Assessment of situation of *Kiska*, an orca, held at Marineland, Niagara Falls, Ontario, Canada.

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1. I have visited Marineland of Canada (hereafter referred to as Marineland), situated on Portage Road, Niagara Falls, Ontario, Canada on the following dates: 26, 28 and 29 July 2015. I opportunistically photographed (Canon D5 MkIII camera with an 80-200 lens) and videoed (same camera and also a GoPro miniature, wide angle HD video camera) *Kiska* during these visits. I was only permitted access into the public areas during public viewing times. I have also reviewed extensive video and photographs available online (and supplied to me by concerned citizens), of *Kiska*.

2. I am qualified to make the following statements due to *inter alia*, the following;
a) I have been researching wild orca (also known as killer whales, *Orcinus orca*) since 1992, and continue to do so, to the present day. During this time I have gained a PhD through studying the New Zealand population. I have field experience with these animals, not only in New Zealand, but also in Antarctica, Argentina, Australia, the Pacific West Coast of North America (both USA and Canada), Kamchatka (Russia) and Papua New Guinea.

b) My research focuses on a number of different aspects of orca. This is *inter alia* the foraging ecology and social interactions of these top predators. I have published a number of papers looking at different foraging methods, some of which I list here; (Constantine et al. 1998; Sorisio et al. 2006; Visser 1999, 2000; Visser et al. 2000; Visser 2005; Visser et al. 2008; Visser et al. 2010). The full citation reference for each is listed at end of this statement. These references include reports of orca foraging on rays, sharks, other marine mammals (seals, dolphins, whales) and various other prey items (such as penguins and fish). To gather much of this data I spend a considerable amount of time on and in the water with wild orca and regularly observe the teeth of said animals. I am often within a body length of the orca whilst they are hunting and feeding.

c) My research uses a number of methodologies, one of which is standard for field-work with wild cetaceans (whales, dolphins, porpoises) termed photo-identification (photo ID). It is based on the fact that each and every cetacean, including orca, has unique features that allow for identification of the individual. In the case of orca the black/white/grey pigmentation patterns are unique and these do not change dramatically during the lifetime of an individual. For example, the 'eye patch' (the white on the side of the head) remains unchanged from birth to death (see (Visser and Mäkeläinen 2000) for details). Photo ID allows individuals to be tracked over time and from location to location.

d) In addition to the above research papers, I have spent seven seasons in Argentina researching the population of orca which strand onto the beach to take sea-lions. Additionally, I worked with "Keiko" (of Free Willy fame), during the process of releasing him back into the wild, in Iceland. This included feeding, husbandry and in-water as well as open-ocean training sessions.

e) Furthermore, I have spent time observing captive orca at the following facilities around the world (i.e., ; (listed alphabetically, by country); Argentina (Mundo Marino), France (Marineland Antibes),

Japan (Kamogawa SeaWorld, Port of Nagoya Public Aquarium), Spain (Loro Parque), United States of America (Miami Seaquarium, SeaWorld Orlando, SeaWorld San Diego). This is eight of the nine facilities that currently have orca on display, in Japan, Europe and the Americas. I have also visited the facility Dolfinarium Harderwijk (in the Netherlands) a number of times, when they previously held a lone orca.

f) I have documented the behaviour, teeth and body conditions of orca at all of these facilities.

g) I have been involved in (at various capacities) numerous rescues of cetaceans. I hold New Zealand Government recognized qualifications to conduct these rescues. These rescues have included disentanglements and strandings but post rescue I have also conducted a number of necropsies (animal autopsies) and completed 1st Year Veterinary medicine at Massey University (New Zealand) which assisted with my understanding of body condition and assessment of necropsies.

3. With this information to establish my credibility as an expert in the field of orca, both in the wild and in captivity, I will elaborate on the situation of *Kiska* at Marineland. This is with the acknowledgement that I have viewed *Kiska* on only three days in June 2015, but that I have also drawn on the numerous videos and photographs of this animal, available online. As such this assessment is not a medical evaluation, but rather a valid opinion and evaluation that is based on extensive experience.

4. *Kiska* is the only orca held at Marineland. Therefore, no mistake can be made with regards to identifying her whilst on location. With regards to videos and photographs from online and other sources, *Kiska* can be positively identified as an individual based on the method of photo-ID described above. She has a number of small black 'freckles' on her lower jaws which are visible and these are unique to her. Her eye patches have variation in their anterior edge which are clearly visible and these differ between the left and right side and are unique to her.

5. *Kiska*'s dorsal fin has a number of small notches of unknown origin, located along the trailing (posterior) edge. These are unique to her. Additionally, her dorsal fin show some loss of structural integrity and is visible from most angles.

6. Additionally, *Kiska*'s teeth are very badly damaged and most are worn to the gums. Although this is not unique to *Kiska*, such extensive damage does assist even the casual observer with narrowing down the potential images and video found online and from there assisting in her identification.

7. Furthermore, the facility, Marineland Canada has features, of the tank that holds *Kiska,* that are unlike any other facility in the world (i.e., a 'drainage grill' around the edges of the tank, a sloping red/brown brick edge (compared to the more typical glass front), accessibility to the tank edge by the public) which allow for positive identification of the site.

8. a) It should be noted that loss of structural integrity of the dorsal fin (to the point of total collapse) is an inherent issue with all adult male orca in captivity (i.e., 100%) showing near or total dorsal fin collapse, whereby the fin is completely folded over to one side), whilst in the wild these large (up to 1.8 m high) appendages have only been reported as collapsed in less than 1% of wild orca (and those individuals are typically found to be ill or have suffered some sort of trauma).

b). Loss of structural integrity also occurs in a great number of captive female orca including *Kiska* (Figure 1). The collapsed (or collapsing) dorsal fins found in captive orca are highly visible consequences of captivity and as such are oft questioned aspect by the public. Unfortunately, the captivity industry chooses to be duplicitous in their dealings about the structural integrity of an orca's dorsal fin. As such, it is often disputed by the captivity industry as *not* an indicator of health (i.e., collapsed or collapsing fins do not indicate ill-health). However, despite these claims, the structural integrity of the dorsal fins of orca *is* viewed as such by field biologists who regularly observe wild, healthy orca. That is, to field biologists, should the structural integrity of an orca's dorsal fin fail, this is an indicator that some part of the animals health has been compromised (be it an injury, a temporary illness or the onset of chronic disease). Durban et al (2009) report on 13 wild orca who showed "peanut-head" (see separate paragraph pertaining to that topic) combined with compromised dorsal fin structural integrity and they found that three (23%) of those individuals subsequently died.

Figure 1. *Kiska*'s dorsal fin, showing loss of structural integrity with a partial collapse to her left. The dark patch in the water near her blowhole is a reflection from her body. Photo © Ingrid N. Visser / Orca Research Trust (taken 20150626).

b). I have published about the structural integrity of dorsal fins on wild orca, including abnormalities such as partial and complete collapse (Visser 1998).

c). In my professional opinion the partial loss of structural integrity of *Kiska*'s dorsal fin, is an symptom of captivity and indicates that at some time *Kiska*'s health was ailing.

9. a). I have been presented with photographs comparing the area behind *Kiska*'s blowhole, which at the time the one in question was taken (27 July 2014, Figure 2, right image), showed clear evidence of a depression anterior to the cranium. Such a depression is indicative of a cetacean that is emaciated (abnormally thin or weak, especially because of illness or a lack of food). It is commonly termed "peanut-head" (including by biologists) due to the similarity in shape to an unshelled peanut. Peanut-head becomes discernible if the layer of blubber that lies over the dorsal area thins and the depression is visible at the surface, in the area posterior to the cranium (Figure 3). As cetaceans typically have a thick layer of blubber that encompasses their body, signs of emaciation to the extent where a depression behind the cranium is visible, are typically indicative of well-advanced illness or prolonged lack of food. Emaciation has been documented in a range of cetaceans, many of whom end up stranded on beaches (e.g., see Estrella & Le Vazques (2001) who note, with regards to a dolphin with peanut-head, that "*the blood analysis showed that the animal had a high number of white blood cells and low level of glucose. These are signs of an infectious*

process and long fasting time" p293, para 5). This dolphin died three days after stranding, despite extensive 24hr care.

Figure 2. 'Peanut head' evidenced on Kiska on the 27th of July 2014. Comparison of Kiska's dorso-cranial area, showing the 'moderate' depression behind the blowhole (situated above the anterior edge of the cranium). See Figure 3 for anatomy comparison.
SOURCE: https://www.thedodo.com/its-time-to-relocate-kiska-the-646602068.html

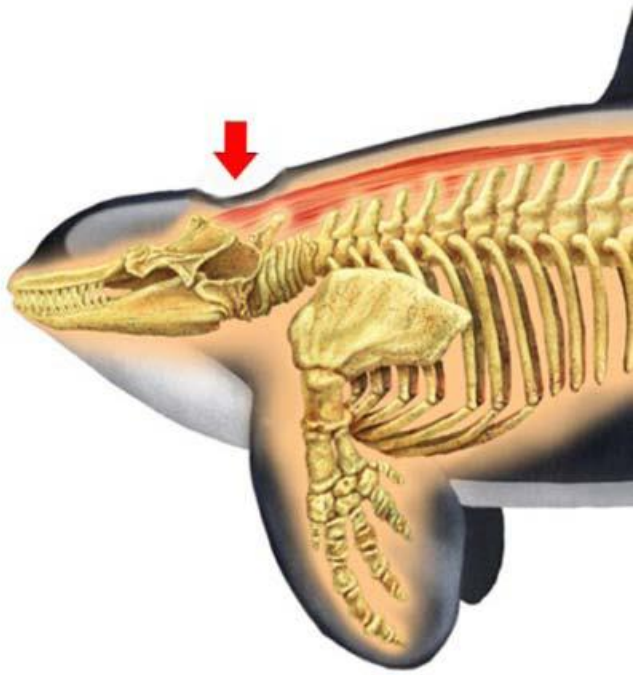

Figure 3. Illustration to show location of cranium and the zone that becomes depressed in the event of 'peanut-head' (arrow). SOURCE: Modified from illustration extracted from internet commons.

b). Both wild and captive orca, in various stages of ill-health (e.g., see (Durban et al. 2009; Ford 2012; Visser and Hardie 2011), have been documented with peanut-head. Of the 13 orca documented off the west coast of North America with peanut-head, 11 are now recorded as deceased.

c). Peanut-head can start with a 'slight depression' and escalate to 'moderate' and then 'prominent'. Based on my expert knowledge of the condition, I would term *Kiska*'s peanut-head at a 'moderate' depression, when assessing the photograph taken of her on the 27 July 2014. At the 'moderate' to 'prominent' point ribs are often also visible, but in this case no photographs of *Kiska*

(that can be verified as coming from that date), show her in a position to view her thorax/rib area to assess the extent of the emaciation. Durban et al (2009) report those individual orca who were first recorded with 'slight depression' (n = 7), had all subsequently died. A further three orca were first recorded with 'moderate' peanut-head. Of these, two subsequently died and the third (injured by a boat strike rather than illness) recovered.

d). *Kiska* has recovered from whatever ailed her, to a certain point as upon my visit one year later, no peanut-head was visible, but no inspection was possible. However, it should also be noted that no orca in captivity has ever reached the age milestone of 'average age' compared to those in the wild (Ventre and Jett 2015). The primary cause of such early onset of death in captivity is failed health[1] (although injuries do account for some deaths). It is well known that veterinarians heavily medicate cetaceans in captivity[2] and it is unclear what *Kiska* is being administered.

e). It is obvious that the tanks holding *Kiska* do not have any scales for weighing cetaceans, which should be one of the standard tools for proper care. Typically, cetaceans in captivity are weighed on a monthly basis, but given that the behaviour to slide onto the scale can be trained and produces little to any stress, it would not be inappropriate for an orca such as *Kiska* to be weighed weekly, should scales be installed. This would ensure a detailed record of her weight could be kept, allow better monitoring of any weight loss and help ensure that her weight was maintained at an optimal point to facilitate her long-term health.

10. a). It is abundantly evident, even to the casual observer, that *Kiska*'s teeth are not pristine. Pristine orca teeth (orca typically have between 40-56 teeth, depending on the individual and the population), are homodont (all the same type), interlock and are conical in shape with a rounded tip (Figure 4). Some are slightly curved to the posterior of the mouth. The maximum length is approximately 13cm (5 in) and the larger teeth are approximately 2.5 cm (1 in) in diameter. The crown is approximately 1/3 of the entire length of the tooth and is covered in enamel (Graham and Dow 1990).

[1] Necropsy reports from SeaWorld orca
https://www.scribd.com/collections/3531412/Necropsy-autopsy-Reports-of-Deceased-SeaWorld-Captive-Killer-Whales-Orcinus-orca.
[2] https://www.thedodo.com/seaworld-orca-drugs-medications-1035364310.html
https://www.thedodo.com/seaworld-gave-nursing-orca-val-493887337.html

Figure 4. Typical, pristine, homodont (similar) teeth, found on a wild orca. The larger teeth are approximately 13cm in total length. Photo © Ingrid N. Visser/ Orca Research Trust.

b). In the photographs I took (Figure 5) of *Kiska* it can be seen that on her right mandible the front **seven** teeth are worn to the gums. The teeth posterior to these seven are worn to nubs. All these teeth would be classified into the most 'extreme wear' classification of (3), where (0) equal no wear, (1) equals wear up to a quarter of the crown height (2) equals up to half and (3) more than half the crown has been worn (see (Labrada-Martagón et al. 2007) for methodology details).

Figure 5. *Kiska*'s right side teeth (left, with close-up same image, right), showing the extreme wear and man-made holes drilled into her teeth. Photo © Ingrid N. Visser / Orca Research Trust (taken 20150626).

c). In the photographs I took (Figure 6) of *Kiska* it can be seen that on her left mandible the front **eight** teeth are worn to the gums. The teeth posterior to these eight are worn to nubs (n = 1) or irregularly worn (n = 2). All these teeth would be classified into the most 'extreme wear' classification of (3).

Figure 6. *Kiska*'s left side teeth (left, with close-up same image, right), showing the extreme wear and man-made holes drilled into her teeth. Photo © Ingrid N. Visser / Orca Research Trust (taken 20150626).

d). In the photograph I took (Figure 7) of *Kiska,* extremely unusual (even for captivity) tooth wear is documented in her right maxillae (upper jaw). The front **six (possibly seven)** teeth are worn down to nubs. These worn teeth would be classified into the most 'extreme wear' classification of (3). As such, *Kiska* is apparently the only orca (documented in captivity by Visser) with this extreme tooth wear in the upper jaw. In orca the upper 'lip' is extremely stiff and inflexible. Therefore, even when concrete biting is conducted, the maxillae teeth are protected. It is unclear as to how these teeth could be work to such an extreme extent without further investigations. It was not possible to document *Kiska*'s left maxillae teeth as the Marineland staff prevented close inspection or photography.

Figure 7. *Kiska*'s right side maxillae (upper jaw) teeth (left, with close-up same image, right), showing the extreme wear. Six (possibly seven) teeth are worn down to nubs. She is apparently the only orca documented in captivity by Visser with this extreme tooth wear in the upper jaw. Photo © Ingrid N. Visser / Orca Research Trust (taken 20150626).

e). Although some wild orca have been recorded with worn teeth (e.g., see Foote et al. 2009), that type of wear is a direct result of foraging (either the prey type – such as rough-skinned sharks, or the method, such as 'suction' from within the water column). It is not from grinding teeth against a hard surface such as concrete.

f). Tooth wearing, of the type exhibited on *Kiska,* is *exclusive* to those orca held in captivity. Despite the captivity industries claims that such tooth wear comes from contact with their food, all orca in captivity are fed (single fish/squid etc or hand-full's of fish/squid etc) as the trainer 'tosses' it directly into the animals mouth (see Figure 8), therefore only swallowing (not handling) is required and contact with the teeth is typically avoided. Although occasionally a single fish may be thrown into the water for retrieval by the orca, this is not a primary method of feeding captive orca and would not result in the extensive tooth wear commonly observed and also documented on *Kiska*.

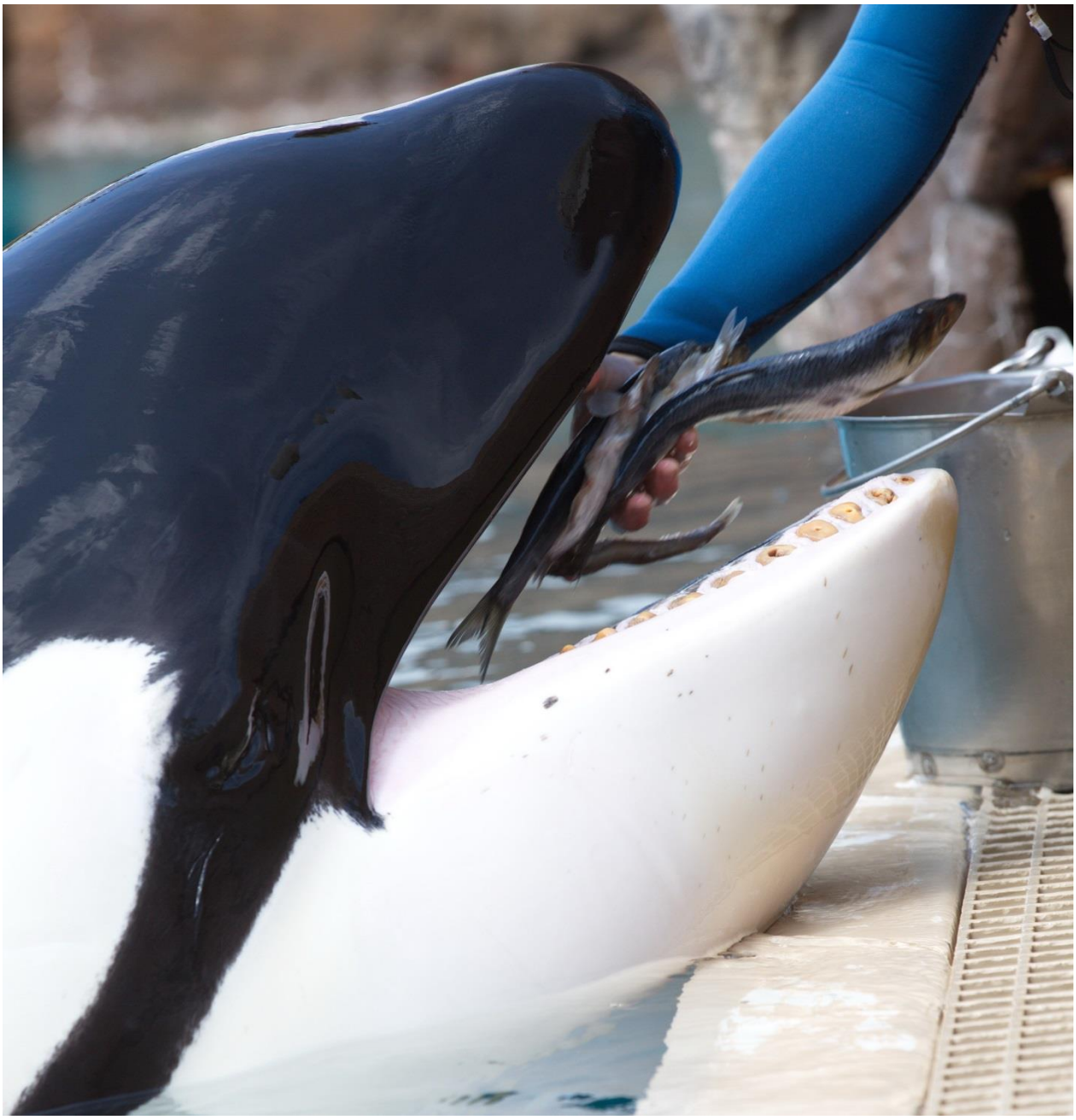

Figure 8. A trainer 'tosses' fish into Kiska's mouth – avoiding all contact with her teeth. Contact with food has recently been cited as a cause of excessive tooth wear by the captivity industry. Photo © Ingrid N. Visser / Orca Research Trust (taken 20150630).

g). Captive orca repeatedly chew on the hard surfaces that abound in their barren environments, including, but not limited to, steel gates, concrete tank edges and grates. An example of how frequently this occurs is illustrated by a slide presented by myself as an Expert Witness, in a court case in the Netherlands (Figure 9), where one orca was photographed chewing on the tank every 72 seconds. The compulsive extent to which captive orca exhibit such abnormal repetitive behaviours (termed stereotypies) is also indicated by the speed (18 months) of which one orca's teeth were worn down, some to the gums, from a pristine state, once she was moved to the facility at question (Figure 10).

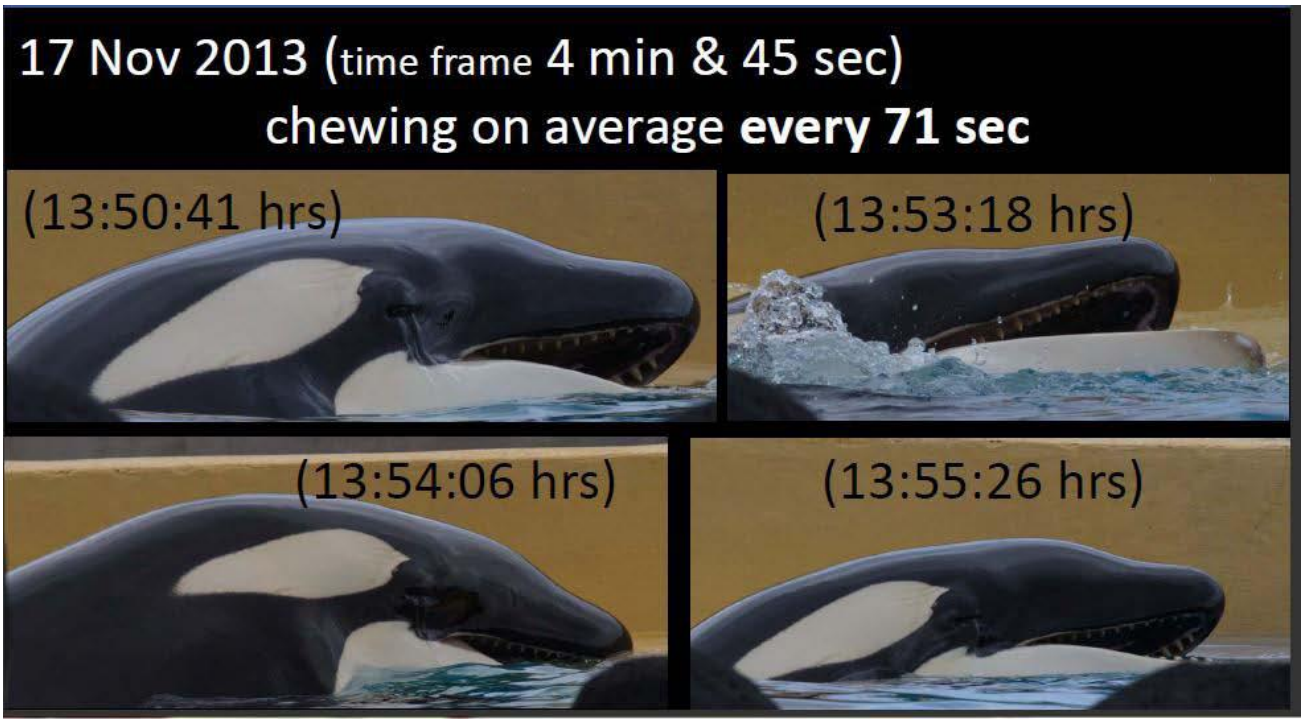

Figure 9. *Morgan*, the orca held at Loro Parque, Spain, chewing on the concrete. She was photographed doing this abnormal, repetitive behaviour every 72 seconds during this particular bout. She repeated bouts during the day. SOURCE: Dr Ingrid N. Visser / Free Morgan Foundation.

Figure 10. Tooth wear over an 18 month period, on a female orca, known as *Morgan*, held at Loro Parque, Spain. Note tooth six and tooth seven are broken/chipped, whilst the anterior teeth have the tops worn off. SOURCE: Dr Ingrid N. Visser / Free Morgan Foundation

h). In the case of *Kiska*, her self-mutilation through tooth wear, has resulted in nearly all her lower teeth being worn away. It is unclear from online images and video how quickly *Kiska* wore down her teeth, but it is apparent that they have reached a point where at least some have been drilled, in what is essentially a modified pulpotomy (removal of the pulp) (Figures5 & 6) . These procedures are typically done on orca without the use of any aesthetic (Jett and Ventre 2011). Observations of *Kiska* during a tooth 'flushing' procedure showed her to 'quiver' and 'flinch' and it is apparent from these behaviours that this is not a 'pleasant' experience for her (and may indicate pain or at a minimum distress).

g). When discussing the issues of dental wear in captive orca Grahman and Dow (1990), comment that orca kept in net pens do not exhibit the tooth wear of those kept in concrete tanks. They also state (page 326) "*Tooth wear that exposes the pulp cavity also creates a convenient location for the collection of food and debris. The deterioration of the pulp allows space for this material to collect and impact, and it is this space that will require the most attention in tooth care. Because the vacant pulp cavity extends into the gum region it is warm, and thus is an area for incubation that may lead to infection*."

h). The state of *Kiska*'s teeth, particularly in combination with the points discussed in the paragraphs above should cause alarm and they are a visibly abnormal state of affairs resulting from her being kept in a concrete tank.

i). It is feasible for captive orca to have their teeth capped as has been done for at least two orca currently held in captivity – one in Spain (Loro Parque) (Figure 11) and one in the USA (Miami Seaquarium) (Figure 12). It should certainly be investigated as an option to alleviate the pain/distress the required twice-daily flushing for *Kiska* currently requires.

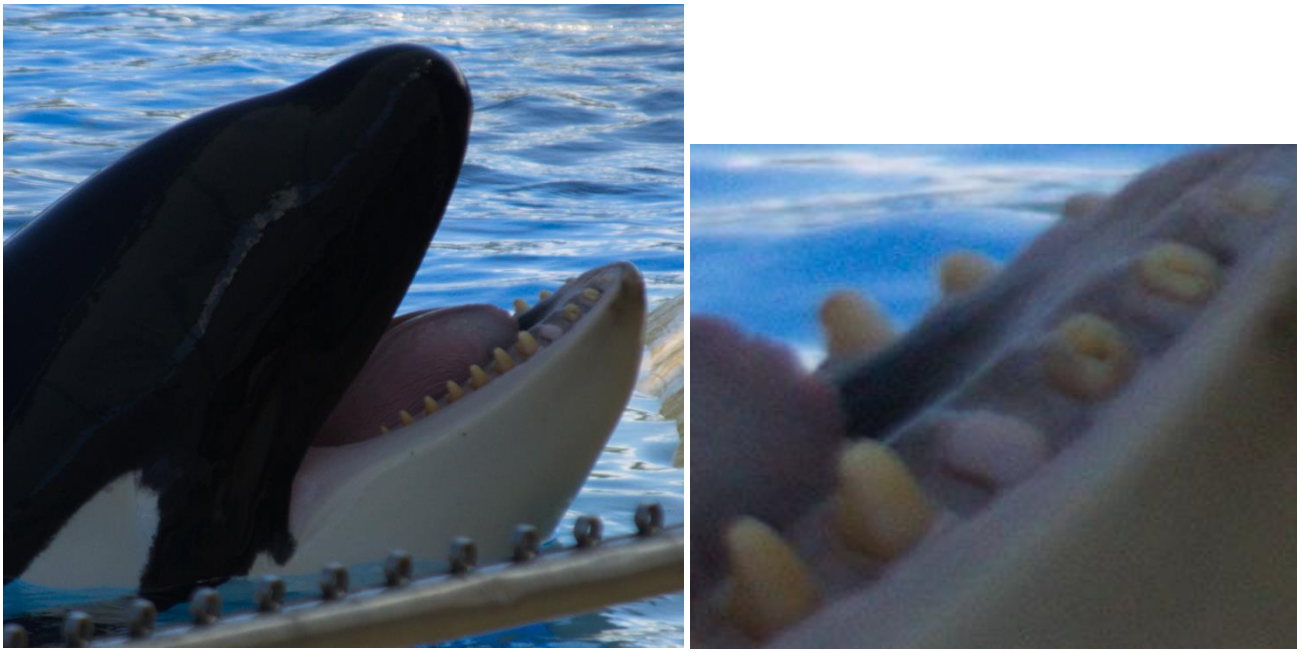

Figure 11. Left, open mouth of orca at Loro Parque (Tenerife, Spain), with close-up (right). Note the 'white' tooth (fourth from anterior of right mandible) – this is apparently a capped tooth – although the facility will provide no comment despite repeated requests for information. Photo: Dr Ingrid. N Visser (taken 16th Sept 2011).

Figure 12. Open mouth of orca at Miami Seaquarium (Florida, USA). Note the dark 'tooth' (anterior of right mandible) – this is apparently a capped tooth – although the facility will provide no comment despite repeated requests for information. NOTE: the right maxillae teeth of this orca are clearly visible and show a normal dentition patter, cf the teeth of *Kiska* in Figure 7. Photo: Dr Ingrid. N Visser (taken 4th July 2015).

11. There is the statistical evidence (collated from 201 captive orca) that the median survival of orca in facilities outside of the USA is 4.4 years (Ventre and Jett 2015). The age of *Kiska* is reported to be approximately 39 years old[3]. As such she is an 'outlier' and statistics also show that "....*killer whales held in foreign facilities face a 59% higher hazard ratio and a* ***61% higher chance of death on any given day*** *than for those held in U.S. facilities*." (Jett & Ventre 2015, page 11) [emphasis added].

12. Additionally, from orca research in the wild we now know that these animals can live long lives with females having a mean life expectancy of 46 years and maximum longevity in the order of 80 years (Olesiuk et al. 2005). However it should also be noted that there is one female calculated to be at least 100 years old (based on her reproductive history – using the age of her oldest known offspring and her own age at primigravida)[4].

13. The tanks that *Kiska* currently has access to (Figure 13) are described here as the 'main' and the 'back' tank. Additionally there are shallow areas which are either fenced off (controlled access)

[3] http://orcahome.de/orcastat.htm - *Kiska* is listed as the 5th orca in the list, captured in Oct 1979 at approximately 3 years of age.

[4] http://www.dailymail.co.uk/sciencetech/article-2628373/Is-oldest-whale-world-Granny-orca-103-years-old-scientists-claim.html

which is the 'med' tank area or the 'slide out' area – which is so shallow to not permit full body submergence. Measurements were made off the internet program Google Earth and are approximately 40x20m (main tank), and 17x21m (back tank). The beluga tank is currently 'off limits to *Kiska*, although in the past she had access to it. The water temperature in all three tanks is maintained at 55˚F (12.7˚C) and therefore *Kiska* could be given access to the 'beluga' tank, if she was habituated to the presence of belugas. This would additionally provide her with some form of 'companion' animals to alleviate the solitary confinement she is currently subjected to which has been well documented as unacceptable conditions for such a socially orientated animal.

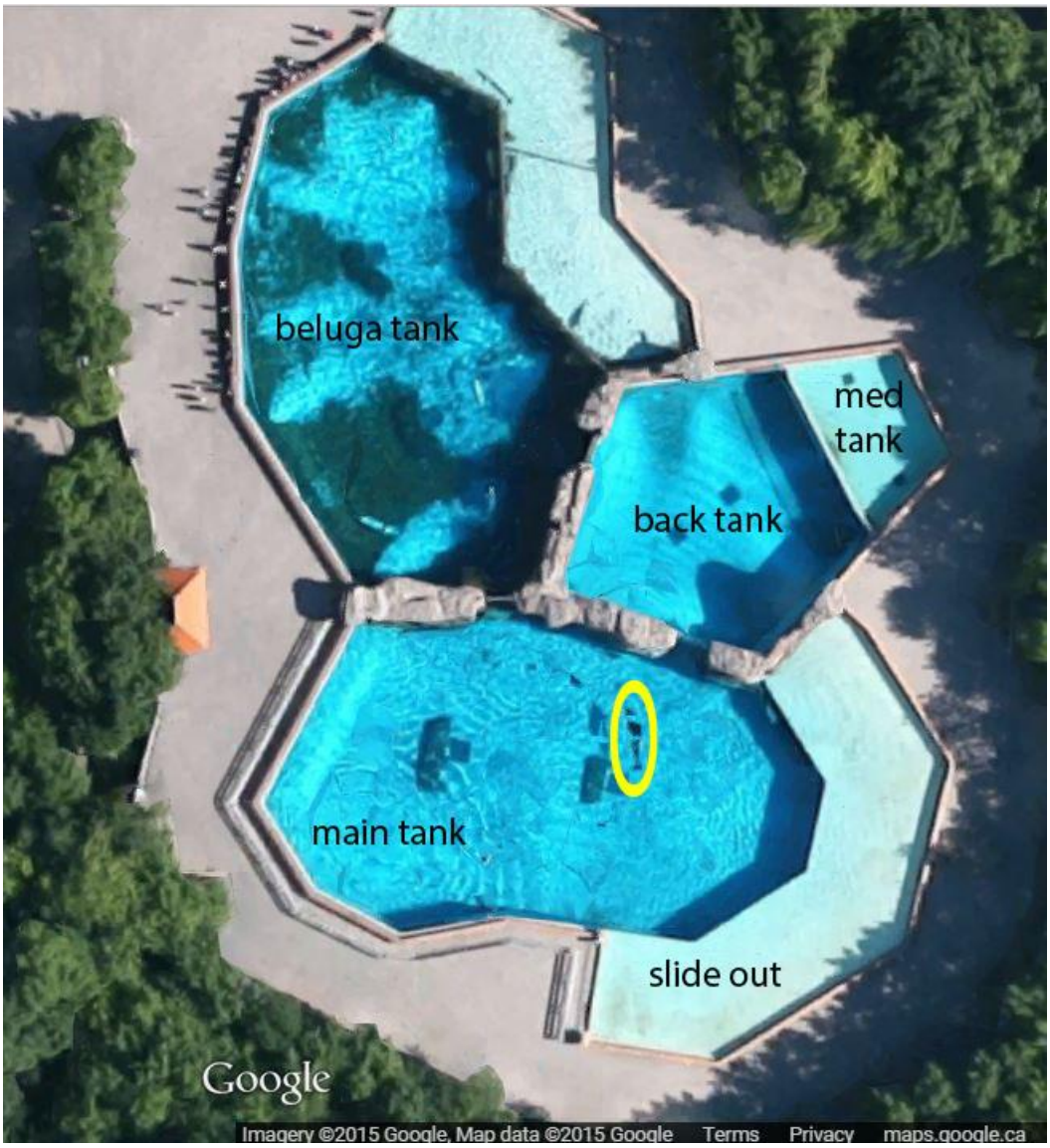

Figure 13. Tanks available (at the discretion of the Marineland staff) are the main, back and med tanks. The slide out area is too shallow for full body submergence. *Kiska* is circled in yellow. The tank dimensions are approximately 40x20m (main tank), and 17x21m (back tank). The beluga tank is currently 'off limits' to *Kiska*, although in the past she had access to it. Photo extracted from Google.

14. There are no signs posted about the depth of the tank that *Kiska* is kept in. However, from visual assessment it is clear that the tank is not more than approximately 30ft (9 m) at its deepest point. This is woefully inadequate given that we know that orca regularly dive in excess of 100 and

200m and have reached depths of 400m (Baird et al. 2005; Matkin et al. 2012; Yano and Dahlheim 1995).

15. *Kiska* exhibits pronounced stereotypies (abnormal, repetitive behaviours, often without any externally obvious function) which I observed and are *inter alia*; logging at the surface, drifting/extremely slow swimming at the surface, predictable swimming patterns (which include bouts of always swimming in the same direction around the tank, swimming upside down, exhaling bubble streams in the same locations, surfacing in the same locations, surfacing without exhaling or inhaling, body rolls, tail flicks, 'push offs' from walls and head lifts,) as well as rubbing her right pectoral fin on the rails (Figure 14) and rubbing her tail flukes along the edge of the tank (Figure 15). Damage from this type of behaviour was reported in the Star[5] in October 2012 and the fact that raw wounds are still apparent 2 years and 8 months later is an indication that there are extreme welfare issues at hand but that the facility has not addressed the issue. Stereotypies are well recognised in the scientific literature as being indicators of compromised welfare (see the follow references for just a few examples; Broom 1983; Broom and Kennedy 2010; Mason and Rushen 2006; Mason 2010).

Figure 14. *Kiska* rubbing her right pectoral fin along the upper edge of the bars into the medical tank. This is just one of the many stereotypies (abnormal, repetitive behaviours) that I observed. Photo: Dr Ingrid. N Visser (taken 26th June 2015).

5 http://www.thestar.com/news/canada/2012/10/18/marineland_killer_whale_bleeding_for_months_trainer_says.html

Figure 15. *Kiska*'s had raw wounds on the tips of both her tail flukes (right one shown here) which are indicative of a stereotypic behaviour. Raw wounds such as this were reported in the media in October 2012 (2 years and 8 months prior to my visit), so this particular issue (rubbing of tail flukes on abrasive structures) has obviously not been addressed by the facility.

16. Furthermore, there are numerous other examples of *Kiska* exhibiting sterotypies which can be found on social media, websites and on Youtube and there have been examples reported in the print media. Some of those behaviours are different than those I observed and are *inter alia*; thrashing, rubbing (various body parts other than those I observed), 'walking' on her pectoral fins in the shallows, body shaking and head thrashing.

17. *Kiska* is provided with no shade from the long hot summer days and given that she spends more time at the surface (and due to the shallow nature of the tanks cannot submerge deep, even if she wished to). It has been shown that cetaceans can get sunburnt (Jett and Ventre 2011; Martinez-Levasseur et al. 2011) this lack of shade is unacceptable.

18. During the whole time that I watched Kiska there was never any enrichment 'toys' placed in her tank, any interactions with the trainers were a perfunctory measure (feed, quick rub) and none lasted more than 3 minutes. I have been informed that typically the trainers leave the facility at approximately 1845 hrs, but depart from the animal areas at around 1800 hrs. I did not see a trainer approach *Kiska* on the three days that I was present, until after 1100 hrs, suggesting that she is not given any contact during this long hours. There is apparently a disconnect between the trainers and *Kiska* and no concerted effort to interact with her was made whilst I was there. Simple rescheduling of feeding times to include night-feeds and night-time interactions may help to address this issue.

19. On the 29th of June 2015, I was removed from Marineland by the owner John Holer and two others who incorrectly claimed that I was making a 'documentary'. Such expulsion only indicates that Marineland has issues at the facility, particularly concerning *Kiska*, that they do not wish to be disclosed to the public.

20. In conclusion, I have compiled this brief report because of my deep concern for the welfare and wellbeing of this particular orca. She shows signs of extreme distress and neglect and this clearly needs to be addressed.

Compiled by Dr Ingrid N. Visser, for the Orca Research Trust, on the 5th Day of July, 2015

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