford, 1989).

As early as 1968 it was clearly recognized that wild orca "*swim at an average of 4 to 6 km/hr when travelling from one feeding area to another…. [T]hey can sustain speeds of nearly 20 km/hr, and under extreme circumstances we have timed them travelling at nearly 35 km/hr*." (Griffin and Goldsberry, 1968, emphasis added). More recent data of an orca travelling an average speed of about 20 km/hr over a 26 minute chase also shows that they travel long distances at high speeds (Ford et al., 2005).

It is clear that the MSQ tank does not allow Tokitae nearly enough space to obtain these typical sustained speeds and she would have to swim an inordinate number of laps (all the while being forced to contort her body into unnatural positions in order to navigate the small tank and avoid collision with the concrete platform and walls) to complete such distances.

Given the circumference of the tank (excluding the outer extension of the rear 'annex' (part B of the tank) and assuming both gates were open to allow egress past the platform), the dimensions of the oval can be calculated as 79 x 56 ft (24 x 17 m) giving a circumference (perimeter swim) of no more than 213 ft (65 m) (see perimeter swim details given in tank dimensions, Annex 3,). There are 5,280 ft in a mile (1,000 m in a km). Therefore, it would take Tokitae approximately 24 laps to complete one mile (or 15 laps to complete one kilometer).

Given the example above, of orca in the wild swimming 138.5 miles (223 km) per day, it would require Tokitae to swim approximately ***3,430 laps in a day*** to cover a similar distance. Even using a more conservative 100 miles (161 km) per day (Baird, 2000) as the distance wild orca would travel, Tokitae would have to swim 2,400 laps in order to swim that distance in her tank.

In order to illustrate how unlikely it is for Tokitae to swim even 2,400 laps on any given day, due to the extreme constraints imposed on her by the physically tiny tank (and taking into account her stereotypic behaviour of logging for inordinate amounts of time), I used video of the plaintiff's site inspection on the 20th of Jan 2016. Using the data collated from those videos (Annex 2C), the number of perimeter swims (laps) she completed could be counted, during the 6.5 hours of daylight video. The spreadsheet shows that she (generously) swam 37.25 laps (i.e., 1.5 miles) in tank A and an additional 1.75 laps (0.06 miles) in tank B for a **total of 1.56 miles (2.5 km) in 6.5 hours.** This *included* the time she spent during shows and during training sessions. If these very food-motivated sessions, where if she is to get her food she is *required* to move (due to signals from the trainers), are then excluded from these calculations, Tokitae completed a total of 26.5 laps (i.e., **1.07 miles/1.7 km) in the 6.5 hours** during the daylight (6.5 hrs).

From these examples it is abundantly clear that Tokitae is not engaging in anything even remotely approaching natural or normal swimming distances. Her dearth of movement is extreme to a degree that can only be described as atrocious. No amount of massaging of the data can hide how appalling this lack of movement is when compared to the wild. This is an intense

and excessive deprivation for her. Furthermore, it is instantly recognizable and obviously unambiguous that this lack of being able to express a behaviour that her species has spent millions of years evolving towards, compromises her welfare *and* her well-being.

Based upon the foregoing, it is clear that MSQ does not provide Tokitea with space to allow her to engage in normal behaviours or exercise effectively. Confinement of animals has been shown to increase their motivation (desire) to move about (Jensen, 1999). Such motivations build up when an animal is prevented from performing normal behaviours (Lorenz, 1950). Yet obviously, given the extremely small and interrupted space of the tank in which Tokitae is kept, it is not feasible for her to travel to any degree or increase her locomotory behaviours like swimming. In the book *Wild Mammals in Captivity* (touted as an 'essential reference' for zoos, aquaria, and wildlife parks[1]) the chapter pertaining to captive marine mammals states that "[d]*esign and construction of appropriate marine mammal habitats should permit the performance of most, if not all, of their natural behaviours*," and "[d]*esign and construction of a facility must meet the physical, psychological and behavioural needs of the animals as well as the goals and obligations of the host organization*." (Joseph and Antrim, 2010). The authors also state, "*Marine mammals need enough space to allow them to perform natural behaviours with freedom of movement*." I reiterate that the MSQ tank that Tokitae is held in does not meet a single one of these criteria.

Moreover, in her paper regarding commercial aquaria, McCormick-Ray (1993), states, "*Aquarium science should emphasize an ecosystem approach and consider the evolutionary history of the species held. Exhibits could focus on the role of organisms in ecosystems to better encourage public understanding and support for aquatic conservation*." The tank in which Tokitae is held does not address any aspect at all of the ecosystem she has been taken from, nor provide her with any features in the tank that would approximate such an ecosystem. In essence, she is kept in a too small, featureless, barren tank which amounts to sensory deprivation.

In summary, based on my extensive knowledge of orca, their behaviour and their biological needs, including the need to travel long distances and, that they have evolved to dive to great depths, there can be no legitimate doubt that this tank is grossly inadequate for any orca. Tokitae's well-being is severely compromised by keeping her in these conditions.

[1] University of Chicago Press, Wild Mammals in Captivity Summary, http://press.uchicago.edu/ucp/books/book/chicago/W/bo8434953.html (last accessed, 08 February, 2016).

II. Opinions Related to Chronic Social Isolation

For approximately the first ten years of Tokitae's captivity at the MSQ, she was kept with a male orca companion named "Hugo." Hugo died in 1980 and the MSQ has held Tokitae without an orca companion since. Though orca are well recognized as having complex social lives, the MSQ has forced Tokitae to live in social isolation for nearly 36 years.

It is highly abnormal for orca to be solitary in the wild. To date, only four semi-permanently or permanently solitary orca are recognized in the literature from 1814 until present (Goodwin and Dodds, 2008, Visser and Hardie, 2011). Tokitae's isolation deprives her of the basic standard of engaging in any social context, which is paramount to ensure her psychological welfare.

Though Tokitae has been housed with a variety of dolphins since 1980 and is currently housed with Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), these species are not socially compatible and the dolphins are not an appropriate substitute for social contact and interaction with biologically related species. In nature, Pacific white-sided dolphins and orca do not naturally share the same habitat in the constant or concentrated fashion in which they are forced to exist in the small tank at the MSQ. Although their habitat in the wild is sympatric, orca and Pacific white-sided dolphins do not typically interact (e.g., see Jefferson et al., (1991) where in over 430 interactions (both predatory and non-predatory) between 1830-1989, only one involved both orca and Pacific white-sided dolphins).

While these two species are members of the same taxonomic 'Family' (Delphinidae), in the same way that gorilla (*Gorilla* sp.) and humans (*Homo sapiens sapiens*) are in the same 'Family' (Hominidae), they should not be considered biologically related species in terms of whether the dolphins can fulfill Tokitae's need for social contact and interaction, which is fundamental to her physical, social and psychological well-being. Any attempt to claim that housing Tokitae with Pacific white-sided dolphins is an appropriate level of social stimulation, would be erroneous. It would be the equivalent of saying that housing a gorilla or a chimpanzee with a human satisfies the social needs of either species. Rather, some mammal-eating orca populations have been known to hunt Pacific white-sided dolphins (Dahlheim and Towell, 1994) and there is growing evidence that some populations of orca feed on a wide range of prey items (Visser, unpublished data). Naturally, it cannot be ruled out that due to Tokitae's sheer size, injuries to the dolphins may occur if she acted aggressively (or even if she conducted 'rough play'). To this day, the US Government records indicate that there were Pacific white-sided dolphin deaths which occurred at the MSQ (ithe dolphins may have died whist in the same tank as Tokitae). However, the only information currently made public (via www.ceta-base.com), indicates that two of these dolphins were involved in some type of blunt force trauma event (such as a ramming by a large object);

(1) Maki (Female), Pacific white-sided dolphin, captured 1988, arrived October 26, 1988. Died December 10, 2004 of "*sepsis from momentum contusion*". Such a description of the cause of death is not clear from assessing the medical literature, however sepsis is defined as an "*Infection of the soft tissues or blood by pathogenic microorganisms, arising usually after these have entered the body through a skin wound. It results in destruction of the tissues by the pathogens or their toxins…*" (Hine & Martin, 2015). A contusion is a "*bruise; damage that results from a blow that breaks blood vessels. This can occur beneath the skin as well as on the surface"* (p 54, Bell, 2012), therefore, in effect a contusion caused by momentum

is a bruise associated with speed (a collision or a ramming, for instance), which apparently resulted in an opening of the skin, allowing sepsis to occur.

(2) Liko (Male), Pacific white-sided dolphin, captive born on May 25, 2009 at Seaquarium. Died August 25, 2015 of "acute subdural hematoma". This is defined in the *Dictionary of Forensic Science* (p 111, Bell, 2012) as a head injury in which "*A pooling or collection of blood that has leaked out of a blood vessel. It can be manifested externally as a bruise and can cause significant swelling. A subdural haematoma and the accompanying swelling are frequently seen as a cause of death involving blows to the head*".

Tokitae's behaviours are at times dangerous to the dolphins. I observed behaviour which in my professional opinion would be categorized as aggressive behaviour, in which she pursued, at what appeared to be the fastest speed she was able to attain within the tight confines of the tank, a Pacific white-sided dolphin. During this pursuit, Tokitae's mouth was wide open and her teeth were clearly visible. The dolphin escaped harm because of its smaller size and maneuverability in the small tank. In my decades of studying orca, I have witnessed a number of orca attacks upon other cetaceans and published peer-reviewed papers about some of these events (see Annex 1). Tokitae's behaviour in this instance was unmistakably aggressive behaviour. It is my opinion that if she had caught the dolphin, the dolphin certainly would have been injured or killed. It should be noted, however, that Tokitae's pursuit did not fit the behaviour profile of a SRKW's (Southern Resident Killer Whale), who as an ecotype are a fish-eating population that subsist predominantly on salmon.

Moreover, my observations of Tokitae at the MSQ have indicated that the presence of the dolphins is likely adding to her stress. In a 'vintage' (circa 1980's) video a trainer is seen to actively encourage and facilitate a Pacific white-sided dolphin to not only ride on the back of Tokitae (see screen shot, Annex 5), but also to 'mount' her when she is in an inverted position (see screen shots, Annex 5), a position that is typically used by female cetacean (whale, dolphin or porpoise) during copulation. The video shows that the dolphin conducted numerous 'pelvic thrusts' during the time it was mounted onto Tokitae, similar to those used during copulation. That this behaviour was instigated and shaped during training, goes without saying as being completely inappropriate, but it likely led to displacement behaviours due to frustration and dominance (by either species). The training of such 'mounting' behaviour onto Tokitae may now account for the inappropriate interspecific sexual harassment behaviour of the male Pacific white-sided dolphins reported in the Health Record Summaries of Tokitae's health, as recorded in [BATES #MSQ0003752-R – #MSQ0003793-R]. There may be multiple perpetrators involved, as not all entries note the identity of the male. However, some do, for example the male Pacific white-sided dolphin Lii is recorded as conducting these behaviours ;

- "Sexual behaviour observed from both Toki and Lii, more Lii towards Toki" (10-2-01) [BATES # MSQ0003752-R]
- "Toki and Lii … active between each other, … sexual between the two of them" (10-3-01) [BATES # MSQ0003752-R]
- "Lii sexually superficially raked her twice, some sexual activity …. been observed" (11-10-01) [BATES # MSQ0003753-R]

- "Observed sexual behaviour what appears to be Lii, very actively swimming" (2-1-02) [BATES # MSQ0003753-R]
- " sexual behaviour" (2-2-02) [BATES # MSQ0003753-R]
- "Somewhat sexual with Lii" (7-9-02) & (8-13-02) [BATES # MSQ0002755-R]
- "Lii was observed with his penis out" (1-20-06) [BATES # MSQ0003763-R]
- "Toki was very sexual with Lii" (8-7-06) [BATES # MSQ0003765-R]
- "Lii has been sexual with her" (5-10-07) [BATES # MSQ0003766-R]
- "Toki has been sexual" (2-2-11) [BATES # MSQ0003772-R]
- "Lii has been rubbing on Toki in a sexual fashion" (3-11-13) [BATES # MSQ0003780-R]
- "Slightly sexual" (4-25-13) [BATES # MSQ0003781-R]
- "Active with the male in the pool" (12-15-14) [BATES # MSQ0003789-R]
- "Tok still active with male in the pool" (12-22-14) [BATES # MSQ0003789-R]

Additionally, as noted by one of the staff of the MSQ, the [BATES # MSQ0003793-R], entry (dated 10-8-15) reads; "*Two new small 5cm sexual rake nips ventrally"* which illustrates the connection between the sexual behaviour and aggression of the Pacific white-sided dolphins towards Tokitae.

There are likely to be many more such sexual harassment events occurring which are either unnoticed (due to the poor water quality and resultant lack of visibility through the water) or unnoted (e.g., the observer may consider these behaviours 'normal' and not bother to record them). That this type of sexual harassment behaviour is noted in the summary record over a period of more than 13 years, indicates that the behaviour is not only ongoing but is chronic.

It is noted that in various documents that individual Pacific white-sided dolphins are moved in and out of the tank with Tokitae (e.g., see "*The female lags were moved to a back nursery area*" dated 12-2-04 [BATES # MSQ0003759-R]). Therefore, although it may not be the same male always involved in this deviant sexual behaviour, transmission of behaviours have been well documented as spreading culturally (e.g., tool use by dolphins, Krützen et al (2005)).

During my personal observations of Tokitae and in the videos I have viewed online and from the plaintiffs' site inspection, I have noted that her interactions with the Pacific white-sided dolphins are often actively instigated by the dolphins as they confront, harass and attack her. As such, their behaviour is what is scientifically termed 'mobbing' behaviour. Mobbing is defined as the potential prey (in this case the dolphin/s) actively approaching, harassing, and sometimes physically attacking potential predator(s) (in this case the orca). Mobbing behaviour is typically done at high speed and may involve a single or multiple mobbers. This concurs with what I have observed of the situation at the MSQ.

The Pacific white-sided dolphins have attacked Tokitae to the point where injuries (rake marks from their teeth) were sustained on Tokitae and noted in the written records by the trainers. It should be noted that Tokitae *cannot* inflict rake marks on herself and even if she could contort in such as way as to do this, the spacing of the teeth of the two species (orca *cf* Pacific white-sided dolphin) would allow immediate identification of the perpetrator.

One only has to look at the Behaviour Logs and in 2015 alone (*sans* x1 week in June & x4 weeks in Dec 2015, i.e., 47 weeks of records) [Bates #MSQ0003744-1655] to see that there are at least 34 entries (recorded in 21 separate weeks) which specifically mention 'rakes'. That is, in 44.6% of the weeks she suffered an attack. Within those records a subset is outlined here;

In a four day period (between 18-21 July 2015) three entries are made on three separate days, specifically regarding rake marks and in two of those instances at multiple locations;

- Saturday 18 July 2015, "*new rake mark on saddle patch, new [rakes]??? on back and pec" [Bates #MSQ0003691]
- Tuesday 21 July 2015 "*new lag [short for '*Lagenorhynchus*'] rake on stomach, scrape on L side of flukes" [Bates #MSQ0003688]
- Monday 27 July 2015 "*new rake on dorsal, left side chest & left belly" [Bates #MSQ0003686]

In another subset of dates (between 2-11 August 2015, i.e. 10 days) another five entries are made which specifically note rake marks (again, in some instances at multiple locations);

- Sunday 2 August 2015 "*new rake on belly (small)*" [Bates #MSQ0003687]
- Friday 7 August 2015 "*new rake on peduncle pm" [Bates #MSQ0003685]
- Sunday 9 August 2015 "*new rake on belly + peduncle" [Bates #MSQ0003685]
- Monday 10 August 2015 "* 3 new rake marks on chest & belly, rub above L pec" [Bates #MSQ0003682]
- Tuesday 11 August 2015 "* 2 new rakes on both tips of flukes, rub above L pec" [Bates #MSQ0003682]

In a seven day period (7-13 September 2015), three entries were made;

- Monday 7 Sept 2015 "*small rake on umbilicus" [Bates #MSQ0003674]
- Tuesday 8 Sept 2015 "*new rakes on base of dorsal; saddlepatch" [Bates #MSQ0003674]
- Sunday 13 Sept 2015 "new rakes on belly" [Bates #MSQ0003675]

Regardless of the motivation for mobbing, it should also be kept in mind that different hypotheses explaining this behaviour are not exclusive and neither are the species involved. For example, mobbing has been described for humans in the workplace, and also described as 'bullying' and as such "mobbing (bullying) [is considered] a severe form of harassment." (Zapf, 1999). In nature, potential predators (of any species), in order to avoid mobbing, will typically divert their path of travel and/or desert the area. At the MSQ, Tokitae is deprived of both of those options, due to the extremely confined conditions. That is, when mobbed, she is unable to divert her path substantially and she is clearly unable to depart from the tank. Instead, she is observed to 'lash out', chase and attempt to bite the dolphins. Such a reaction is similar to rarely observed behaviour described of a great white shark which bit a fur seal when mobbed (Kirkwood & Dickie, 2005) and by a jaguar which killed one of the monkeys which mobbed it (Torrez et al, 2012). From the data made available to myself, it is unclear if the dolphins are harmed during such events, but of note is that at least one dolphin which was recorded as having died whilst cohabitating in the same tank as Tokitae, exhibited blunt force trauma indicative of an event such as ramming by an orca (see details above).

Depriving an individual of appropriate social contact is unacceptable for a highly social species and as such has been recognized in Switzerland, which passed a law mandating that social animals must be allowed contact with conspecifics and that solitary confinement is synonymous with abuse (Switzerland Government, 2008). Other species of mammals are known to suffer psychologically when subjected to social isolation, *e.g.*, primates (Visalberghil & Anderson, 1993), tigers (Jenny & Schmid, 2002) and horses (Broom & Kennedy, 2010). When used on humans, solitary confinement is considered to be a form of psychological torture particularly when the period of confinement is longer than a few weeks or is continued indefinitely (Gawande, 2009, Kupers, 2008). Given the strong evidence of orca brain complexity, subjecting orca to extended solitary confinement, is likely as psychologically damaging as it is to humans.

Tokitae's isolation from other members of her species presents additional concerns regarding her well-being, as she has no opportunity to engage in the distinctive SRKW foraging culture. Not only is her food type and intake controlled by MSQ staff, but she cannot hunt with conspecifics and has no opportunity to "food-share," which is a common behaviour seen amongst orca (Baird, 1994, Baird and Dill, 1995, Fertl et al., 1996, Fertl and Wursig, 1995, Guinet, 1992, Hoelzel, 1991, Visser et al., 2010). Aggressively chasing another captive cetacean through a small tank is certainly no substitute for opportunities to engage in species-specific behaviour and in my professional opinion that behaviour is a product of frustration borne of boredom and stress rather than a natural hunting behaviour.

Of no small significance is the fact that Tokitae has also been deprived of the chance to interact acoustically with others of her species and specifically her family. Orca are well recognized in the scientific literature as having group (and even pod {family}) specific calls (e.g., for a small selection see Filatova et al (2004), Ford (1991), Saulitis et al (2005), Weiß et al (2006)). During the site inspection video recordings of the 20th of January 2016, Tokitae could be clearly heard vocalizing. These calls were loud enough and distinctive enough that they could be heard in the air, recorded by the camera which was at least 30 ft (9 m) away (for example listen to video # A013C253_1601208C_CANON at 47m47s, 1h24m16s and 2h25m48s). Three different call types can be detected in the air above water and clearly distinguished from other bioacoustic calls (such as bird calls) and the excessive anthropogenic noise (e.g., mowers or leaf blowers and airplanes as just some examples) which permeated the stadium.

Tokitae has also been noted by the trainers to emit vocalizations as they have recorded comments in the Animal Behaviour Records (e.g., see [BATES #MSQ0003672], for the 16 September 2015 and [BATES #MSQ0003686], for the 30 July 2015) and the author(s) of the Health Record summaries note the following instances of her vocalizing;

- "Toki was moderately vocal today" (7-10-01) [BATES # MSQ0003751-R]
- Toki mildly vocal (7-11-01) [BATES # MSQ0003751-R]
- Vocalizing in the underwater viewing window (2-28-03) [BATES # MSQ0003756-R]
- Toki has been very vocal (7-7-03) [BATES # MSQ0003757-R]
- She is vocalizing to her self (3-17-05) [BATES # MSQ0003760-R]
- vocalize* (1-20-06) 2x [BATES # MSQ0003763-R]
- very vocal (4-9-07) [BATES # MSQ0003766-R]

- vocal last week (7-20-09) [BATES # MSQ0003769-R]
- was vocalizing (6-28-10) [BATES # MSQ0003771-R]
- Toki was vocal (6-26-12) [BATES #MSQ0003777-R]
- Acutely vocal (9-12-14) [BATES # MSQ0003788-R]

With all of these notable deprivations, in terms of her social isolation, Tokitae's welfare has obviously been severely compromised. She has been subjected to long-term deprivation of what should be considered basic and fundamental rights. This has resulted in standards which are so low that is difficult to comprehend the overall impacts they are having on her.

III. Opinions Related to Lack of Protection from Sun and Severe Weather

In addition to the physical restrictions of the tank, but of no lesser concern, is the lack of protection from the sun for Tokitae. It is known that orca in captivity spend extended times at the surface, which does not typically occur for long periods in the wild. Rather, wild orca spend the majority of their lives submerged at depths where potential damage from UV light (radiation) is minimized due to refraction/filtration via the water's depth (Tedetti and Sempéré, 2006) and where dissolved organic matter will increase turbidity and therefore protection from UV radiation (e.g., see Gibson et al., 2000). All cetaceans have extremely delicate skin (Robson, 1984, Geraci and Lounsbury, 1993, Greenwood et al., 1974, Geraci and Lounsbury, 2005) and this can result in sunburn and other adverse skin damage (Addink and Smeenk, 2001, Harms et al., 2004, Martinez-Levasseur et al., 2010). Orca, despite having predominantly dark (melanistic) pigmentation, are still susceptible to sunburn (Jett and Ventre, 2011) who state "*we commonly observed blistered and peeling skin on the dorsal surfaces of the captive orcas we worked with, especially among those who commonly exhibited logging behavior*." Due to the shallow depth of Tokitae's tank and its lack of features, she is unable to minimize her exposure to the sun's harmful rays.

Sunburn among wild orcas is not described in the literature. This is most likely due to the fact that most of the well studied wild orca populations live in environments with relatively low UV. Additionally, individuals are typically submerged underwater for significantly longer times than they are at the surface (e.g., see Williams et al 2002). This is in direct contrast to the conditions for, and behaviour of, Tokitae at the MSQ.

Furthermore, in the wild, orca typically sleep by coordinating/synchronizing their breathing to that of their mothers and tend to surface and dive as a 'unit' (Ford, 1989; Ford, 2008). Individuals who are sleeping also typically maintain their momentum (i.e., keep swimming below the surface, rising to breathe) and may rest (albeit not stationary, but rather slowly moving) for up to seven or eight hours continuously (Jacobsen, 1990, Jacobsen, 1985, Jacobsen and Smith, 1984, Ford, 1989). Again, this is in contrast to captive orca who will typically lie at the surface, hardly moving at all, whilst sleeping (Lyamin et al., 2008, Flanigan, 1975). Although there are also records of captive orca sleeping by lying on the floor of the tank (Lyamin et al., 2008, Visser, unpublished data), even this provides little (if any) protection because there is negligible dissolved organic matter in marine mammal tanks, i.e., the water is typically 'clear'

(Joseph and Antrim, 2010). This precludes any indirect protection the water might provide from UV radiation. When orca are held in captivity this compromise of reduced dissolved organic matter for filtration and purification systems is also essential for maintaining water quality and animal health (Reeves et al., 1994, Geraci et al., 1979, Bonar et al., 2007, Ridgeway and Patton, 1971, Andersen, 1973, Wallis, 1973).

A lack of protection from the sun is also a concern with regards to Tokitae's eyes. There are multiple entries in the behaviour records with regards to issues with her eyes. It is unclear if this is related to poor water quality or exposure to sun (or to both). Regardless, Tokitae is clearly physically suffering. The Medical History summary [BATES #MSQ0003750-R] states that as early as 1970 there were issues with her eyes. The condition was obviously severe enough that in the "1980's" an ophthalmologist had been called in for a diagnosis. The specialist determined that Tokitae suffered from a pterygium in her right eye. Symptoms of pterygiums include inflammation, foreign body sensation, tearing, dry and itchy eyes. Furthermore, in advanced cases the pterygium can affect vision. Pterygiums have been associated with and, are thought to be caused by, ultraviolet-light exposure (e.g., sunlight) as well as dust and low humidity. The latter is unlikely to be an issue given that her eyes are often bathed in water and that she is continuously administered medication (e.g., see [BATES #MSQ0003750-R] for mention of 'eye drops' and [BATES #MSQ 0003689], medication summary, final line for mention of 'artificial tears').

Mr Arthur Hertz [BATES #MSQ0010543 & #MSQ0010543] and/or the staff of APHIS (mentioned on the first page) are either unaware or choose to ignore the long-term implications of exposure to sun with respect to this eye issue. Mr Hertz mentions the proposed installation of shade for Tokitae, but disregards it on three grounds (1) that "*APHIS has advised us that too much shade can lead to pathogen build up*"; (2) "*costly structural alterations may be necessary*" and (3) "*shade may necessitate fundamental changes in how Lolita [Tokitae] is exhibited and allowed to interact with her professional trainers and the public*." He reiterates his concern for the aquarium, rather than expressing any concern for Tokitae's health, when his concluding sentence states; "*These changes could substantially impact the Seaquarium and its operations*."

It is of note that shade does not mean complete darkness, nor even that complete cover of the tanks would be required as it is well recognised that UV disinfection technology is used by the water industry to promote inactivation of micro-organisms, as UV is typically effective against waterborne pathogens. Given that Tokitae (if the plaintiffs video of the 20th of January 2016 is a representation of a typical day), spends an inordinate amount of time in less than a quarter of the tank (and that area is typically the same south west area, see Annex 2 for details), a shade over this area alone would have been a substantial improvement. The fact that such a simple mitigation, at a minimal cost, has not been implemented, is once again a reflection of the poor quality of care she is receiving.

Examples of her **right** eye issues can be found, *inter alia*;

- 24 July 2015 "S4- eyes squinty - rt [right] eye closed most of show" [Bates #MSQ0003689]
- Thursday 30 July 2015 "right eye closed show 1 →[arrow] end of day" [Bates #MSQ0003686]
- Friday 31 July 2015 "eyes squinty in pm" [Bates #MSQ0003687]

- Saturday 1 August 2015 "*Right eye cloudy". [Bates #MSQ0003687]

Examples of her **left** eye issues can be found, *inter alia*;

- 24 July 2014 [BATES #MSQ0003787-R] "her left eye although completely open does appear to have slightly more opacity to the ptrygium area perimeter"
- 1 August 2014 [BATES #MSQ0003787-R] "Toki left eye has increased corneal opacity around her ptrygium"

Furthermore, with regards to Tokitae's eyes, of note is that the symbol (ED) (in the Behaviour Records it is capitalized and fully enclosed in a circle) indicates 'eye drops' (see "ANIMAL RECORD SYMBOLS" section of the "Animal Training Manual", [Bates #MSQ0009765[) and is alarmingly prevalent throughout the records I inspected.

For example, *inter alia*;

- 6-9 April 2015, (ED) is entered n = 13 times in 4 days [Bates #MSQ0003716]
- 31 July – 2 August 2015, (ED) is entered n = 7 times in 3 days [Bates #MSQ0003687]
- 23-26 November 2015, (ED) is entered n = 9 times in 4 days [Bates #MSQ0003687]
- 20-23 April 2015, (ED) is entered n = 12 times in 4 days [Bates #MSQ0003687]

Galhardo et al. (1996) found that captive dolphins spent a disproportionate amount of time with their heads above water. This is not a particularly natural behaviour for dolphins, but could be interpreted as functional of captivity because most environmental complexity is on or above the water-surface in captive facilities (e.g., the presence of animal staff, floating enrichment objects etc). This is also the case for Tokitae, whereby, particularly during training sessions and shows, her eyes are repeatedly out of the water as she watches the trainers. Again, a simple shaded area (perhaps even just an extension from the south west area mentioned above) over the south west end of the stage (where Tokitae is typically stationed during all the shows) would have provided relief from the sun which rises over the 'rear' of tank B (i.e., in the east) and progresses throughout the day over the tank to set approximately in the direction of the stadium entrance. Therefore, Tokitae is typically exposed to the sun all day and the stadium roof provides no shade over her tank.

IV. Opinions Related to Indications of Extreme Stress in Lolita's Captive Environment

When I observed Tokitae at MSQ in 2013 and again in 2015, she exhibited several stereotypical behaviours (abnormal, repetitive behaviours which have no outwardly obvious function). Examples of these types of behaviours are also evident in the plaintiff's video of the site inspection (see Annex 2 for details). These are typical of captive cetaceans, yet they rarely, if ever, are observed in wild cetaceans. They are typically considered to be indicative of extreme stress and deprivation.

I observed Tokitae repeatedly 'bobbing' at the surface of the pool, during which the tip of her rostrum (the tip of her jaws) and the anterior part of her face would break the surface. Bobbing is distinguishable from spyhopping—a practice orca use to look above the water surface, using a

technique similar to that of humans treading water—in that it is not as animated (nor does the animal rise out of the water as far during bobbing). It also appeared that Tokitae may have had her tail flukes on the bottom of the extremely shallow tank and raised her head by 'tail-standing', using the tank floor, in the same way a person could 'handstand' and raise their legs up and down. Such 'tail-standing' has not been reported in the literature for wild orca.

Additionally, I observed Tokitae apathetically logging (a body position in which most of an orca's dorsal surface, from blowhole to behind the dorsal fin, or even extending as far as the caudal peduncle, is exposed), in one or more places in the tank. For example, when logging, Tokitae would occasionally lift her head out of the water, perhaps to scan above the surface. These combination stereotypies included, for instance; logging whilst rocking or 'swaying' – moving either her head only or her head and torso and at times doing this excessively. This behaviour, although milder in appearance, seems to be akin to the excessive motoric obsessive–compulsive disorders recorded in some humans (Hollander et al (2012).

I observed Tokitae engaged in such bobbing behaviour mostly prior to the shows and logging predominantly after the shows. In my opinion, the difference between the two stereotypic behaviours' timings may be that bobbing behaviour would position Tokitae's head (and therefore her eyes) such that they could scan above the surface for the trainer's arrival. Tokitae became "animated" only when trainers were arriving for the show and when they directed attention to her during the show—i.e., when she was given commands to present certain behaviours. When no commands were given to her during the show, typically, Tokitae begged (held her mouth open, orientated towards a trainer) at the side of the platform. She generally ignored the trainers when the show was over and if not bobbing, mostly logged in one place, likely because she was aware that the show was over and she has learned that she is unlikely to get a response from the trainers if she attempts an interaction in those circumstances.

From the 6.5 hrs of video made during the plaintiffs site inspection it is also abundantly clear that Tokitae spends an inordinate amount of time either logging or submerged (and stationary during submergence, i.e., apparently laying on the bottom of the tank). She remains predominantly in the south west area of tank A during these low energy behaviours (see Annex 2A for details).

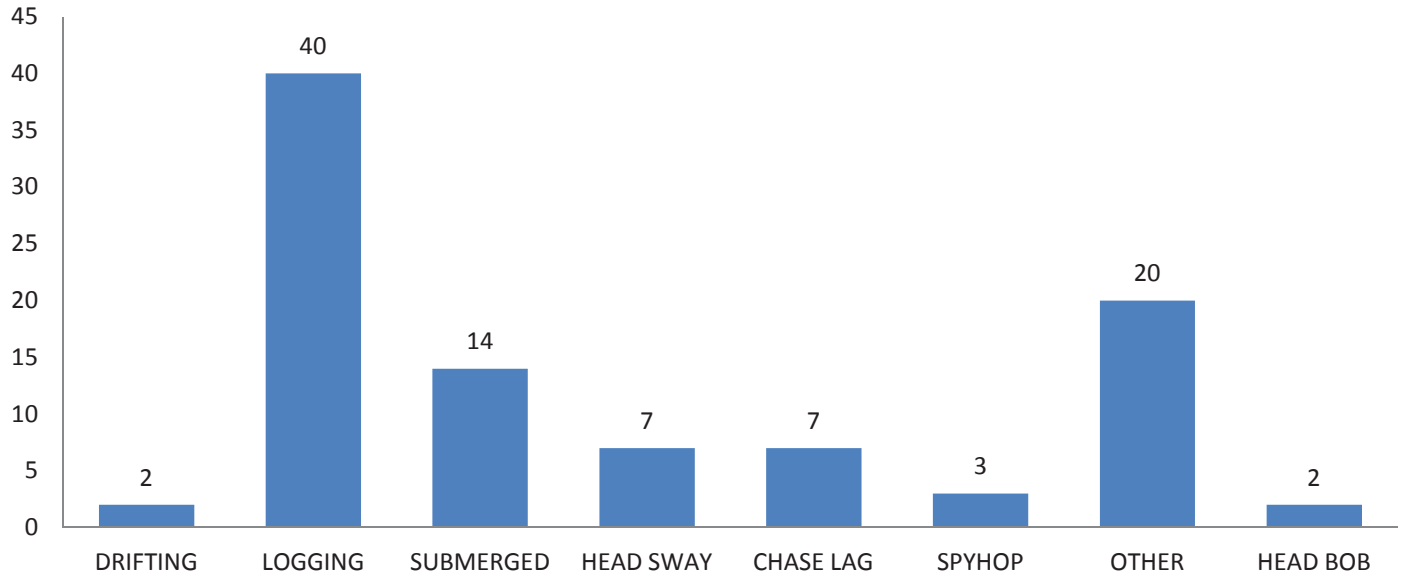

Figure 1. The amount of time Tokitae spent conducting various behaviours (except active swimming, which was logged separately, see Annex 2C). These behaviours were all recorded on video on the 20th of January 2016, on Camera 'A' (wide angle) (Annex 2A). The total video time (daylight hours) was 6.5 hrs. The total number of behavioural events was 95. The number of occurrences of each behaviour are noted above each column. Of note is that SUBMERGED was described as *stationary and submerged*. OTHER also included events where two behaviours were conducted simultaneously and as such included 'logging' when paired with 'head sway' or 'head bob'.

It is known that orca in captivity spend unusual amounts of time at the surface (either 'hanging' with their dorsal fin partially or fully exposed, or 'logging') (Lyamin et al., 2003, Lyamin et al., 2008, Spencer et al., 1967). In the wild, although 'logging' may also occur (e.g., occasionally while sleeping), captive orcas generally engage in this behaviour in increments more than three times longer than wild orcas (Jacobsen, 1990, Ford, 2008, Ford, 1989, Jacobsen, 1985). Tokitae's excessive logging is likely a psychological response to an almost complete lack of environmental enrichment (see below) in her MSQ habitat and to the acutely diminutive tank and the extremely shallow depth of her tank, which prevents her from engaging in the diving behaviours and swimming behavoiurs orca exhibit in the wild. In my opinion, the classic stress responses I observed in Tokitae are caused by the conditions of her confinement.

V. Opinions Related to Lack of Adequate Environmental Enrichment

In the 2015 Behavioural Records [BATES #MSQ0003744-1655] (Dates: 29 Dec 2014-29 Nov 2015) it appears that the trainers only provided the following items as environmental enrichment for Tokitae;

1. Ice
2. Hose
3. Wetsuit
4. Ball

Four items is a woefully inadequate range of devices to provide for a week, let alone for a year and even double this number would likely still be inadequate. To deprive a socially complex and intelligent individual, such as an orca to the level demonstrated in the MSQ documents is abhorrent. It is well recognized that members of the dolphin family (of which orca are one species) are considered to have high levels of 'intelligence', in many ways comparable to humans and great apes (Marino, 2002). Even snakes respond to environmental enrichment (and when provided with four separate enrichers, responded better than the control subjects with none) Almli & Burghardt (2006).

Of the four enrichment items listed in the 2015 Behavioural Record, effectively only two of these (the wetsuit & ball) are 'toys'; another is a 'food' (providing much need hydration due to frozen fish not providing enough liquid in her diet) and; one is a physical stimulus. That there is no variation, other than these four items provided to Tokitae, is deplorable. Allowing such an utter deficiency of stimulus by those who are responsible for her care is nothing short of willful neglect and is unpardonable. Such a blatant disregard for enrichment is a clear cut welfare *and* wellbeing issue, in which Tokitae is the victim and suffering is inflicted. Unfortunately, the abuse doesn't stop with just the (low) total number of items. When the enrichment is considered in the context of when the items are deployed (i.e., during the play sessions) and then also the combination of items is also compared, an alarming trend becomes apparent. Out of 245 play sessions that were collated, only 24.3% of the sessions had more than one item listed as deployed for Tokitae to play with. For the remainder of the sessions, only a single item was used. The wetsuit was listed as deployed (as the only item) for 63 sessions (i.e., 25.7% of the play sessions) (e.g., see [BATES # MSQ0003745]). <u>The hose was the only enrichment deployed for 123 sessions</u> (that is the remaining **50%** of the play sessions) (e.g., see [BATES #MSQ0003742].

Environmental enrichment is not a new consideration for those holding animals captive and more than a decade ago Kuczaj et al (2002) made this opening statement in their abstract that; "*The use of novel objects as environmental enrichment devices is a key aspect of many environmental enrichment programs ...*". The paper included an orca, from SeaWorld, Orlando, Florida, as one of the study subjects. The second and third authors of this paper are Mr Thad Lacinak and Mr Otto Fad, both formally of SeaWorld Orlando. That facility is known to collaborate with MSQ (e.g., see the acknowledgments in Bossart & Eimstad (1988). The Kuczak et al (2002) paper showed that it is possible to reduce the effects of habituation when objects are presented on a varying schedule (i.e., in direct contrast to the repetitive and unvarying schedule that used on Tokitae).

Another, more recent (2013), study was published in the peer-reviewed journal, *Journal of Zoo and Aquarium Research*. The paper looked into environmental enrichment specifically for marine mammals and states in very clear terms "*While most captive marine mammals are trained and this challenges their social-cognitive skills to a moderate or high level, <u>their physical-cognitive skills are not being challenged to a high level by floating 'toys' in the pool</u>.* " [Emphasis added] (Clark 2013). It goes on to state; "*Wild animals face many challenges that require the application of evolved cognitive skills. In contrast, captive animals tend to live in highly predictable and structured environments, and their cognitive skills may be challenged at a low or inappropriate level*." (references omitted) [Emphasis added].

I cannot stress enough that the woefully insufficient attention given towards providing environmental enrichment to Tokitae and the actual enrichment made available to her (i.e., ice, hose, wetsuit, ball) are completely inadequate. Based on such a deficiency of enrichment items provided to Tokitae, there appears to be a complete disconnect between the staff/owners and the current 'best practice' standards of the zoo and aquarium industry. There is no excuse for such a lack of stimulus being provided to Tokitae as there are a wide variety of professional organizations and networks available (such as the International Conference on Environmental Enrichment), who typically strive towards providing appropriate species-specific environmental enrichment for captive animals and have a wide range of resources available.

In the MSQ 'Animal Training Manual' there are six categories of 'Animal Interactions'; 'Relationship', 'Husbandry', 'Encounter', 'Play', Train' and 'Show' [BATES #MSQ0009766]. Each of these is represented by a short-hand code 'R' 'H' 'E' 'P' 'T' or 'S' [BATES #MSQ0009766]. These codes are entered into the top centre of the divided 'session square' in the daily Behavioural Records. See [BATES #MSQ0003744], 01 Jan 2015 for a completed entry. Tokitae is not exposed to an 'Encounter' type of session (which would involve a guest entering the water with her).

It is of considerable significance in the context of Tokitae's welfare and care that the MSQ Animal Training Manual [BATES #MSQ0009763] gives the following details in a separate section of the manual, specifically dedicated to interactions; "*We interact with our animals through a variety of different sessions at Miami Seaquarium. The acronym R.H.E.P.T.S. is used to describe these interactions.*" It then goes on to provide a description of each of the categories; **R**elationships, **H**usbandry, **E**ncounters, **P**lay, **T**raining, **S**hows. The entry for 'PLAYS' reads "*The animal and trainer literally play! It doesn't matter which behaviors occur. There are no expectations of desired behavior from the animals.*".

The entry for the 'RELATIONSHIPS' category is described as "*This is **a very important bonding time between trainer and animal**. The animal and trainer will spend time together without asking for any behaviours. Initially this will only be by offering a primary reinforcement.*" [Emphasis added].

Unfortunately, and obviously to the detriment of Tokitae, the Relationship type of session (despite being the only one that is described with the word 'important', or any other descriptor that indicates an interaction with high significance), is the session type that is *conducted the least* (see details below and Figure 2).

This is well illustrated within the 'Behaviour Records' of the 12 month period (29 Dec 2014-29 Nov 2015, *sans* 1 week 22-28 June 2015, which is missing) [BATES #MSQ0003744-1655] and is of tremendous concern. A total of 2205 behaviour 'sessions' are recorded in these documents. If Husbandry (health care) sessions are removed (because, in theory these are mandatory and should be regularly scheduled, regardless), **2093 sessions** remain in the records. Remarkably, of these, only 243 Play sessions were recorded. This was the second lowest type of interactive session and represents only 11.02% of the total. However, disturbingly, the lowest category of sessions was the **Relationship** category, with **merely 138 sessions** recorded, which is only **6.26% of the total**. The distribution of session types is shown in Figure 2.

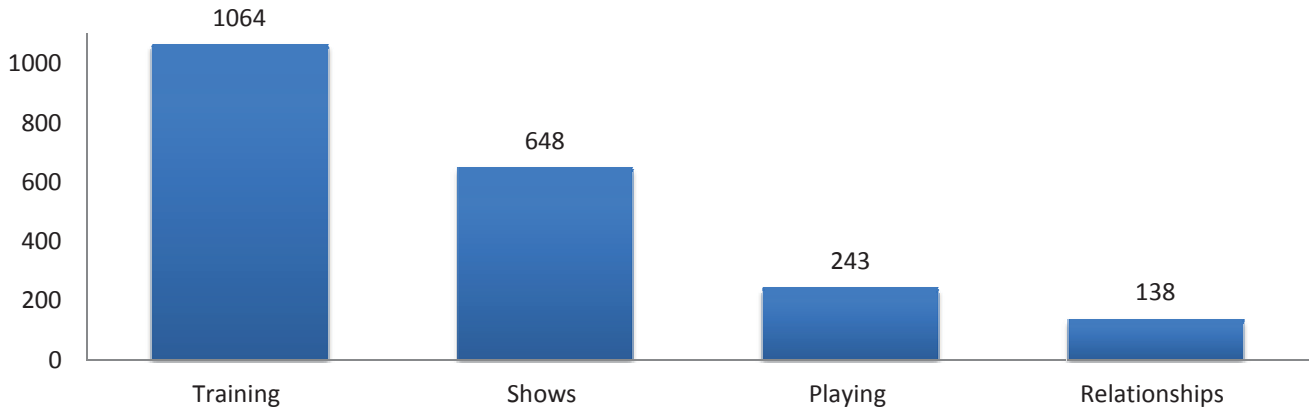

Figure 2. Animal Behaviour Record Sessions, separated into their different interactive types (total for 29 Dec 2014-29 Nov 2015 n = 2093, not including 'husbandry' (health care) sessions which should be mandatory). The MSQ described 'RELATIONSHIP' using the term '*important*', yet this is represented by the dramatically least number of session types. This, along with other factors, illustrates the inadequate and exceptionally poor quality of care that Tokitae received in 2015. Data extracted from [BATES #MSQ0003744-1655].

Combined Stressors = Compromised Individual

The above listed stressors are beyond a doubt contributing to causing a compromised individual.

The level of compromise is illustrated in the Medical Records in considering the range of organisms which have been cultured from samples collected from Tokitae. Focusing on the Medical Records from 2014 & 2015 which are labeled as belonging to Tokitae (or 'Ms Toki'), they show an inordinate number of organisms which have been cultured from her (*at least* 39 different species) (Annex 6). This level of infection is extremely disturbing, even more so when it is taken into account that sometime before the 23 January 2012 Tokitae had been "provided" with "*an immune stimulant that has bolstered her immune system*" as described by her veterinarian Magdalean Menchaca, an employee of the MSQ [BATES #MSQ0001548]. That is, this treatment had begun at least 2 years prior to the Medical Records described below.

Such a plethora of bacteria, fungi, protozoa and viruses are an unreasonable and totally unacceptable number, especially when put into the context of the published scientific literature regarding pathogens noted in orca **worldwide** (both in the wild (n = 5) and those orca (other than Tokitae), held in captivity (n = 16)), (Annex 7, and details given below). This excessively high number of pathogens diagnosed in Tokitae's cultures is a clear indication that she is in an environment that is not only dangerous to her well-being, it is in fact demonstrably detrimental to her.

The extent of the detriment is manifested in Tokitae's Medical and Health records. By inspecting the results from the cultures collected from Tokitae (e.g., from her breath), I was able to compile a list of organisms (Annex 6). Although some are 'normal' bacteria, for instance *Escherichia coli* (*E. coli*) which is commonly found in the lower intestine of mammals (including

Tokitae (e.g., see [BATES#MSQ0000835-R] report dated 08 July 2011, 'STOOL' sample) [BATES#MSQ0000396-R] (report dated 26 December 2013, 'FECAL' sample)), it would not be considered healthy for such a bacteria to be regularly cultured from a 'TOOTH' sample e.g., see just a few examples in; [BATES#MSQ0000807-R] (report dated 07 September 2011); [BATES#MSQ0000833-R] (report dated 16 July 2011);

Although the fecal coliform count was apparently maintained at 0/100 ml within Tokitae's tank in the MSQ during the late 1980's (p 42, paragraph 1, in Bossart & Eimstad, 1988), an example of the potential for cross contamination between feces in the water, food and Tokitae's mouth was recorded during the plaintiffs' site inspection [video recording made 20 January 2016, file name "AA000512", event starts at ~03:00mins, see Annex 2-B] when a female trainer had been handling Tokitae and had placed her hands in the water. Tokitae was recorded as defecating and then turning her body and orientating her head to the trainer. Once tuned she was 'on station' and Tokitae begged for food. The trainer takes a fish (without sanitizing her hands) and places it into Tokitae's mouth. The second fish is then 'wet' with feces infested water from the tank. The trainer apparently realises the mistake and then places the offending fish in a box behind her. She then turns away from the camera and has a discussion with the vet standing by which is inaudible on the recording. She then proceeds to continue to feed Tokitae, still with hands that have been in the feces infested water.

E. coli has also been found in the 'EXHALE' sample of Tokiae e.g., [BATES#MSQ0000332-R] (report dated 18 July 2011). Although it might be claimed that the 'blow' (exhale) of any cetacean naturally contains water from their environment, it is standard practice when collecting samples from captive cetaceans to not use the first exhalation upon surfacing but request a second exhale from the subject, e.g., see p408, para 2, Borowska et al (2015). Such methodology appears to also be used by the vet during the site inspection (see video file AA000511).

Additionally, Tokitae's blowhole culture returned a positive for *Burkholderia cepacia* (bacteria) (e.g., see just one example in; [BATES#MSQ0000804-R], report dated 12 December 2011). This bacteria has been documented to be spread person-to-person and as a result, many health care facilities enact strict isolation precautions for those infected with BCC. Infected individuals are often treated in a separate area from uninfected patients to limit spread, since BCC infection can lead to a rapid decline in lung function and result in death. The bacterium is so hardy, it has been documented to persist on commercially available benzalkonium chloride swabs and antiseptic wipes and to persist in betadine (antiseptic) (Anderson et al 1990).

Aeromonas hydrophila (bacteria) has been cultured from Tokitae's tooth (e.g., see just one example in; [BATES#MSQ0000807-R], report dated 07 September 2011). This bacteria is considered to be one which rarely infects healthy individuals.

There are also references to 'super-bugs' (an informal name for pathogens which have become resistant to the drugs used to treat it). An example is the well recognized methicillin-resistant *Staphylococcus aureus* (MRSA), which has been cultured from Tokitae and reported by the laboratory on a number of occasions over at least a 11 year period – e.g., see 23 January 2004 "Culture showed MRSA [Staph]" [BATES # MSQ0003758-R] and 07 Feb 2012 [BATES#

MSQ0000693-R] and "Resistant *E.coli*" (5-1-15) [BATES # MSQ0003790-R]. References are made in general, in what appears to be an alarmingly casual way (i.e., no more details are given) to "resistant bacteria" (2-26-11) [BATES # MSQ0003773-R] and "resistant microbes" (3-2-11) [BATES # MSQ0003774-R].

Furthermore, Tokitae has been recently recorded as having a positive clinical diagnosis for 'Papilloma' on her 'ventral' surface (therefore it is unclear if the sample was collected from the genital area), DATE: 21 September 2015 [BATES #MSQ0001251]. Papilloma typically manifests itself as cauliflower-like shaped tumors on the skin or on a mucous membrane. It is derived from the epidermis and although often benign, it is infectious (e.g., see the extensive ~16 x 12 inch (40x30 cm) area covered by this growth on a captive male orca, (Bossart et al, 1996). In captive orca papilloma has been associated with poor water quality (Cornell, 1993). Papillomaviruses have been the focus of much research in recent years because of the growing association of these infectious agents with neoplasia (tumors). (Bossart et al 1996). On the day following the diagnosis of the papillomiavirus the same laboratory also gave a clinical diagnosis of 'open, neoplasia' for Tokitae, although it also stated that no neoplastic cells were seen in the specimen.

It is unclear, with such a list of organisms cultured from one orca, how the Seaquarium's current veterinarian Dr Rodrigues (DVM) can write (on the 19 Feb 2014) of Tokitae; "*Her ongoing …. immune profile …. within normal clinical parameters for killer whales.*" …. "*At this time "Lolita" appears to be in good health and free from active infectious disease.*", as these pathogens occur time and time again throughout her medical records. The extent of infestation, regarding the number of infections and the wide range of species, is nothing less than staggering. Again, this is even more obvious when compared to the scientific literature regarding other captive orca, worldwide.

The list of organisms that have been cultured from Tokitae falls so far outside the range of "*within normal clinical parameters*" that they have no comparison, worldwide. Even if **all** of the known organisms found in wild <u>*and*</u> captive orca (n = 21), were combined into just one orca, this 'super-infested' orca would still have less than half the number of organisms that Tokitae has (at least 39 are named specifically, but others are described only broadly). Furthermore, emphasizing just how extremely her health has been compromised compared to other orca in captivity (and in the wild), Annex 8 lists the minimum number of pathogens which have been cultivated **exclusively** from Tokitae (n = 32), which is <u>**twice**</u> the number of pathogens **globally** recorded in orca (Annex 7).

It should also be noted that I have not looked through the earlier health records in detail, but rather concentrated on those from **2012** [Bates# MSQ0000706-R to MSQ0000401-R] and **2014** [Bates# MSQ0000385-R to MSQ0001234-R] along with the Health Record summary [Bates# MSQ0003750-R to MSQ0003793-R]. The author(s) of this same Health Record summary indicate that there are other pathogens pre these dates, which they do not name but rather list in very unspecific terms such as;

- resistant microbes (2 March 11) [BATES # MSQ0003774-R]
- resistant bacteria (26 February 11) [BATES # MSQ0003773-R]

Emphasizing just how compromised her health is, there are few weeks in the Behavioural Records in which Tokitae isn't on medicines. It is common medical (and veterinarian) practice to not prolong the use of antibiotics and as such this extensive usage must be called into question either because the treatments are being administered inappropriately, or because Tokitae's immune system is severely compromised.

There are also a number of times that Tokitae has been administered drugs without any clinical evidence that they are required. For example;

- "Placed on stomach prophylactively because repair work ....in the whale stadium" (10-21-02) [BATES # MSQ0003755-R]
- "back stairs ... redone ... we will put Toki on preventative Mylanta Carafate 15 BID" (9-27-04) [BATES # MSQ0003759-R]
- "RX preventative for the busy season Ranitidine 6 SID & carafate 15 SID" (12-19-06) [BATES # MSQ0003765-R]
- ".... her meds will go on until the end of the season preventively" (12-27-10) [BATES # MSQ0003772-R]
- "preventative stomach meds" (10-22-12) [BATES # MSQ0003778-R]
- "preventative antifungals" (9-18-13) [BATES # MSQ0003783-R]
- "prophylactic fungal treatment" (8-18-13) [BATES # MSQ0003783-R]
- "Ranitidine 5 SID preventative" (11-25-14) [BATES # MSQ0003788-R]
- "Prophylactively ranitidine" (7-12-15) [BATES # MSQ0003791-R]
- "preventative ranitidine & Rolaids" (9-17-15) [BATES # MSQ0003792-R]

Typically, there is more harm than help in taking antibiotics when you are not sick. By using antibiotics when not yet required, there is an increased risk of targeting (and killing) the body's natural flora and additionally making the body prone to infection by pathogenic bacteria. Moreover, it is guaranteed that some bacteria (which may include those that cause disease) will survive during antibiotic treatment. These bacteria will then be antibiotic-resistant, as has been documented in Tokitae (see above).

Summary Conclusion

From my personal observations and from my review of the evidence, it is clear that Tokitae is generally lethargic, that she consistently exhibits an apathetic behavioural state in which her stupor is displayed to the point of her being basically catatonic for much of the time. I cannot stress enough that, despite the fact that I have observed orca in captivity around the world and that I had conducted research into the Miami Seaquarium before my first visit, I was shocked and horrified at the abysmal conditions Tokitae is held in. It is my professional opinion that world-wide, this facility ranks as one of top two contenders for the 'worst conditions' an orca is currently being kept in.

Compensation

I did not receive any compensation for my research, my report preparation, or for consultation on this matter.

Declaration

Pursuant to 28 U.S.C. § 1746, I, Ingrid Visser, hereby declare that under the penalty of perjury the contents of the foregoing report are true and correct to the best of my knowledge.

EXECUTED on this 8th day of February 2016

[redacted]

Ingrid N. Visser
Researcher & Founder

MATERIAL CONSIDERED IN FORMING EXPERT OPINION

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Annex 1

Ingrid N. Visser (PhD)

[redacted]

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➤ SCIENTIFIC & RESEARCH SUMMARY

With over 20 years experience in cetacean research, I have been responsible for a wide variety of projects including completion of a PhD on New Zealand orca, individual research projects and contributing as part of teams to various research projects worldwide.

Research has included field surveys (boat & aerial based), behavioural and photo-identification studies as well as necropsies on various species. As such, I have observed or researched cetaceans in numerous locations around the world, including (alphabetically) Antarctica, Argentina, Australia, Canada, Chile, Namibia, New Zealand, Papua New Guinea, Philippines, Russia (Kamchatka), Tonga, United States of America (Alaska, West and East coast mainland, Hawaii). I have mentored numerous students from undergraduate to graduate level.

My involvement, along with data collated, from numerous rescues of stranded and entangled cetaceans has contributed towards research projects and scientific publications.

To help promote research, as well as provide platforms for conservation, I have founded and run a variety of cetacean-orientated non-profit organizations at both national and international level.

➤ RESEARCH ACTIVITIES

1992 – present	Whale researcher, specialising in orca (killer whales) around NEW ZEALAND. Only women in the Southern Hemisphere and only person in the South Pacific specialising in orca. Research featured in award-winning documentaries by BBC, PBS, Discovery Channel, etc.
1992 – present	Whale Researcher & research assistant (including work on orca, bottlenose (both *Tursiops truncatus* and *Tursiops aduncus*), Hector's, Risso's, spotted spinner and common dolphins, humpback, pilot, sperm and beaked whales) in various locations around the world.
1998 – present	Published scientific research in peer-reviewed journals (see scientific publications list at end of CV).
2001 – present	Whale researcher, specialising in orca in ANTARCTICA. Established first long term, non-lethal research project for this species in Antarctica. Founded Antarctic Killer Whale Identification Catalogue, the first photo identification catalogue for the area, working in conjunction with Antarctic tour operators.

2002 – present	Whale researcher, specialising in orca around PAPUA NEW GUINEA. First, and remain the only, researcher working with cetaceans (all species) in Papua New Guinea waters. Conducted cetaceans surveys in the Kimbe Bay, West New Britain. Published the first peer-reviewed paper on cetaceans in Papua New Guinea waters.
2002 – 2004	Conducted Rapid Ecological Assessment of Marine Mammals in the Kimbe Bay, West New Britain area of PAPUA NEW GUINEA towards establishing a Marine Protected Area.
2004 – present	Co-Founder and Director of Punta Norte Orca Research, the only research project working on the well-recognised but little known orca of ARGENTINA, which intentionally strand ashore whilst hunting for sealions.
August 2001 and September 2002	Research assistant for ICELANDIC wild orca project. Research assistant for rehabilitation and release into the wild of the captive orca 'Keiko' (star of the movie *Free Willy*), in Iceland waters.
2011 – present	Scientific Advisor (and Co-Founder) of the Free Morgan Foundation. Facilitated, co-authored or authored various reports regarding rehabilitation and release of the captive orca known as 'Morgan'. Expert witness for Free Morgan Foundation in Netherlands Court, against Netherlands Government.

➢ ADDITIONAL RELEVANT ACTIVITIES & EXPERIENCE

International.
I have worked and lived extensively overseas (on all seven continents) and visited over 70 countries. I have worked in tropical areas during all seasons of the year and in the summer seasons of the extreme climates of Antarctica (as well as the sub-Antarctic islands) and the High Arctic. I have driven boats of various sizes, in all oceans of the world. Please request separate CV for more details.

Publishing & Media.
I have published scientific peer-reviewed papers as well as in 'popular' style format magazines (e.g., BBC Wildlife) and in book format (autobiography, children's books). I have worked with film crews to produce Public-Service-Announcements, documentaries, TV series episodes and segments for a wide range of TV shows. My photographs have been published in a wide range of media from magazines such as National Geographic to posters for education. My videos have been used in documentaries & TV shows around the world. Please request separate CV for more details.

Tourism & Educational Courses.
With over 20 years experience in the ecotourism industry, designing and implementing tours, I have been responsible for a wide variety of projects including private and bespoke guiding, small ship eco-cruising and larger scale popular cruises around the world. Generally these trips are conducted with a strong focus on cetacean and wildlife eco-tours. I have formulated and conducted various workshops and educational courses such as the 'Wild Whale Workshop' and 'Orca Camp' for educating the public. Please request separate CV for more details.

➢ NON-PROFIT ORGANISATIONS

I have founded or co-founded a number of NGO's (non-profit / non-Governmental organisations) to facilitate the dissemination of information, education and scientific findings to the public. Additionally, within some of the NGO's, there has been a focus on the conservation, welfare and rescue of cetaceans.

Organisation	Role	Founded	Tenure
Orca Research Trust (New Zealand) Non-profit organisation to facilitate research on orca Mission Statement: *"To protect orca & their habitat, through conservation, education & scientific research."* www.orcaresearch.org	Founder, Director, Principal Scientist	1998	16 years
Adopt an Orca (USA) (501 (c)3 status in USA) Adopt an Orca (New Zealand) (later merged with Orca Research Trust, New Zealand)	Founder	1998	16 years
Papua New Guinea Orca Research Project (Papua New Guinea) Establishing orca research in Papua New Guinea.	Founder, Director, Principal Scientist	2000	14 years
Punta Norte Orca Research (Argentina) Mission Statement: "*We are a non profit international organisation based on the Peninsula Valdés, Chubut, Argentina. Our mission is to scientifically study and better understand the unique population of orca in this area, including their distribution and foraging techniques. We seek to educate the public about these animals and their delicate environment."* www.pnor.org	Co-founder, Director, Principal Scientist	2004	10 years
Orca Research & Education Centre (New Zealand) To facilitate the Orca Research Trust, host students and researchers and promote collaboration at a National and International level. www.orcaresearch.org	Director, Principal Scientist, Facility Manager	2008	7 years
Whale Rescue (New Zealand) Mission Statement: "*Our specialised crew will respond to whales and dolphins in need of help, as quickly as possible and in a professional manner, whilst consulting with stakeholders.*" www.Whale-Rescue.org	Co-founder, Scientific Advisor	2010	4 years
Free Morgan Foundation (Netherlands) Working towards rehabilitation of a captive orca named Morgan and addressing issues of cetaceans in captivity www.freemorgan.org	Co-founder, Director, Scientific Advisor	2010	4 years
World Cetacean Alliance (International) Mission Statement: "*By working together, the organizations and individuals of the World Cetacean Alliance aim to conserve and protect cetaceans and their habitats in all of the world's oceans, seas and rivers. We acknowledge that cetaceans have the right to live free and in the wild.*" www.worldcetaceanalliance.org	Co-founding member, Global Council Co-chair (2015)	2013	2 years

➢ EXPERIENCE IN CETACEAN RESCUE/REHABILITATION/HUSBANDRY

1992 - present	Attended and coordinated more than 30 rescues of stranded whales and dolphins (in events involving up to 150 animals and over 200 personnel).
1998 – present	Instructor (and previous committee member) for Project Jonah, the largest whale and dolphin stranding rescue organisation in the world. Co-founder, Coordinator and Scientific Advisor of Whale Rescue, a "S.W.A.T."-like team of experienced cetacean rescuers.
Aug 2001, Sept 2002	Assisted the Keiko Reintroduction Team with longest 'at-sea' program for Keiko the orca (star of the *Free Willy* movie). Tasks at sea included food preparation and cleaning, behavioural observations and video recording, satellite tracking and observation of Keiko's interactions with wild killer whales.
Sept 2011	Assisted the 'Into the Blue' Born Free Foundation Reintroduction Team with reintroduction program for Tom & Misha (two bottlenose dolphins, removed from a backyard swimming pool). Tasks included food preparation and cleaning, behavioural observations and video recording, monitoring endoscopies and moving of dolphins within a seapen to alternative location.
2010- present	Conducted investigations of various captive cetacean facilities and produced reports regarding the conditions therein, primarily regarding orca. The focus has been on the lack of species-specific environmental enrichment and the stereotypic behaviours that manifest themselves as a result of stress from the dearth of enhancement of otherwise typically featureless tanks. Other topics have included (aggressive) and overtly sexual interactions between captive orca, poor facility conditions (e.g., space requirements for such a wide-ranging species). Documentation of poor dental condition of orca has been conducted.
2010- present	Prepared, consulted on or reviewed rehabilitation and release plans for captive cetaceans in preparation of their release (or long-term retirement/movement to a sanctuary). Attended various international workshops with a focus on this.
2012- present	Qualified for (and participated in) Large Whale Disentanglement rescues.

➢ ADDITIONAL SKILLS & EXPERIENCE

- Completed 52 000 sea miles via: Asia, Indian Ocean, Europe, Caribbean & Pacific on 17 m (57 ft) yacht during 4 ½ year world circumnavigation.
- PADI Diving Instructor, including specialty courses (note; no longer diving).
- Topside & underwater photographer and videographer.
- Qualified Skipper; Commercial Launch Masters ticket (qualified to captain any vessel up to 100 tons) and Surf Life Saving Inflatable Rescue Boat, operators ticket.
- Consultant, researcher and presenter for documentaries and TV.
- Spent years at sea aboard ships in remote locations, for research, diving and eco-tourism.

➢ SCIENTIFIC PUBLICATIONS
(NOTE: chronological, then alphabetical)
(see www.orcaresearch.org for copies)

Morin, P.A., Parsons, K.M., Archer, F.I., Ávila-Arcos, M.C., Barrett-Lennard, L.G., Dalla Rosa, L., Duchêne, S., Durban, J.W., Ellis, G., Ferguson, S.H., Ford, J.K., Ford, M., Garilao, C., Gilbert, M.T.P., Kaschner, K., Matkin, C.O., Petersen, S.D., Robertson, K.M., **Visser**, I.N., Wade, P.R., Ho, S.Y.W., Foote, A.D., (2015). Geographical and temporal dynamics of a global radiation and diversification in the killer whale. Molecular Ecology.

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Stockin, K. A., & **Visser**, I. N. (2005). Anomalously pigmented common dolphins (*Delphinus* sp.) off Northern New Zealand. *Aquatic Mammals, 31*(1), 43-51.

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Constantine, R., **Visser**, I., Buurman, D., Buurman, R., & McFadden, B. (1998). Killer whale (*Orcinus orca*) predation on dusky dolphins (*Lagenorhynchus obscurus*) in Kaikoura, New Zealand. *Marine Mammal Science*. 14, (2), 324-330.

Schneider, K., Baird, R. W., Dawson, S., **Visser**, I., & Childerhouse, S. (1998). Reactions of bottlenose dolphins to tagging attempts using a remotely-deployed suction-cup tag. *Marine Mammal Science*. 14, (2), 316-324.

➢ SCIENTIFIC CONFERENCE PRESENTATIONS & PUBLICATIONS (NOTE: chronological, then alphabetical)

Visser, I. N. (2015) 'Rescuing' Cetaceans: Compassionate conservation or just linking aquaria's corporate coffers? Compassionate Conservation Conference. Vancouver. 29-31 August, 2015.

Eisert, R. Lauriano, G., Panigada, S., Ovsyanikova, E.N., **Visser**, I.N., Ensor, P.H., Currey, R.J.C., Sharp, B.R. Pinkerton, M.H. (2015) Activity, seasonal site fidelity, and movements of Type-C killer whales between the Ross Sea, Antarctica and New Zealand. Report # WG-EMM 15/52. Prepared for Commission for the Conservation of Antarctic Marine Living Resources. Available from https://www.ccamlr.org/en/wg-emm-15/52.
Clemens, S.E., Dwyer, S. L., **Visser**, I.N., Mayorga, F., Stockin, K. A., (2013). A review of blue whales (*Balaenoptera musculus*) in the Hauraki Gulf, New Zealand. The 20thBiennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand. 9-13 December 2013.

Wilson, S, Oliphant-Stewart, R, Wakefield, J, **Visser**, I N, Fordyce, E, White, S, Slooten, E (2015) Skull ontogeny in respect to sexual dimorphism in the orca (*Orcinus orca*); a case study of nine individuals from one stranding. Conference Proceedings of the Society for Marine Mammalogists. San Francisco, CA 12-19 Dec, 2015.

Dwyer, S. L., **Visser**, I.N., Tezanos-Pinto, G., Meissner, A. M., Berghan, J., Stockin, K.A., (2013). Overlooking an important habitat within the known home range of a nationally endangered species: The case of bottlenose dolphins at Great Barrier Island, New Zealand. The 20thBiennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand. 9-13 December 2013.

Visser, I. N. (2013). Long-term survival of stranded & rescued New Zealand orca (*Orcinus orca*). Poster presented at the 20th Biennial Conference on the Biology of Marine Mammals. Society for Marine Mammalogy. Dunedin, New Zealand. 9-13 December 2013.

Zaeschmar, J. R., **Visser**, I. N., Dagmar, F., Dwyer, S. L., Meissner, A.M., Halliday, .J, Berghan, J., Donnelly, D. and Stockin K.A. (2013). False killer whales (*Pseudorca crassidens*) and their association with common bottlenose dolphins (*Tursiops truncatus*) off north-eastern New Zealand. The 20thBiennial Conference on the Biology of Marine Mammals, Dunedin, New Zealand. 9-13 December 2013.

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Rankmore, K., **Visser**, I.N., Martinez, E., Stockin, K.A. (2011). Factors affecting the occurrence and demographics of killer whales (*Orcinus orca*) in the Hauraki Gulf, New Zealand. *Proceedings of the 25th Annual Conference of the European Cetacean Society, Cadiz, Spain*. 21-23 March 2011.

Visser, I. N. (2007). Killer whales in Papua New Guinea waters (SC/59/SM20). 59th Annual meeting of the International Whaling Commission Scientific Committee. International Whaling Commission, Anchorage, Alaska. 28-31 May 2007.

Visser, I. N. (2007). Killer whales in New Zealand waters: Status and distribution with comments on foraging (SC/59/SM19). 59th Annual meeting of the International Whaling Commission Scientific Committee. International Whaling Commission, Anchorage, Alaska. 28-31 May 2007.

Visser, I. N., Berghan, J. and Norton, K. (2007). Killer whales of Antarctica; Details gathered via eco-tourism (SC/59/SM21). 59th Annual meeting of the International Whaling Commission Scientific Committee. International Whaling Commission, Anchorage, Alaska. 28-31 May 2007.

Visser, I. N., and Hardie, T. M. (2007). Close encounters of the killer kind. Unique deployment prospects with New Zealand killer whales. Animal Borne Imaging Symposium. National Geographic Society, Washington D.C., United States of America. 10-13 October 2007.

Stockin, K. A., & **Visser**, I. N. (2005). *A summary of anomalously pigmented common dolphins (Delphinus sp) off Northern New Zealand.* Paper presented at the 19th Annual Conference of the European Cetacean Society, La Rochelle, France. 2-7 April 2005

Visser, I. N. (2002). *Preliminary cetacean survey in Kimbe Bay, New Britain, Papua New Guinea.* Paper presented at the SEAMAM II. Second international conference on the marine mammals of Southeast Asia, Dumaguete City, Philippines, July 22-23, 2002.

Visser, I. N. (2002). *First photo-identification matches for Papua New Guinea killer whales.* Paper presented at the Fourth International Orca Symposium, Noirt, France. 23 - 28 September 2002.

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Berghan, J., & **Visser**, I. N. (2001). *Antarctic Killer Whale Identification Catalogue.* Paper presented at the 14th Biennial Conference on the Biology of Marine Mammals, Page 22. Vancouver, Canada. 28 November – 3 December, 2001.

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Visser, I. N., & Fertl, D. (2000). *Stranding of a New Zealand killer whale (Orcinus orca) and information on post-stranding sightings, including a probable boat strike of the individual.* Paper presented at the Proceedings of the fourteenth annual conference of the European cetacean society, Cork, Ireland, 2-5 April 2000.

Visser, I. N. (1998). *Killer whales (Orcinus orca) benthic foraging on rays in New Zealand waters.* Paper presented at the World Marine Mammal Science Conference (Society for Marine Mammalogy & European Cetacean Society), Monaco, 20-24 January 1998.

➤ SCIENTIFIC REPORTS (NOTE: chronological, then alphabetical)

Visser, I. N., (2013). Assessment of proposal "Proyecto Kshamenk". Confidential Unpublished report. p33. Commissioned by and submitted to Argentinean Government. April 2013.

Visser, I. N., (2012). Report on the physical & behavioural status of Morgan, the wild-born orca held in captivity at Loro Parque, Tenerife, Spain. (Unpublished Report for the Free Morgan Foundation, as supporting evidence in a court case). Available from www.freemorgan.org

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Visser, I. N. (2002). *Kimbe Bay Preliminary Cetacean Survey Report*: Unpublished report submitted to Walindi Plantation Resort and Mahonia na Dari Conservation and Research Centre, P.O. Box 4, Kimbe, West New Britain, Papua New Guinea.

➤ POPULAR STYLE PUBLICATIONS

2004	Autobiography: *Swimming with Orca; My life with New Zealand's killer whales*. Penguin Publishers, Auckland.
2001	Children's educational book (8-12 year olds) about orca, including text and photographs. *I love killer whales*. Wendy Pye Publishing Ltd, Auckland.
2001	Children's educational book (5-8 year olds), about orca, including text and photographs. *The Orca*. Reeds Children's Books, Auckland.
Various dates	Numerous popular articles for children's and adult magazines, including school magazines, dive magazines and nature magazines (see www.orcaresearch.org for examples).
Various dates	Numerous popular style articles for newspapers (see www.orcaresearch.org for examples).
Various dates	Photographs have appeared in National Geographic, BBC Wildlife, Ranger Rick, Taptoe, DiveLog, and various other magazines and books. (see www.orcaresearch.org for examples).
Various dates	Photographs for educational book (8-12 year olds) about whale strandings.

➤ EDUCATIONAL RECORD

1992 - 2000	Auckland University (New Zealand) PhD (Environmental & Marine Science). Thesis; Orca (*Orcinus orca*) in New Zealand waters
1990 - 1992	Auckland University (New Zealand) Masters of Science (Zoology). Thesis; Growth Rates of Commercial Oysters
1987 - 1990	Massey University (New Zealand) Bachelor of Science (Zoology) & 1st Year Veterinary Science
Pre 1987	Completed High School with University Entrance level gained (Correspondence School, New Zealand)

Annex 2

ANNEX 2-A (Camera A - wide angle)
VIDEO LOG OF BEHAVIOURS (Tokitae) - taken 20 Jan 2016, Miami Seaqurium

CAMERA_A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
night time	A013C252_160120RY_CANON			too dark to ascertain
night to dawn	A013C253_1601208C_CANON	22:00	logging	dawn, can start to see behaviours
	A013C253_1601208C_CANON	24:00	drift from west to south	
	A013C253_1601208C_CANON	28:30	logging	south-west
	A013C253_1601208C_CANON	37:00	head swaying	south, for 8 mins
	A013C253_1601208C_CANON	45:00	going after Lag?	
	A013C253_1601208C_CANON	46:50	head swaying	south, for 2 mins
	A013C253_1601208C_CANON	52:15	head swaying	south, for 10 mins
	A013C253_1601208C_CANON	1:03:15	logging	south, for 2 mins
	A013C253_1601208C_CANON	1:08:35	slow swimming/logging	
	A013C253_1601208C_CANON	1:15:35	head swaying	south, for 2:30mins
	A013C253_1601208C_CANON	1:19:50	logging	
	A013C253_1601208C_CANON	1:25:00	logging	
	A013C253_1601208C_CANON	1:29:19	logging	
	A013C253_1601208C_CANON	1:33:25	head swaying	
	A013C253_1601208C_CANON	1:36:44	going after Lag	west
	A013C253_1601208C_CANON	1:41:20	logging/headswaying	south-west
	A013C253_1601208C_CANON	1:51:30	head swaying	south
	A013C253_1601208C_CANON	1:54:08	submerged, stationary	south-west, for 3 mins
	A013C253_1601208C_CANON	1:57:37	logging	1:30 mins
	A013C253_1601208C_CANON	2:00:00	submerged, stationary	1:40mins
	A013C253_1601208C_CANON	2:01:40	logging	
	A013C253_1601208C_CANON	2:06:00	head swaying	
	A013C253_1601208C_CANON	2:08:40	logging	
	A013C253_1601208C_CANON	2:13:00	logging/headswaying	south-west, for 3 mins
	A013C253_1601208C_CANON	2:24:40	logging	south-west, for 2mins
	A013C253_1601208C_CANON	2:31:30	logging	south-west, for 2mins

CAMERA_A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight	A014C254_160120Y7_CANON	00:00	logging	south, for 2mins
	A014C254_160120Y7_CANON	4:12	logging	south, for 2mins
	A014C254_160120Y7_CANON	8:50	logging	south, for 2mins
	A014C254_160120Y7_CANON	12:10	logging	south
	A014C254_160120Y7_CANON	14:40	logging	south, for 2 mins
	A014C254_160120Y7_CANON	17:15	logging	south-west, for 3 mins
	A014C254_160120Y7_CANON	21:24	logging	south
	A014C254_160120Y7_CANON	26:10	logging	south-west
	A014C254_160120Y7_CANON	30:25	logging	south
	A014C254_160120Y7_CANON	33:48	logging	south
	A014C254_160120Y7_CANON	35:50	logging	south, for 2 mins
	A014C254_160120Y7_CANON	40:55	logging	south (video clip is 43 mins long)
daylight	A014C255_160120R9_CANON	3:00	logging	south
	A014C255_160120R9_CANON	8:37	head bobbing/small spyhops	south
	A014C255_160120R9_CANON	9:20	logging	south
	A014C255_160120R9_CANON	18:38	logging	south-west, for 2mins
	A014C255_160120R9_CANON	22:25	logging	south (video clip is 30 mins long)
daylight	A014C256_16012017_CANON	1:45	logging	south-west, for 2mins
	A014C256_16012017_CANON	5:24	logging	south
	A014C256_16012017_CANON	12:12	submerged, stationary	south
	A014C256_16012017_CANON	20:00	trainer orientated logging	east, for 3 mins
	A014C256_16012017_CANON	23:45	drift from south to west	
	A014C256_16012017_CANON	25:00	trainer orientated logging/head bobbing	north-east, for 7:30 mins
	A014C256_16012017_CANON	34:10	logging	centre of A tank

CAMERA_A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight, training	A014C257_160120J5_CANON	00:00	logging/headswaying/head bobbing	pre-training, north-west, for 3 mins
	A014C257_160120J5_CANON	24:23	going after Lag	post-training
	A014C257_160120J5_CANON	30:10	logging	post-training, south
	A014C257_160120J5_CANON	33:54	playing with wetsuit	
			trainer playing with wetsuit in Tokitae's	
	A014C257_160120J5_CANON	36:00	mouth	south
			slow swimming after trainer, stopped	
	A014C257_160120J5_CANON	38:00	playing with wetsuit	south to north
	A014C257_160120J5_CANON	38:42	picking up wetsuit	south-west
	A014C257_160120J5_CANON	39:00	logging besides wetsuit	south
	A014C257_160120J5_CANON	40:22	spyhopping, multible times	south
	A014C257_160120J5_CANON	42:24	picking up wetsuit	
	A014C257_160120J5_CANON	43:54	picking up wetsuit	south-west
	A014C257_160120J5_CANON	44:11	spyhopping, multible times	south-west
	A014C257_160120J5_CANON	44:54	trainer interaction with wetsuit & Tokitae	
	A014C258_160120TJ_CANON	2:13	submerged, stationary/logging	south-west, for 2mins
	A014C258_160120TJ_CANON	6:16	going after Lag	south
			logging/submerged, stationary/head	
	A014C258_160120TJ_CANON	8:34	bobbing	south-west, for 4 mins
	A014C259_160120LP_CANON	00:00	submerged, stationary	south-west, for 5 mins
	A014C259_160120LP_CANON	4:50	submerged, stationary	south
	A014C259_160120LP_CANON	5:40	logging	south
	A014C259_160120LP_CANON	6:30	submerged, stationary	south, for 3 mins
daylight, training	A014C260_160120KZ_CANON	00:00	head bobbing	pre-training, south, for 2 mins
	A014C260_160120KZ_CANON	3:23	trainercontact with tongue	
	A014C260_160120KZ_CANON	16:00	submerged, stationary	post-training, south

CAMERA_A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight, pre-show	A014C261_1601206X_CANON	00:00	submerged, stationary	south-west, for 3 mins
	A014C261_1601206X_CANON	3:40	logging	south
	A014C261_1601206X_CANON	4:00	submerged, stationary	south, for 3 mins
	A014C261_1601206X_CANON	6:40	logging/headbobbing	south
	A014C261_1601206X_CANON	7:53	going after Lag. aprupt behaviour change	
	A014C261_1601206X_CANON	8:40	submerged, stationary	south, for 3 mins
	A014C261_1601206X_CANON	12:00	logging	south
	A014C261_1601206X_CANON	13:00	small spyhops	south
	A014C261_1601206X_CANON	13:56	submerged, stationary/logging	south, for 3 mins
	A014C261_1601206X_CANON	17:58	taillobbing	pre-show, south-west
	A014C261_1601206X_CANON	19:15	submerged, stationary	pre-show, south
daylight, pre-show	A013C262_160120R3_CANON	00:00	submerged, stationary	pre-training, south, for 1:30 mins
	A013C262_160120R3_CANON	2:40	submerged, stationary	pre-show, south, for 1:30 mins
daylight, pre-show	A013C263_160120Z9_CANON	00:00	taillobbing	pre-show, south
	A013C263_160120Z9_CANON	0:50	logging	pre-show, east, for 4 mins
daylight, show	A013C264_160120FV_CANON	00:00	logging	pre-show, east, for 3 mins
	A013C264_160120FV_CANON	24:08	going after Lag, multible times	post-show
	A013C264_160120FV_CANON	25:15	logging	post-show, east
	A013C264_160120FV_CANON	26:14	going after Lag	post-show, east
	A013C264_160120FV_CANON	29:20	submerged, stationary	post-show, south
	A013C264_160120FV_CANON	30:57	submerged, stationary/logging	post-show, south, for 3 mins
	A013C264_160120FV_CANON	34:50	head bobbing	south to north

ANNEX 2-B (Camera B - closeup)
VIDEO LOG OF BEHAVIOURS (Tokitae) - taken 20 Jan 2016, Miami Seaqurium

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight	AA000201	00:00	slow swimming/small spyhop	south-west, for 2mins
	AA000201	2:00	submerged, stationary	south-west, for 3 mins
daylight	AA000202	00:00	submerged, stationary	south
	AA000202	1:25	logging/headswaying	south, for 2:30mins
	AA000202	4:00	submerged, stationary	south
daylight	AA000203	00:00	logging	south
	AA000203	1:45	slow swimming	south to north
			submerged, Lags approach, strong head	
	AA000203	3:20	swaying (against wall?)	west, for 2 mins
daylight	AA000204	00:00	logging	west to south
	AA000204	1:22	submerged, stationary	west, for 4:30 mins
	AA000204	4:50	logging	south-west
daylight	AA000205	00:00	logging	south
	AA000205	0:40	submerged, stationary	south, for 3 mins
	AA000205	3:40	logging	south
daylight	AA000206	1:30	going after Lag	
daylight	AA000207	00:00	submerged, stationary	south
	AA000207	0:58	logging	south-west, for 3 mins
	AA000207	4:05	submerged, stationary	south-west
daylight	AA000208	00:00	submerged, stationary	south, for 5 mins
daylight	AA000209	00:00	submerged, stationary	south
	AA000209	1:38	submerged, stationary/headswaying	south, for 3 mins
daylight	AA000210	00:00	submerged, stationary	south-west
	AA000210	1:28	logging	south-west, for 1:30 mins
	AA000210	3:02	submerged, stationary	south-west, for 2 mins
daylight	AA000211	0:12	logging	south-west, for 2 mins
	AA000211	2:05	submerged, stationary	south-west, for 2:30 mins
	AA000211	4:35	logging	south-west

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight	AA000212	0:10	submerged, stationary	south-west, for 2 mins
	AA000212	2:00	logging	south-west
	AA000212	3:15	submerged, stationary	south-west, for 2 mins
daylight	AA000213	00:00	submerged, stationary	south-west, for 1 min
	AA000213	1:02	logging	south-west, for 4 mins
daylight	AA000214	00:00	logging	south-west, for 2mins
	AA000214	1:54	going after Lag	
	AA000214	3:33	submerged, stationary	west, for 1:30 mins
daylight	AA000215	00:00	submerged, stationary	south-west, for 1 min
	AA000215	2:05	logging	south-west, for 2 mins
	AA000215	4:04	submerged, stationary	south-west, for 1 min
daylight	AA000301	00:00	submerged, stationary	south-west, for 3:30 mins
	AA000301	3:27	logging	south-west, for 1:30 mins
daylight	AA000401	00:00	submerged, stationary	south-west, for 1:30 mins
	AA000401	1:40	logging	south-west, for 3 mins
	AA000401	4:28	slow follow on Lags	
				south-west, for 4 mins *tail on
daylight	AA000402	00:00	logging	bottom example
	AA000402	3:56	submerged, stationary	south-west
daylight	AA000403	00:00	submerged, stationary	south-west
	AA000403	0:50	logging	south-west, for 2 mins
	AA000403	2:52	submerged, stationary	south-west, for 3 mins
daylight	AA000404	0:10	logging	south-west, for 2 mins
	AA000404	2:11	left eye closed	south
	AA000404	2:45	right eye closed, mucus	north
	AA000404	3:37	logging	south-west, for 1 min
	AA000404	4:52	displaced by Lag	
	AA000404	5:04	shadowed by Lag as she turns sharply	
daylight	AA000405	0:54	logging	south-west
	AA000405	1:54	submerged, stationary	south-west, for 1:30 mins
	AA000405	3:20	logging	south-west, for 1:30 mins

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
daylight	AA000406	00:00	logging	south-west
	AA000406	0:52	submerged, stationary	south-west, for 1:30 mins
	AA000406	2:17	logging	south-west, for 1:30 mins
	AA000406	3:40	submerged, stationary	south-west, for 1:30 mins
daylight	AA000407	00:00	submerged, stationary	south-west, for 1:45 mins
	AA000407	1:45	logging	south-west, for 1:30 mins
	AA000407	3:15	submerged, stationary	south-west, for 2 mins
daylight	AA000408	00:00	submerged, stationary	south-west, for 0:45 mins
	AA000408	0:45	logging	south-west, for 1:30 mins
	AA000408	2:27	submerged, stationary	south-west, for 1:30 mins
	AA000408	4:05	logging	south-west, for 1 min
daylight	AA000409	0:40	logging/headswaying	south-west, for 2:30 mins
	AA000409	3:20	slow follow of Lag	
	AA000409	3:34	submerged, stationary	south-west, for 1:45 mins
daylight	AA000410	00:00	submerged, stationary	south-west, for 0:45 mins
	AA000410	0:40	logging	south-west, for 1:30 mins
	AA000410	2:00	submerged, stationary	south-west, for 3 mins
daylight	AA000411	00:00	submerged, stationary	south-west
	AA000411	0:25	logging	south-west, for 1 min
	AA000411	1:23	submerged, stationary	south-west, for 4 mins
daylight	AA000412	00:00	submerged, stationary	south-west, for 0:45 mins
	AA000412	0:45	head bobbing/small spyhops	south-west, for 0:45 mins
	AA000412	1:30	logging	south-west, for 1 min
	AA000412	2:37	submerged, stationary	south-west, for 3 mins
daylight	AA000413	00:00	submerged, stationary/srong headswaying	south-west, for 5 mins
daylight	AA000414	0:15	logging	south-west, for 2 mins
	AA000414	2:00	submerged, stationary	south-west, for 2 mins
	AA000414	4:00	logging	south-west, for 1 min
daylight	AA000504	00:00	submerged, stationary	south-west, for 3:30 mins
	AA000504	3:52	submerged, stationary	south-west, for 1:30 mins
daylight, train	AA000505	00:00	submerged, stationary	south-west, for 0:45 mins

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
	AA000505	1:38	submerged, stationary	south-west, for 1 min
			trainer orientated logging/head swaying/small	
daylight	AA000507	00:00	spyhops	north-east, for 5 mins
			trainer orientated logging/head swaying/small	
	AA000508	00:00	spyhops	north-east, for 2 mins
			trainer orientaited slow circle swim around A	counterclockwise, start from north-
	AA000508	2:51	tank	east
	AA000508	3:21	logging	north, for 1 min
	AA000508	4:53	smal spyhops	north
daylight, train	AA000509	0:17	logging	north, for 2 min
	AA000509	2:22	high head out (tail on bottom of tank)	near west perimeter
	AA000509	2:27	high head swaying	
	AA000509	2:37	high head out (tail on bottom of tank)	near west perimeter
				preparing her for blood-sample in B
	AA000509	5:00		tank
daylight, train	AA000510	00:00		takeing bloodsample
				trainer having mouth contact with
	AA000510	3:23		Tokitae's tongue
	AA000510	4:33		exhale sample taken
daylight, train	AA000511	0:55		teeth sample taken
	AA000511	1:34		teeth sample taken
	AA000511	2:52		exhale sample taken
	AA000511	3:14		exhale sample taken
	AA000511	3:49		teeth inspection (upper jaw)
				pec inspection, palpation of stomach
	AA000511	4:25		area
				pec inspection, palpation of stomach
daylight	AA000512	00:00		area
	AA000512	1:38		teeth inspection (lower jaw)
	AA000512	2:06	defecation	
	AA000512	3:03		trainer has hand-contact with feces

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
	AA000512	3:30		feeding with contaminated fish
daylight	AA000513	0:45		teeth inspection (lower jaw)
	AA000513	3:26	going after Lag	
	AA000513	4:58	submerged, stationary	south-west
daylight	AA000514	3:40	slow swimming	getting hosed, north-west to south-west
daylight	AA000515	00:00		getting hosed on genital area
	AA000515	2:27	playing with wetsuit	trainer throws wetsuit on her back
	AA000515	4:33	playing with wetsuit	trainer plays with wetsuit in Tokitaes mouth
daylight	AA000516	00:00	playing with wetsuit	trainer plays with wetsuit in Tokitaes mouth
daylight	AA000701	1:34	playing with wetsuit	
	AA000701	2:41		getting hosed on genital area
	AA000701	3:55		getting hosed on belly
daylight	AA000702	00:00	playing with wetsuit	south-west, for 1 min
	AA000702	1:30	playing with wetsuit	
	AA000702	1:45	head bobbing	middle A tank, for 1 min
	AA000702	3:35		feeding her ice
	AA000702	4:34	submerged, stationary	south-west
daylight	AA000703	00:00	submerged, stationary	south-west, for 3:45 mins
	AA000703	4:11	logging	south-west, for 1 min
daylight	AA000704	00:00	logging	south-west
	AA000704	0:18	submerged, stationary	south-west, for 3 mins
	AA000704	4:28	logging	south-west
	AA000704	4:57	submerged, stationary	south-west
daylight	AA000705	00:00	submerged, stationary	south-west, for 1 min
	AA000705	1:16	spyhopping	south-west
	AA000705	1:40	submerged, stationary	south-west
	AA000705	2:00	head bobbing/small spyhops	south-west, for 2:30 mins
	AA000705	4:23	submerged, stationary	south-west, for 1 min
daylight	AA000706	1:03	submerged, stationary	south-west, for 4 mins
daylight	AA000707	00:00	submerged, stationary	south-west, for 1 min

CAMERA_B	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT
	AA000707	1:49	logging	south-west, for 1 min
	AA000707	2:43	submerged, stationary	south-west, for 2:30 mins
daylight, train	AA000708	0:20	head bobbing/small spyhops	south-west, for 2 mins
	AA000708	3:36		trainer having mouth contact with Lolitas tongue
daylight, train	AA000711	00:00	submerged, stationary	west, for 4:30 mins
	AA000711	4:58	submerged, stationary	west
daylight	AA000712	00:00	submerged, stationary	west, for 2:30 mins
	AA000712	2:28	logging/headbobbing	south-west, for 1 min
	AA000712	3:35	going after Lag	
	AA000712	4:02	submerged, stationary	south-west, for 1 min
daylight	AA000713	00:00	submerged, stationary	south-west, for 2 mins
	AA000713	2:25	logging/spyhoping	south-west, for 2 mins
	AA000713	4:20	submerged, stationary	south-west
daylight	AA000714	00:00	logging	south-west, for 1:30 mins
	AA000714	1:27	submerged, stationary	south-west
	AA000714	3:15	tail lobbing	south-west
	AA000714	5:00	submerged, stationary	south-west
daylight, shov	AA000801	00:00	submerged, stationary	south-west, for 2 mins
	AA000801	2:24	submerged, stationary	south-west
	AA000801	3:48	submerged, stationary	south-west, for 1:30 mins
daylight, shov	AA000802	0:10	spyhopping, multiple times	south
	AA000802	0:55	tail lobbing	south
	AA000802	1:50	logging	east, for 3 mins
daylight, shov	AA000803	00:00	logging	east, for 3:30 mins
daylight, shov	AA000807	3:46	going after Lag, multiple times	pre-show
daylight	AA000808	0:39	going after Lag, multiple times	pre-show
daylight	AA000809	0:26	logging	south-west
	AA000809	1:43	logging/headbobbing	south-west, for 1 min
	AA000809	3:43	slow swimming	south to north

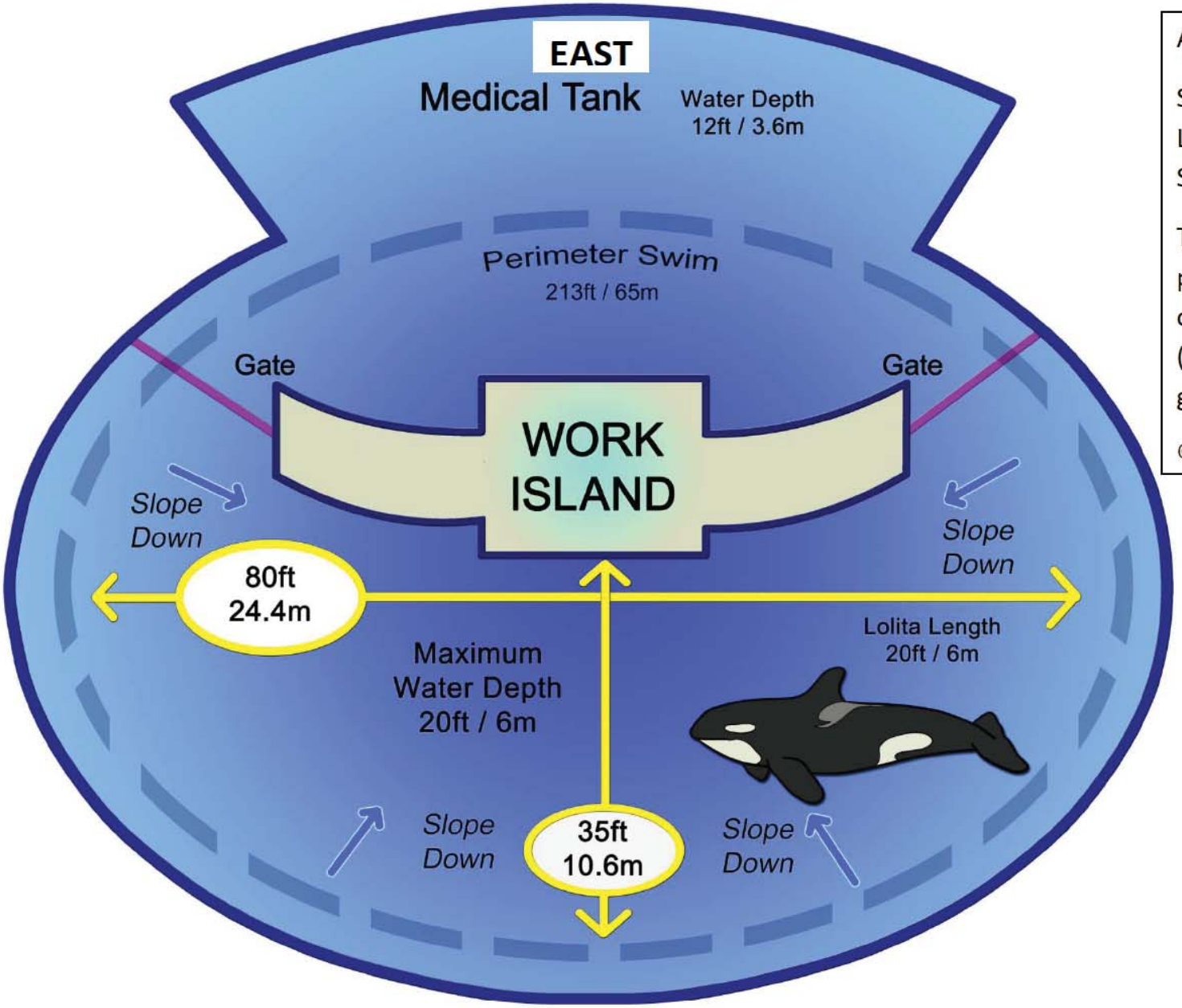
ANNEX 2-C (# of laps, from video on Camera A)
VIDEO LOG OF BEHAVIOURS (Tokitae) - taken 20 Jan 2016, Miami Seaqurium

CAMERA A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT	Laps in tank_A	Laps in tank_B
night to dawn	A013C253_1601208C_(	28:04	swimming	half lap, tank A	0.5	
	A013C253_1601208C_(	44:57	swimming	2 laps, tank A	2	
	A013C253_1601208C_(	1:02:12	swimming	quarter lap, tank A	0.25	
	A013C253_1601208C_(	1:05:09	swimming	half lap, tank A	0.5	
	A013C253_1601208C_(	1:06:54	swimming	quarter lap, tank A	0.25	
	A013C253_1601208C_(	1:08:32	swimming	half lap, tank A	0.5	
	A013C253_1601208C_(	1:21:00	swimming	half lap, tank A	0.5	
	A013C253_1601208C_(	1:22:22	swimming	quarter lap, tank A	0.25	
	A013C253_1601208C_(	1:36:38	swimming	3.5 Laps, tank A	3.5	
	A013C253_1601208C_(	2:19:08	swimming	2 laps, tank A	2	
daylight	A014C254_160120Y7_(	10:57	swimming	1 lap, tank A	1	
	A014C254_160120Y7_(	35:11	swimming	half lap, tank A	0.5	
	A014C254_160120Y7_(	38:26	swimming	quarter lap, tank A	0.25	
daylight	A014C256_16012017_(	17:55	swimming	trainer present, half lap, tank A	0.5	
	A014C256_16012017_(	19:46	swimming	trainer present, quarter lap, Tank B		0.25
	A014C256_16012017_(	23:03	swimming	1 lap, tank A	1	
	A014C256_16012017_(	32:53	swimming	half lap, tank A	0.5	
daylight	A014C257_160120J5_C	3:07	swimming	training, half lap, tank A	0.5	
	A014C257_160120J5_C	4:05	swimming	training, half lap, tank B		0.5
	A014C257_160120J5_C	09:03	swimming	training, half lap, tank A	0.5	
	A014C257_160120J5_C	19:30	swimming	trainer present, half lap, tank A	0.5	
	A014C257_160120J5_C	19:49	swimming	trainer present, half lap, tank A	0.5	
	A014C257_160120J5_C	23:33	swimming	trainer present, half lap, tank A	0.5	
	A014C257_160120J5_C	24:22	swimming	1.5 laps, tank A	1.5	
	A014C257_160120J5_C	27:00	swimming	trainer present, 1 lap, tank A	1	
	A014C257_160120J5_C	28:34	swimming	1 lap, tank A	1	
	A014C257_160120J5_C	29:44	swimming	half lap, tank A	0.5	

CAMERA A	FILE NAME	TIME CODE	BEHAVIOUR	COMMENT	Laps in tank_A	Laps in tank_B
	A014C257_160120J5_C	33:54	swimming	trainer present/wetsuit on her back, 1 lap, tank A	1	
	A014C257_160120J5_C	38:43	swimming	quarter lap, tank A	0.25	
	A014C257_160120J5_C	41:43	swimming	half lap, tank A	0.5	
	A014C257_160120J5_C	45:16	swimming	trainer present, quarter lap, tank A	0.25	
daylight	A014C258_160120TJ_C	06:17	swimming	half lap, tank A	0.5	
daylight	A014C260_160120KZ_(	2:22	swimming	trainer present, half lap, tank A	0.5	
	A014C260_160120KZ_(	06:35	swimming	trainer present, half lap, tank A	0.5	
	A014C260_160120KZ_(	14:00	swimming	trainer present, quarter lap, tank A	0.25	
	A014C260_160120KZ_(	15:15	swimming	quarter lap, tank A	0.25	
daylight	A014C261_1601206X_(	7:53	swimming	1 lap, tank A	1	
daylight, show	A013C263_160120Z9_(	0:33	swimming	trainer present, half lap, tank B		0.5
daylight, show	A013C264_160120FV_(	3:44	swimming	trainer present, 1 lap, tank A	1	
	A013C264_160120FV_(	7:21	swimming	trainer present, half lap, tank A	0.5	
	A013C264_160120FV_(	14:18	swimming	trainer present, 1 lap, tank A	1	
	A013C264_160120FV_(	17:16	swimming	trainer present, 1 lap, tank A	1	
	A013C264_160120FV_(	18:18	swimming	trainer present, 1 lap, tank A	1	
	A013C264_160120FV_(	19:25	swimming	trainer present, half lap, tank A	0.5	
	A013C264_160120FV_(	21:54	swimming	trainer present, half lap, tank B		0.5
	A013C264_160120FV_(	22:40	swimming	trainer present, quarter lap, tank A	0.25	
	A013C264_160120FV_(	24:07	swimming	3 laps, tank A	3	
	A013C264_160120FV_(	26:11	swimming	3.5 Laps, tank A	3.5	
					37.25	**1.75**

Trainer present	5.25	1
Trainer present in show	11.25	1.25

Annex 3



ANNEX 3.

Schematic of the orca Lolita/Tokitae's tank, Miami Seaquarium, Florida.

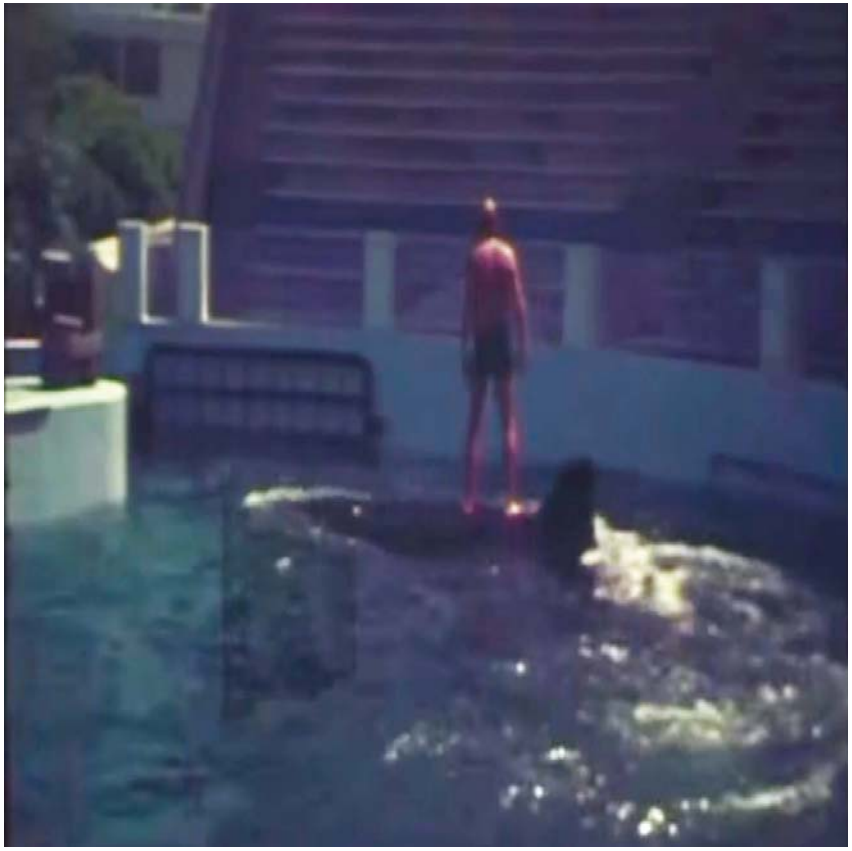
The dotted line inside the larger part of the tank indicates the circumference of a ~215 ft (65m) 'perimeter swim', if both gates were left open.

SOUTH

Annex 4

ANNEX 4. Images showing the water level fluctuations as indicated in the Behavioural Records. Left = screen shot @ 00.02 mins from plaintiff's video (file number A014C258_160120TJ_CANON) at, taken 20 Jan 2016. Right = screen shot @ 07.09.44 from undated (circa 1980's) sourced from the internet (https://www.youtube.com/watch?v=oulOgt4lIc0, last accessed 20160206).

Of note is the gate which is not visible on the left, but which is clearly visible on the right. The glass barrier around the perimeter of the tank gives a good visual reference as to the scale in each image as the cameras were on slightly different angles and lenses.



Annex 5

ANNEX 5. Screen shots from 'vintage' (circa 1980's) video accessed online at https://www.youtube.com/watch?v=oulOgt4lIc0 (last accessed on downloaded 20160206). Trainers have inappropriately trained Pacific white-sided dolphins to ride on the back of Tokitae. Furthermore, they also trained her to swim inverted and for a dolphin to 'mount' Tokitae and whilst doing so use pelvic thrust in a copulatory-like behaviour.

Above: Dolphin riding on Tokitae's dorsal surface, behind trainer

Below: Dolphin riding on Tokitae's dorsal surface, in front of dorsal fin

Above: Dolphin attempting to mount onto Tokitae's ventral surface, with a trainer

Below: Dolphin riding on Tokitae's ventral surface, *sans* trainer

Annex 6

ANNEX 6. ORGANISMS (alphabetically) ISOLATED FROM TOKITAE (Miami Seaquarium)

with **[BATES #'s from Miami Seaqarium's discovery documents]** – *as compiled by Dr Ingrid N. Visser*

minimum # of pathogens _n_ = 39*

*not including the forms of bacteria described as; 'super bug' *Staphylococcus aureus* (MRSA) (Methicillin-resistant *S. aureus*), *Escherichia coli* Sp#2, *Escherichia coli* (Resistant), or *Staphylococcus sp.* (CoNS) (Coagulase-negative)

(NOTE: compare to ANNEX 7, organisms isolated from captive orca other than Tokitae (_n_ = 16) cf wild orca (_n_ = 5))

Acinetobacter baumannii (bacteria) 09 Feb 2012 **[BATES# MSQ0000692-R]**

Aeromonas hydrophilla (bacteria) 10 Jan 2014 **[BATES# MSQ0000386-R]**

Aspergillus sp. (fungus) undated **[BATES# MSQ0003750-R]**

Bacillus (bacteria) 20 Dec 2002 **[BATES # MSQ0003756-R]**

Burkholderia cepacia (bacteria) 12 Sep 2012 **[BATES# MSQ0000804-R]**

Candida albicans (fungus / yeast) 18 May 2012 **[BATES# MSQ0000600-R]**

Candida fennigen (fungus / yeast) 28 Feb 2008 **[BATES # MSQ0003767-R]**

Candida tropicalis (fungus / yeast) 01 Jul 2014 **[BATES# MSQ000389-R]**

Candida palmioleophila (fungal pathogen) 12 Jun 2012 **[BATES# MSQ0000417-R]**

Candida parapsolis (fungus / yeast) 30 Nov 2010 **[BATES # MSQ0003772-R]**

Chlamydia sp. (bacteria) undated **[BATES# MSQ0003750-R]**

Ciliates (protozoa) 19 Dec 2006 **[BATES # MSQ0003765-R]**

Clostridium species 04 Jun 2002 **[BATES # MSQ0003754-R]**

Corynebacter sp. (bacteria) 29 Feb 2012 **[BATES# MSQ0000680-R]**

Coccidiodomycosis (fungal pathogen) 12 Jul 2012 **[BATES# MSQ0000424-R]**

Citrobacter freundii (bacteria) 27 Jun 2012 **[BATES# MSQ0000564-R]**

Edwardsiella tarda (bacteria) 06 Mar 2012 **[BATES# MSQ0000678-R]**

Enterobacter agglomerans (bacteria) 6 Feb 2014 **[BATES# MSQ0001567]**

Enterobacter cloacae (bacteria) 21 Apr 2012 **[BATES# MSQ0000629-R]**

Enterococcus sp. (bacteria) 14 Dec 2012 **[BATES# MSQ0000413-R]**

Erysipelothrix rhusiopathiae (bacteria) (Bossart & Eimstad, (1988). *Erysipelothrix vesicular* glossitis in a killer whale (*Orcinus orca*). *Journal of Zoo Animal Medicine,* 19**,** 42-47

Escherichia coli (bacteria) (Sp. #1) 14 Dec 2012 **[BATES# MSQ0000818-R]**

Escherichia coli (bacteria) (Sp. #2) 13 Jan 2012 **[BATES# MSQ0000698-R]**

Escherichia coli (RESISTANT) 01 May 2015 **[BATES # MSQ0003790-R]**

Hepatitis-B (virus) (Bossart et al (1990). Hepatitis B-like infection in a Pacific white-sided dolphin. *Journal of the American Veterinary Medical Association,* 196)

Klebsiella pneumonia (bacteria) 09 Feb 2012 **[BATES# MSQ0000564-R]**

Leptosphaerulina sp (trifolii) (fungal plant pathogen) 12 December 2012 **[BATES# MSQ0000414-R]**

Morbillivirus sp. (virus) undated **[BATES# MSQ0003750-R]**

Morganella morganii (bacteria) 15 May 2012 **[BATES# MSQ0000603-R]**

Papillomavirus (cutaneous) 21 September 2015 **[BATES #MSQ0001251]**

Poxvirus (virus) 30 Jul 2013 **[BATES # MSQ0003783-R]**

Proteus mirabilis (bacteria) 20 Feb 2012 **[BATES# MSQ0000684-R]**

Plesiomonas shigelloides (bacteria) 31 Jan 2012 **[BATES# MSQ0000694-R]**

Pseudomonas aeruginosa (bacteria) 13 Mar 2012 **[BATES# MSQ0000670-R]**

Pseudomonas fluorescens (bacteria) 07 Feb 2012 **[BATES# MSQ0000693-R]**

Shewanella putrefaciens (bacteria) 26 Apr 2012 **[BATES# MSQ0000620-R]**

Staphylococcus aureus (bacteria) 30 Mar 2012 **[BATES# MSQ0000657-R]**

Staphylococcus aureus (MRSA) ('superbug' bacteria) 07 Feb 2012 **[BATES# MSQ0000693-R]**

Staphylococcus sp. (CoNS) (Coagulase-negative) 23 Jun 2012 **[BATES# MSQ0000572-R]**

Stenotrophomonas maltophilia (bacteria) 10 Jan 2014 **[BATES# MSQ0000386-R]**

Trichosporon beigelii (fungus / yeast) 14 Feb 2014 **[BATES# MSQ0001578]**

Torulopsis candida (fungus / yeast) {NOTE: renamed as *Candida glabrata*} 26 May 2012 **[BATES# MSQ0000592-R]**

Vibrio alginolyticus (bacteria) 25 Apr 2012 **[BATES# MSQ0000621-R]**

Vibrio (marine sp) (bacteria) 23 Jan 2012 **[BATES# MSQ0000695-R]**

NOTES:

Samples collected variously from: Exhale, Vagina, Tooth, Lower Jaw, Fecal, Stomach, but only one BATES# from each organism (and one from each variation) is listed here.

Entries from the Health Record summary not listed above due to insufficient details:

resistant bacteria (26 Feb 2011) **[BATES # MSQ0003773-R]**

resistant microbes (2 Mar 2011) **[BATES # MSQ0003774-R]**

"cus" cultured on exhale (17 Oct 2013) **[BATES # MSQ0003784-R]**

Annex 7

ANNEX 7. INFECTIOUS DISEASES in ORCA as reported in the literature (captivity *vs* wild).

Wild (*n* = 5), Captivity (*n* = 17).

Notes; 3 bacteria & 1 viruses (from Tokitae) had previously been found in the wild, but not captivity (full row shaded).

Pathogens reported in other captive orca **and** cultured in Tokitae are indicated by shading species cell (***n* = 2**)

A *further* ***32 pathogens have been cultured exclusively*** *from Tokitae* but not listed here (see Annex 8 for details).

PATHOGEN	CAPTIVITY	WILD	LOCATION IDENTIFIED	NOTES	SOURCE
BACTERIA					
Brucella spp.		WILD	Northeastern Atlantic Pacific		(Jepson et al., 1997) (Dunn et al., 2001) (Raverty et al., 2004)
Burkholderia pseudomallei	CAPTIVITY				*(Hicks et al., 2000)*
Clostridium sp.	**CAPTIVITY**		**Maimi Seaqarium, USA** Seattle Public Aquarium / unreported	**Tokitae / Lolita**	**[BATES # MSQ0003754-R]** *(Griffin and Goldsberry, 1968)* *(Greenwood and Taylor, 1978)*
Clostridium perfringens	CAPTIVITY				*(Walsh et al., 1994)*
Edwardsiella tarda	**CAPTIVITY**	WILD	**Maimi Seaqarium, USA** Wild = Northeastern Pacific	**Tokitae / Lolita**	**[BATES# MSQ0000678-R]** Wild = (Ford et al., 2000)
Erysipelothrix rhusiopathiae	**CAPTIVITY**	WILD	**Maimi Seaqarium, USA**	**Tokitae / Lolita** (wild case resulted in death)	**(Bossart and Eimstad, 1988)** Wild = (Young et al., 1997)
Nocardia asteroides	CAPTIVITY				(Sweeney et al., 1976)
Nocardia otitidiscaviarum	CAPTIVITY				(Dunn et al., 2001)
Pseudomonas aeruginosa	**CAPTIVITY**	WILD	**Maimi Seaqarium, USA** Wild = Avacha Gulf, Kamchatka, Russia	**Tokitae / Lolita** Wild, caused abscessing pneumonia & death	**[BATES# MSQ0000670-R]** Wild = (Rozanova et al., 2007)
Salmonella sp.	CAPTIVITY				(Colegrove et al., 2010, Ridgway, 1979)
Salmonella sp.	CAPTIVITY				(Ridgway, 1979)
Streptococcus sp., beta-hemolytic	CAPTIVITY				(Greenwood and Taylor, 1985)

VIRUS	CAPTIVITY	WILD	LOCATION IDENTIFIED	NOTES	SOURCE
Cetacean pox virus (Orthopoxvirus)	**CAPTIVITY**	WILD	**Maimi Seaqarium, USA** Wild, not reported	**Tokitae / Lolita**	**[BATES # MSQ0003783-R]** (van Bressem and Gaspar, 1999)
Cutaneous papilloma virus	CAPTIVITY				(Bossart et al., 1996)
Flavivirus St. Louis Encephalitis Virus	CAPTIVITY		SeaWorld Orlando, Florida, USA		(Jett and Ventre, 2012) (Buck et al., 1993)
Flavivirus West Nile virus	CAPTIVITY		SeaWorld San Antonio, Texas, USA	nonsuppurative encephalitis	(St. Leger et al., 2011)
Papillomavirus (cutaneous)	CAPTIVITY		**Maimi Seaqarium, USA** Reino Ventura, Mexico (captured from Iceland)	**Tokitae / Lolita** Tumors (warts) Keiko (axis)	**[BATES #MSQ0001251]** (Bossart et al., 1996, Greenwood et al., 1974) (Cornell, 1993)
Papillomavirus (genital)	CAPTIVITY			On penis	(Greenwood et al., 1974)

FUNGI	CAPTIVITY	WILD	LOCATION IDENTIFIED	NOTES	SOURCE
Aspergillus fumigatus	CAPTIVITY				(Reidarson et al., 1999)
Candida sp.	CAPTIVITY		SeaWorld San Diego		Cornell, (1975) (Sea World, Inc, San Diego) *pers. comm. in* Sweeney & Ridgeway (1975)
Candida alibicans	CAPTIVITY		**Maimi Seaqarium, USA** Other aquariums not stated	**Tokitae / Lolita**	**[BATES# MSQ0000600-R**] (Greenwood and Taylor, 1985); (Ridgway, 1979); Sweeney et al. (1976)
Saksenaea vasiformis	CAPTIVITY				Reidarson et al. (1999)

SUSPECTED (no virus isolated)	CAPTIVITY	WILD	LOCATION IDENTIFIED	NOTES	SOURCE
Influenza	CAPTIVITY				(Ridgway, 1979)
Varicella	Not stated			Herpes Zoster (shingles)	(Greenwood et al., 1974)

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Annex 8

ANNEX 8. EXCLUSIVE ORGANISMS (alphabetically) ISOLATED FROM TOKITAE (Miami Seaquarium)

with **[BATES #'s from Miami Seaqarium's discovery documents]** – *as compiled by Dr Ingrid N. Visser*

minimum # of pathogens _n_ = 32*

***not including the forms of bacteria described as; 'super bug' *Staphylococcus aureus* (MRSA) (Methicillin-resistant *S. aureus*), *Escherichia coli* Sp#2, *Escherichia coli* (Resistant), or *Staphylococcus sp.* (CoNS) (Coagulase-negative)

(NOTE: compare to ANNEX 7, organisms isolated from captive orca other than Tokitae (_n_ = 16) cf wild orca (_n_ = 5))

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Bacillus (bacteria) 20 Dec 2002 **[BATES # MSQ0003756-R]**

Burkholderia cepacia (bacteria) 12 Sep 2012 **[BATES# MSQ0000804-R]**

Candida fennigen (fungus / yeast) 28 Feb 2008 **[BATES # MSQ0003767-R]**

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Escherichia coli (RESISTANT) 01 May 2015 **[BATES # MSQ0003790-R]**

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