

Commentary on *What People Believe, What Science Knows* (January 2012)
A document of the European Association of Aquatic Animals
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Overall, the document *What People Believe, What Science Knows* is simplistic and misleading, particularly in its references to the scientific literature. In a number of instances, it cites papers that contain no specific information in support of the point the authors are making. In other instances, it does *not* cite papers that were obvious choices for the topic at hand. In a few instances, the papers cited actually support a view opposed to or different from the EAAM's claims. However, the document's main flaw is that the authors use science to confuse and deflect rather than to clarify. The authors also raise straw men, indulge in jargon, and apply double standards in many of their responses.

What People Believe, What Science Knows also does not cite Couquiaud (2005)¹, a special issue of *Aquatic Mammals* that reviewed the captive cetacean environment, husbandry practices and standards, and identified 'best practices.' This special issue involved the cooperation of numerous captive facilities, some in the European Union, and was written by a researcher who is generally supportive of captive display but also concerned about maximizing captive cetacean welfare. Her survey is a must-read for anyone interested in captive cetacean welfare and a must-cite for anyone writing about it, yet *What People Believe, What Science Knows* never refers to it, although *Aquatic Mammals* is an EAAM publication. Couquiaud (2005) is a relatively balanced evaluation of dolphinarium care and maintenance practices and in several instances does not support the EAAM's claims.

The following is a commentary on *What People Believe, What Science Knows*. The questions are numbered in the order in which they appear under each topic in the EAAM document.

About Cetacean Biology

1. Is it true that dolphins are as intelligent as humans?

This question is a straw man. While some animal activists believe that dolphins are as smart as (or smarter than) humans, the majority of those who oppose captivity simply believe that dolphins are intelligent enough to make meeting their needs difficult if not impossible in captivity. Boredom is a significant source of stress for intelligent, social species in captivity, including elephants, wolves, and primates, as the entire zoo-based science of 'environmental enrichment' confirms. This is not a controversial claim until it is applied to cetaceans, which are a more lucrative source of revenue than elephants, wolves, or primates.

The EAAM accuses animal activists of incorrectly utilizing encephalization quotient as a tool to measure "brain power;" however, it in turn inappropriately downplays and even dismisses EQ as a metric for measuring cognitive abilities. EQ is in fact in common use as such a metric. EQ is the brain-to-body-weight ratio and the dolphin's is very high, on a par with primates. Claiming that dolphin brain size is primarily due to the need for auditory signal processing is like saying human brain size is primarily due to the need for visual signal processing. The dolphin brain's complexity encompasses far more than the auditory processing region.

¹ Couquiaud, L. 2005. A survey of the environments of cetaceans in human care. *Aquatic Mammals* 31: 279-385.

Dolphins have demonstrated most of the cognitive characteristics listed in the EAAM's response. They have demonstrated cognitive abilities on a par with a 3-4 year-old human child using current measures of such abilities. The conclusion that, because dolphins do not *appear* to have language similar to humans', their intelligence must be lesser than humans' is fallacious. One, human-like language is not the prime criterion for assigning superior intelligence and two, scientists actually have no idea how sophisticated dolphin communication/language is, as they have barely begun deciphering it.

2. Is it true that killer whales are more aggressive than regular dolphins?

The EAAM claims that killer whale "males tend to leave the group when they are weaned and/or reach their adolescence." This is incorrect. Males never completely leave the group – in some populations they remain with their mothers for life and in others they retain a life-long social bond with their mothers after dispersing. These family bonds are a major reason keeping killer whales in captivity is inhumane, as husbandry considerations rarely keep families together.

The EAAM tries to distinguish predators taking down prey from 'attacks,' which is specious. A predator taking down a prey animal is an attack. Handlers in zoos do not go into the lion or tiger cages and they should not go into the orca tanks. While training makes captive orcas more predictable than captive lions or tigers, they are still capable of unpredictable and dangerous behavior by virtue of their size, their predatory nature, and their formidable hunting apparatus (teeth and jaws).

The entire response is essentially a deflection, bogging down in the details of how killer whales learn hunting techniques, but ignoring the simple fact that a large animal like a killer whale (or an elephant) can kill someone without intention. The size difference alone means that when a killer whale decides to go 'off behavior,' he or she can seriously injure or kill a trainer, even if the whale is not being aggressive, and there is nothing anyone can do to stop them.

3. How can the sea-diving species like dolphins cope with the (more limited) depth of artificial habitats?

This response ignores evolution. Modern humans can run, climb, jump, and perform other athletic feats, but it is not essential for them to do so to survive. However, when they do not exercise enough, their health deteriorates. Dolphins may not need to dive deep or swim far to survive (as captivity demonstrates), but the fact that they can do both (and have evolved to do so) means that if they do not, their health is likely to suffer for it.

To continue the analogy, it seems obviously inhumane to keep children from running and climbing and jumping throughout childhood, even though they don't need to do so to survive. It is equally inhumane to keep dolphin calves from exercising to the full extent of their abilities as they grow in captivity. If a species cannot perform natural behaviors in captivity, then there is something wrong with the conditions of their captivity. This is a basic tenet of animal welfare.

4. Is it true that killer whales are so big and pools are so small that the species should not be kept under human care?

This is a non-response. Taking into account all of the elements the EAAM actually lists here, it is easier to argue that these standards cannot be met for killer whales than that they can. In

addition, this response is a good example of how the EAAM does not cite the best literature. DeMaster and Drevenak 1988 was superseded by Small and DeMaster 1995 – DeMaster and Drevenak 1988 should never be cited alone when discussing survivorship.

5. Is it true that dolphins, when confined to pools, cannot dive deeply enough and begin suffering from eye problems?

This again is a non-response. To say that eye problems can arise from many causes does not address the question, which is about a specific cause. In fact UV light exposure in shallow tanks with reflective walls (painted white or light blue) *does* cause eye problems in captive marine mammals². Referring to the dolphins in Sarasota, Florida is a non-sequitur – these dolphins, while often in shallow water, do not spend their entire lives in water less than 5m deep and even if they did, the water in Sarasota is not crystal clear nor are the dolphins surrounded by reflective surfaces. UV exposure is much lower in Sarasota shallow water than in any tank.

6. Is it true that dolphins need to be constantly travelling (swimming dozens/hundreds of kilometres/miles per day) in order to be safe, healthy and/or in good physical condition?

This response is nonsensical. One need only look to the human medical literature to realize this. Obesity and lack of exercise cause health problems because we evolved as hunter-gatherers – constantly moving and eating lean. When we go against our evolutionary history, we get sick. The same holds true for any wildlife species held in captivity – for example, wide-ranging predators fare poorly in zoos compared to predators with small home ranges³. This is why accepted welfare standards require providing enclosures that allow an animal to perform natural behaviors and adopt natural postures. Captive dolphins are in effect the equivalent of human couch potatoes and that is unhealthy.

In addition, small home ranges for dolphins mean on the order of 25sqkm (large home ranges are on the order of hundreds or even thousands of sqkm). The largest dolphin tank is going to be less than one-ten thousandths of one percent this size. In short, it does not matter *why* dolphins swim constantly in the wild – from a health and welfare perspective, it only matters that they *do* and that in captivity they *cannot*.

About Cetacean Ecology

1. Do dolphins commit suicide?

The references for this response are not about suicide, but about dolphin cognition and self-awareness. So the first sentence "*According to science, only humans commit suicide*" (emphasis added) is without citation. To my knowledge, there is no science supporting such a claim.

As for the claim that some captive dolphins have lived to be 30-40 years old, these were typically not animals kept in substandard, illegal conditions. The EAAM is mixing anecdotes

² See, for example, Gage, L.J. 2011. Captive pinniped eye problems: We can do better! *Journal of Marine Animals and Their Ecology* 4: 25-28 and also Couquiaud 2005 op. cit.

³ Clubb, R. and G. Mason. 2003. Captivity effects on wide-ranging carnivores. *Nature* 425: 463–474; Clubb, R., and G. J. Mason. 2007. Natural behavioural biology as a risk factor in carnivore welfare: How analyzing species differences could help zoos improve enclosures. *Applied Animal Behaviour Science* 102: 303–328.

(some dolphins have lived in substandard zoos and not committed suicide; some dolphins have lived to be 30-40 years old – but these two groups overlap little or not at all) to suit its narrative.

2. Is it true that collections from the wild disrupt dolphins' families?

While this response starts out promising, by acknowledging that captures *may* disrupt dolphin family groups, it then goes into details that are largely irrelevant to the question but sound impressive. In short, this response is largely a deflection.

It talks about male bottlenose dolphin dispersal patterns, when in fact many capture operators take more females than males, as females are favored for breeding needs and swim-with programs (due to their less aggressively sexual behavior). The response mentions solitary sociable animals, as if this *extremely* rare phenomenon is typical of dolphin social structure. Finally, there is no CITES prohibition on disrupting social units when removing dolphins from the wild, so CITES requirements are irrelevant to this question.

3. If, in the wild, dolphins live in large family groups, how can they adapt to living in small captive groups?

The first sentence of this response does not distinguish between bottlenose dolphins, which do indeed live in fission-fusion societies, and orcas, which most certainly do not. Also, all dolphin species held in public display facilities are on CITES Appendix II, which *does* allow removals from the wild, so the second and third sentences are incorrect. The rest of this response is nothing more than opinion – there is nothing in the cited scientific literature that clearly supports the claim that group and enclosure sizes are less important for welfare than husbandry practices.

Frankly, none of these questions address cetacean ecology, although group size is related (the concept of suicide is plainly unrelated to ecology). There are far better questions to have posed under this topic, such as “Dolphins are active predators; how can this be accommodated in captivity?”

About Cetacean Husbandry

1. Is it true that dolphins suffer from living in chlorinated water?

The first part of this response is contradicted by industry practice – most ‘state-of-the-art’ facilities no longer use chlorine at all, suggesting that there were concerns about its impact on animals. The mention of supervisory authorities is a red herring – to my knowledge, there are no captive marine mammal care and maintenance regulations in any jurisdiction that have chlorine level standards.

2. Is it true that bacteria found in pools harm dolphins?

This response is paradoxical. On the one hand, it states that wild dolphins do not exist in sterile environments (so expecting captivity to be so is unrealistic and unnecessary), while on the other it describes how dolphinariums do in fact maintain fairly sterile environments, so concerns about dangerous bacterial levels are unfounded. Either public expectations for hygiene in captivity should be lowered because dolphins are naturally resistant to relatively high levels of bacterial exposure or hygiene in captivity is exceptional and so concerns about bacterial levels can be dismissed. Also, the water in dolphinariums is not always as hygienic as this response

implies and regardless, dolphins are also exposed to bacteria in the food they eat, even when facilities carefully control fish handling.

However, the response does not clarify that the *reason* tanks are kept as hygienic as possible is because captive dolphins do not react to bacteria in the same way as wild dolphins. Captive dolphins appear to have reduced immune responses, probably due to stress, and therefore natural pathogen exposure (including to parasites) can be harmful, whereas in the wild animals are (less stressed and) more resistant. All captive dolphins are dewormed routinely, for example, because the parasite loads wild dolphins carry, generally without harm, can in fact lead to health problems in captive dolphins.

3. Is it true that captive dolphins' infant mortality is extremely high?

This response demonstrates a double standard. It invokes the natural high infant mortality rate (which it attributes to newborn immunosuppression), directly after the response clarifying that exposure to pathogens in captivity is lower than it is in the wild because of the rigorous hygiene standards maintained in captive enclosures. If in fact pathogens are kept at lower-than-natural levels in captivity, newborn immunosuppression is unlikely to be a primary cause of the similar-to-the-wild captive infant mortality rate. It is only logical to conclude that causes of death – not only for calves but for adults – must be different in captivity compared to the wild (given the two environments' vast differences), so invoking mortality rates in the wild is an insufficient explanation for similar rates seen in captivity.

4. Is it true that dolphins suffer if exposed to water with less salt than seawater?

This response is a bit incoherent and oddly overemphasizes the energetic consequences for dolphins moving through water with low salinity levels (the main concern is *not* energetic impacts, but impacts to skin, eyes, and internal salt balance), but is fundamentally correct. As the response notes, marine dolphins can be harmed by prolonged exposure to fresh or brackish water. The operative term is *prolonged*. If a tank permanently housing cetaceans is kept at a salinity lower than naturally encountered, then skin problems are likely to occur and other more significant problems (e.g., related to eyes or kidneys) are possible.

5. Is it true that hundreds of dolphins have already died in European dolphinariums?

If hundreds of dolphins have been held in captivity over the years, then it is to be expected that some or even many of them will have died by now, but presumably dolphins in captivity do not die from the same causes as those in the wild. There are no predators, there are no food shortages, there is no fishing gear entanglement, and so on. What kills dolphins in captivity with the same efficiency as all of these causes in the wild? This is never addressed by dolphinariums in their responses to this type of question.

This response essentially claims that people should not be surprised that dolphins die in captivity, as animals of course die. This is true – but it is legitimate to ask if the mortality rate is higher in captivity and to ask *why* captive animals die. If they are not subject to the same causes of death faced by wild dolphins, what causes do they face? (One hypothesis is that captive dolphins are subject to chronic stress that affects their immune response, leading them to die of

infections and diseases that they are able to withstand in the wild, but this cannot be tested without the full cooperation of dolphinariums, which has to date not been forthcoming.)

In addition, the assumption in this response is that there has been a learning curve with dolphin husbandry – “over the past half century...the husbandry techniques and protocols regarding the holding of these species have evolved and improved tremendously.” A strong argument can be made that continuing to hold an intelligent, long-lived species in captivity, when such a prolonged learning curve was needed – and is presumably still on-going – to learn how to maintain it appropriately is unethical.

6. Is it true that the breeding success of captive dolphins/cetaceans is very low, reduced or non-existent?

The first part of this response implies that the factors listed are somehow intrinsic or mostly outside human control. However, almost all the factors listed are very much in human control and therefore, if they are unfavorable to breeding success, then this is the fault of husbandry practices, not the dolphins’ biological nature. As an obvious example, if breeding success is lowered by the limited or poor experience of a facility’s care-giving staff, then such a facility should not be allowed to display dolphins, let alone breed them.

As for the second paragraph, all mammals are immune-suppressed at birth – an infant mammal gets its first immunity from mother's milk. This is a fundamental feature of mammals. This response tries to suggest cetaceans are special in this way, which would explain any discrepancy between their infant survival and, say, any other mammal in captivity, when of course it does not. In addition, as the EAAM earlier states, there is supposedly less exposure to pathogens in captivity versus the wild due to hygienic water quality and food handling, so the lack of immunity to pathogens at birth should not be as much of a problem in captivity compared to in the wild. Double standards and logical inconsistencies arise throughout these responses.

As for the final paragraph, none of the literature cited contains this information. The only paper even to mention ‘86%’ in reference to any topic was Wells *et al.* (2005), which cited another paper (Reddy *et al.* 2001) that reported that 86% of first-time bottlenose mothers in the Navy marine mammal program lost their calves (through stillbirth or soon after birth). So at best this statement has no corroboration in the scientific literature – at worst, it is incorrect, based on a misreading (inadvertent or otherwise) of one of the cited papers.

About Cetacean Welfare

1. Is it true that dolphins live less [shorter lives] under human care (captivity)?

The first sentence of this response is at best misleading and at worst false. In modern zoological facilities, dolphins can live as long as their wild counterparts. They do not live longer – not on average and not as a maximum. However, many existing facilities (some in North America, some in the European Union, and many if not most in all other parts of the world) are not in fact ‘modern’ – their design and water quality maintenance methods are outdated (e.g., tank walls are not curved, chemicals are still widely used), staff are poorly experienced, veterinary care is fair or poor, and so on. When factored into longevity analyses, these facilities negatively affect the results for dolphinariums as a whole.

The final paragraph of this response is nonsensical (at least in English – there may be a translation problem here) – “any given dolphin” cannot have a mean or average age. By definition, an average age can only be for a group of individuals, not for any one individual.

2. If captive dolphins have ulcers, does that mean that they have stress?

The EAAM claims that stress does not cause ulcers, bacteria do. But that is like saying people do not kill people, guns do. Bacteria are the proximate cause of ulcers; stress is one of several potential ultimate causes, as it can make an animal more susceptible to those bacteria.

The sentence “Many experts, however, believe that stress is not necessarily a cause but a complication of peptic ulcers – meaning that an ulcer may cause stress, but that the other way around is not necessarily true” is meaningless without a reference to these “many experts.” The papers cited for this response contain no information relevant to this sentence. (The EAAM appears to assume that readers will not check original sources.)

Finally, the discussion of the stress faced by wild dolphins confuses chronic stress (which is the concern for captive dolphins) and acute stress (which is the type most often faced by wild dolphins). Acute stress is a survival mechanism and does not necessarily result in any long-term harm. It often saves an animal from predation or other threats and is not believed to be a factor in long-term damage such as ulcers. However, stress becomes potentially harmful when it is chronic – the body does not handle chronic stress well. The EAAM conflates and confuses the two types of stress to imply that because wild dolphins are faced with all sorts of (acute) stress without experiencing long-term harm, this is evidence that (chronic) stress should be considered non-harmful for captive dolphins. This is an invalid conclusion.

In fact, one of the papers cited (Abollo *et al.* 2000) concluded that minor ulcers are relatively common in wild dolphins and are non-fatal. The real questions that require a response are therefore “Are captive dolphins’ ulcers similar to those of wild dolphins and if not, how do they differ? Do they differ in severity? Are ulcers in captive dolphins as common as, less common, or more common than in wild dolphins?”

3. Is it true that the filtration equipment is harmful, due to its noises and vibrations, to the cetaceans?

The response to this question is comparatively factual.

4. Is it true that dolphins under human care cannot use their sonar abilities due to the physical nature of their surroundings?

This question is a straw man. Some members of the public and even the animal activist community do still believe this, but the number of those still making this claim is declining. Activists do express concern that tanks are not ideal acoustic environments and that dolphins use echolocation relatively infrequently in tanks (which is true), but they rarely claim any longer that dolphins *cannot* use their echolocation in tanks.

That said, the claim that dolphins can use their echolocation “at any time and without limitation – in any aquatic environment” is misleading. While technically true, it is also technically true that some aquatic environments are acoustically difficult for cetaceans and can cause vocalizations

and echolocation clicks to reverberate and echo in less-than-ideal ways. Enclosure architecture in modern facilities generally addresses acoustic characteristics to minimize resonance, echoes, and reverberation. To imply that there are no concerns regarding echolocation or vocalizations in captivity is disingenuous in the extreme.

The highly subjective claim regarding “dolphin etiquette” is not supported by scientific evidence.

5. Is it true that should any dolphin use its sonar in a pool, the sound reverberates on the walls and stresses/frightens them?

While most of this response is accurate, the fact is that poor enclosure architecture can cause acoustic reverberations (if not of echolocation, than of other noises that enter the water from machinery and external activities such as construction) that lead to stress. In addition, dolphins do not echolocate as much in captivity as they do in the wild⁴. It is likely that captive dolphins use this sophisticated sense infrequently, not because they cannot or it frightens them (since they will use it effectively on command if they are trained to do so), but because there is no need, when the surrounding environment is relatively monotonous and predictable, with very high visibility (clear, shallow water with good light penetration).

6. Is it true that visitors’ clapping and loud music being played in dolphinarium is harmful to the dolphins?

Most of this response is jargonistic filler that does not actually answer the question. Also of note, in most performances, trainers tell the audience to clap and cheer because the animals hear this in-air noise, respond positively to the encouragement, and enjoy the participation of the audience. If this response is accurate, it seems that facilities are telling their trainers to mislead – or outright lie – to the audience and mis-educate them about cetacean hearing.

7. Is the scarring on the dolphins’ bodies related to fighting and/or to the “stress of being captive”?

While much of this response is accurate, it does not distinguish between normal rake marks and scarring from excessive raking beyond ‘normal’ levels. Many captive cetaceans (especially species such as orcas where raking varies in frequency in the wild depending on the population, with some populations having relatively few rake marks) exhibit very high levels of raking, far beyond what is usually seen in wild populations, suggesting that aggression levels among such captive groups is abnormally high. The frequent inability of a facility to provide adequate space and separation when captive cetaceans in a group are incompatible is an on-going problem in captive cetacean management⁵.

⁴ Mass, A.M. and A.Y. Supin. 2009. Vision. In: *Encyclopedia of Marine Mammals 2nd edition* (W.F. Perrin, B. Wursig, and J.G.M. Thewissen, eds.). Academic Press, New York, p. 1200.

⁵ See, for example, Waples, K.A. and N. J. Gales. 2002. Evaluating and minimizing social stress in the care of captive bottlenose dolphins (*Tursiops aduncus*). *Zoo Biology* 21: 5–26.

8. Is it healthy for the captive cetaceans to eat dead fish and dead squid?

The implication in the first two paragraphs, that natural diets of live prey carry greater risk for cetaceans than unnatural diets of dead fish and squid (no cetacean species is naturally a scavenger), is disingenuous in the extreme and highly misleading. These paragraphs actually imply that it is a problem for wildlife (not just dolphins) that they cannot sanitize their prey by cooking it. This is anti-evolution and anti-biology.

9. How can a small pool (when compared to the big ocean) allow good welfare for any cetaceans?

The first sentence of this response has no evidence to support it and seems counter to common sense. The only published literature on this topic, a brief note by Bassos and Wells⁶, suggests that enclosure size is directly related to the frequencies with which whales perform natural behaviors and the degree to which they are active (i.e., the larger the tank, the more they move and stay active). More research should have been done over the years regarding enclosure size preference, but the industry has not pursued it.

As for the second sentence, comparing what a human being would prefer to what a species that evolved in the open ocean would prefer is both breathtakingly arrogant and completely invalid from an evolutionary and ecological standpoint.

10. Is it true that dolphins kept under human care have a lot of diseases?

“[Sickness] may have no relation whatsoever to its zoological context, as we can...find many pathologies both in wild and stranded cetaceans” is a non-response and also invalid. It implies that every environment puts animals at equal risk of disease, which is illogical. In fact, it is unlikely that captivity exposes dolphins to the same types or number of diseases as the wild does. In addition, this response is inconsistent with a common industry claim that veterinary care is an advantage captive dolphins have over wild ones. If captive dolphins are equally susceptible to similar or even different (but equally dangerous) diseases compared to wild dolphins, then it must be concluded that preventative veterinary care is ineffective.

To imply that “life is life” for wild species no matter where it is lived must be supported by data that show, *inter alia*, mortality rates and disease frequencies or types are similar in different environments. Without such data, it is perfectly legitimate to ask if life for wild species in one environment versus another is better or worse when it comes to mortality and disease frequency or type and demand evidence to support one answer over another. The references cited for this response do not provide that evidence (for example, Bossart 2007 simply discusses diseases found in wild dolphins, without addressing diseases found in captive ones).

⁶ Bassos, M.K. and R.S. Wells. 1996. Effect of pool features on the behavior of two bottlenose dolphins. *Marine Mammal Science* 12: 321–324.

11. Is it true that dolphins living in pools lack adequate and enough stimuli and, as such, have boring and stressful lives?

Most of this response focuses on environmental enrichment and is relatively consistent with the literature. However, it implies that if trainers spend a lot of time interacting with captive dolphins with toys and other artificial stimuli, providing nothing more than a tiny concrete tank is acceptable. This is troubling and not supported by scientific evidence.

About Cetacean Management

I am not familiar enough with EU management regimes to address the EAAM's responses to the first three questions.

4. Is it true that dolphins need to be starved in order to be motivated to participate in training sessions and/or other human-based interactions?

This question is a straw man. Most animal advocates now understand that cetacean training methods are similar to those used for domesticated dogs. However, to imply that the reaction of cetaceans to these relatively benign training methods is similar to that of dogs, which have been bred for centuries to be human companions, is disingenuous and misleading.

Cetaceans are wild animals; they are not domesticated, even after decades of captive breeding. They are best motivated by food, regardless of the rhetoric regarding secondary reinforcers (e.g., toys, touch) found in this response. The most obvious evidence for this is the frequency with which primary reinforcers (fish and other food) are used in performance sessions. For a dog, a small treat at the end of such a session would suffice to keep the dog motivated; for cetaceans, food must be provided throughout the session or the animal would soon lose interest and stop responding. The obvious test for either claim is to have a cetacean perform an entire show without food at all, using only secondary reinforcers.

In addition, the claim that starvation would result in a dolphin ceasing to respond as soon as hunger was satisfied is highly disingenuous. Obviously hunger is a strong motivator and has been effectively used in any number of circumstances – animal and human – to elicit a desired response. It is not considered humane, which is the only reason it is no longer used – *not* because it is ineffective.

5. Can captive dolphins be trained to return to the wild and live free and healthy?

The response to this question does allow for the possibility, but the details provided on specific releases are outdated and in some cases incorrect. In the section on Keiko, the whale that starred in the film *Free Willy*, the EAAM does not cite Simon *et al.* (2009) (it does cite this paper in the response to the next question – see below). The implication that Keiko's rehabilitation was a failure and that he sought human companionship in vain after his release and died alone is incorrect, as Simon *et al.* (2009) clarifies.

Three bottlenose dolphins were successfully released in S. Korea in 2013 and a peer-reviewed publication will be forthcoming on this project, which had input from international researchers.

6. Was the release of Keiko/Willy, the killer whale, a success?

The response to this question is simply and plainly false. The claim that Keiko “died...without the help of its care-givers” is contradicted by Simon *et al.* (2009), given as a reference yet clearly misunderstood (deliberately or inadvertently) by the EAAM. Keiko’s care-givers were present when Keiko became ill and cared for him in his last days with the advice of his veterinarian – to state otherwise is either a lie or a degree of ignorance that is shocking given that the EAAM has chosen to highlight this release project in this document. Professionals should confirm factual details before using any case study as an example.

About Cetaceans and Humans

1. Do dolphins enjoy being trained?

This question cannot be answered, because assessing ‘enjoyment’ in dolphins is at best inexact and at worst impossible.

The contradictions, illogic, and fallacious reasoning in this response are rampant. For example, the EAAM claims that animals “desire and enjoy” training using operant conditioning with positive reinforcement. However, the original study animals when this training method was developed in the 1950s were pigeons – based on the methods and results of this early work, the birds were entirely motivated by the provision of food. There was absolutely no basis for assuming they desired or enjoyed the training experience. Again, an obvious test of this claim for cetaceans is to conduct a full performance with secondary reinforcers only and see if the animals respond to commands through to the end of the show.

Finally, the double standard when considering other zoo species is clear. Zoos do not train wolves or chimps for performances. Does this mean these intelligent, social species are suffering from lack of enrichment, engagement, stimulation, and physical exercise? One imagines zoos would say no, so the claim that training for performance is essential for adequate stimulation in cetaceans seems arbitrary.

2. Don’t dolphins get stressed by performing to an audience?

Much of this response is a double standard or directly contradicted by what dolphinariums tell their visitors. It is also contradicted by arguments given by other industry associations (such as the Alliance of Marine Mammal Parks and Aquariums). For example, the claim in the first sentence directly contradicts what the trainers tell the audience during a show (where they exhort the audience to clap and cheer to encourage the dolphins in their performance). If this sentence is factually correct, it is an admission that what trainers are told to tell the audience in their ‘script’ is misleading at best and a lie at worst. Given that dolphinariums represent themselves as educational centers, this is troubling.

The claim that dolphins have “poorer vision and poorer hearing outside of the water” is incorrect. Dolphin vision in air is very good. And while their auditory architecture is adapted primarily for underwater hearing, they also can hear in air. The claim that they are unaware of visitors due to poor in-air vision and hearing is not supported by scientific evidence.

This response also appears to argue against allowing the swim-with-dolphin encounters often featured at dolphinariums. If dolphins knowing and trusting the people around them is important for their welfare and if they basically ignore visitors/strangers, then having dolphins interact with a constant parade of strangers (whom they therefore can neither know nor trust) seems counter-indicated from a welfare and stress perspective.

3. Can dolphins be used as therapists?

The response to this question is interestingly non-committal.

4. Do dolphins enjoy interacting with humans?

It is interesting that the EAAM doesn't simply say 'yes' in response to this question. However, most of what it does say is highly subjective and not science-based. The references cited do not support statements such as "experience lets them know (contrarily to the large majority of those in the wild) that the interaction has a strong potential to become fun and poses no harm." Science does not know what dolphins *know* – certain carefully designed studies can provide evidence for the way they *think*, but science cannot easily measure a dolphin's comprehension of concepts such as 'this interaction poses me no harm.' In addition, many wild dolphins appear unafraid of humans in the water – they are unusual in this regard compared to many other wildlife species. So the claim that captive dolphins are 'contrary to wild ones' in this regard is also not supported by evidence.

5. Can interactive programs with dolphins jeopardize their safety and health?

All of the species the EAAM names in this response are domesticated animals. Dolphinariums often make comparisons with domesticated animals, as in 'Dolphins are as smart as dogs.' This is always inappropriate. Domesticated animals are the result of generations of artificial selection; that is, people selectively breeding for traits they find desirable (which may have nothing to do with adaptation to an environment or survival). Wildlife species (such as dolphins), on the other hand, are the result of millennia of *natural* selection. Comparing interactions between humans and domesticated animals (which only exist because people created them) and humans and wildlife (which exist independent of human intention) is a classic 'apples and oranges' exercise.

6. Can people who interact with dolphins be victims of aggression and/or contamination?

The first part of this response is factual. However, once again the comparison with domesticated animals is inappropriate.

The claim in the second to last paragraph, however, is false. Dozens if not hundreds of interactions with captive cetaceans, by the public and by trainers, have resulted in injuries requiring medical intervention. People experiencing bites and rakes requiring stitches, broken bones, and bruising have been recorded during interactions with bottlenose dolphins globally. More such negative interactions have no doubt occurred in facilities in other regions of the world without publicity.

7. Is it true that the dolphins' sonar has healing abilities?

While this response is true, the reference cited has no information relevant to the question.

8. How can people be educated and/or motivated towards conservation, simply by witnessing cetaceans' presentations?

The EAAM's response to this question is standard industry rhetoric. Most of the references cited are either grey literature (unpublished and/or not peer-reviewed) or published papers that do not actually examine the efficacy of visitor learning in dolphinariums. The EAAM is stating an opinion here, because in fact there has been a singular dearth of systematic examination in the peer-reviewed literature of the efficacy of the informal education provided by dolphinariums. Despite the clear need for such systematic evaluation of the powerful claims made by dolphinariums, they continue to rely on polls, non-systematic surveys, and belief when it comes to the educational value of cetacean public display.

9. Wouldn't it be better if people, instead of visiting zoos and dolphinaria, would watch the dolphins in the wild?

Dolphinariums usually imply that there are only two choices for the public to experience informal learning about cetaceans – visits to dolphinariums or cetacean watching, which, if all the people who visit dolphinariums were to go cetacean watching, would put a tremendous strain on dolphin habitat and wild populations. This is a false dichotomy. There are other options for informal learning, some of which may already be more effective at teaching people about cetaceans and cetacean conservation needs than dolphinarium visits. These include, but are not limited to, museums, documentaries, virtual reality exhibits, and books.

The characterization of cetacean watching in this response is also over-simplified and is not supported by the references. There is an extensive literature on the impacts of cetacean watching on cetaceans and on the efficacy of various regulatory regimes and codes of conduct on mitigating these impacts, which the EAAM has not consulted (it certainly has not cited it). Earlier, the EAAM clarifies that how well dolphins do in captivity is a function of a facility's staff experience and so on. Similarly, the impact of cetacean watching is a function of the mitigation measures an operator applies, adherence to best practices, and so on.

About Cetaceans and Ethics

1. Is it legal/ethical to collect dolphin from the wild?

Legality and ethics are not the same thing and should not be coupled in this way. The dolphinarium industry often defends its practices with the claim that its activities are legal. This is independent of whether its activities are ethical and certainly independent of whether its activities are moral.

As for the rest of the response, it is a deflection. The EAAM had an opportunity here to take a position on capture from the wild and chose not to, by invoking tradition, culture, and so on. Many traditional or cultural practices have, over time, come to be seen as unethical or immoral in a majority of societies and have ceased, such as child labor, viewing women as chattel, and slavery. Animal-abuse activities such as cock-fighting and bear-baiting have also ceased in many societies due to ethical or moral considerations. There are often measures that can determine independently of history, culture, tradition or law whether an activity is ethical or moral; this includes measures of human or animal welfare. The EAAM avoids addressing this key point here.

2. Is it ethical to keep such intelligent species in zoos?

This is yet another non-response. An industry association such as EAAM is perfectly capable of taking ethical stands – it is not merely a matter of “individual perspective.” As for the references cited, DeMaster and Drevenak (1988) do not address this question in any way. This paper was an analysis of biological measures of quality of care, not an examination of the ethics of keeping one species or another in captivity.

In addition, as noted above, this is another false dichotomy. The ethical consideration of dolphin captivity is not a matter of quality of care on the one hand and emotions or beliefs on the other. Animal welfare science is a growing discipline and can and should be applied here.

3. Is it legal/ethical to keep dolphins in dolphinariums?

As with the first question of this section, this response is a deflection.

4. Is it true that dolphins are self-aware and, thus, more closely related to humans?

This is another straw man. The question suggests that, if a species is not “closely related to humans,” then it is not worthy of ‘human-like’ consideration. This is a fallacy. In addition, the claim is not that dolphins are *related* to humans, but simply merit similar ethical and/or moral consideration.

As for the comparison with a bird, the implication is that birds *cannot* have an intelligence on a par with intelligent mammals, let alone humans. This is not necessarily true.

5. Is it legal/ethical to promote interactive programmes with dolphins?

This is a non-response. The operative phrase is “should the safety and welfare of all the participants (both human and non-human) be secured.” The EAAM does not actually demonstrate this – it takes this condition as a given. Yet this is the whole point of such a question – it seeks evidence that the safety and welfare of the people and dolphins in such programs are in fact secured. The references cited do not provide that evidence.

The goal should be to conduct systematic studies that support the hypothesis that people and dolphins participating in interactive programs are not harmed in any way by the interactions. Studies to date have been only partially successful at addressing this hypothesis and there is more evidence suggesting that dolphins *are* stressed by interactions with swimmers than that they are *not*⁷, but regardless, this response does not cite these studies.

6. Is it legal/ethical to promote therapeutic programmes with dolphins?

Once again, this is a non-response. It simply states that therapeutic programs *can* be legal and ethical (again, these are not equivalent). But it offers no evidence to support the ethical claim.

⁷ See, for example, Kyngdon, D.J., E.O. Minot, and K.J. Stafford. 2003. Behavioural responses of captive common dolphins *Delphinus delphis* to a ‘Swim-with-Dolphin’ programme. *Applied Animal Behaviour Science* 81: 163–170.

7. How is it possible for a dolphinarium (and its captive population of cetaceans) to contribute to conservation?

Although several papers are cited here, this response is opinion only. There is little peer-reviewed literature that supports the claim that visiting a dolphinarium effectively increases environmental awareness in the public. Certainly some individual visitors may be inspired to do more for conservation, but based on the peer-reviewed literature, it is equally valid to claim that the majority of visitors learn little and are inspired less by visiting a dolphinarium.

Certainly some dolphinariums are involved in stranding networks, conduct research, promote beach clean-ups, and so on. However, the vast majority of dolphinariums do *not* – they claim to, but in fact rely primarily and passively on their dolphin performances or interactive programs to teach or inspire visitors, rather than actively work not only to teach and inspire, but to *measure* the degree of learning and inspiration that does or does not occur.

As for the final paragraph, dolphinariums have been known to work against laws put in place to protect wildlife. For example, in the U.S., the Georgia Aquarium, a facility that claims to be a conservation organization, is currently challenging the denial of a permit application to import 18 wild-caught beluga whales from Russia for public display. The permit was applied for under a strict U.S. law put in place to protect marine mammals. Rather than accept the decision of the regulatory agency that issuing the permit would have violated several precautionary standards of the law, the Georgia Aquarium is suing to reverse this decision and issue the permit, even though it will likely lead to negative impacts on the beluga population in Russia.

8. Why is it that many citizens do not agree with maintaining captive populations of cetaceans?

This response over-generalizes the opposition to captive display of cetaceans. It implies that dolphinarium opponents are typically misinformed and overly emotional. The EAAM is being hypocritical, by generalizing its opposition while claiming it is the opposition that generalizes dolphinariums.

This response uses the word ‘believe’ liberally, as if opponents of dolphinariums reach their opinions only through irrational processes rather than rational, fact-based ones. This is a common but weak tactic in debate – the *ad hominem* attack. If one cannot engage the argument with facts or logic, one attacks those who present the arguments as ignorant, unethical, irrational, and so on. The EAAM’s hypocrisy continues by asserting that “judgments should be done on an individual, direct basis, using modern and scientifically recognized and legally based (and unbiased) criteria.” Yet this entire document is fundamentally non-science-based (despite the long list of scientific references) and biased.

9. Shouldn’t we, as humans, be generous and release all captive cetaceans?

This question is a straw man. No reasonable, well-informed opponent of dolphinariums is suggesting that all captive cetaceans be released. They understand that some captive dolphins are not good candidates for release and should instead be retired to sanctuaries, as many other species of wildlife rescued from unsuitable captive situations are.

In addition, this response could equally apply to captures from the wild (yet the earlier response to a question about captures did not address these points). Captures should never be done if they have a negative impact, directly or indirectly, on the individuals being taken and the populations they are taken from. Once again the EAAM applies a double standard.

10. If dolphins kept under human care cannot be released, shouldn't their breeding be stopped altogether, in order to implement the phasing out of cetaceans in zoological facilities?

The first part of this response is rhetoric, unsupported by practice. The EAAM is claiming that dolphinariums represent a great resource to help protect cetaceans in the wild, yet at almost the same time suggests that cetaceans are faring poorly in the wild. These are mutually exclusive concepts – either dolphinariums are doing an excellent job of educating the public about conservation needs and the environment is being protected...OR the marine environment is steadily deteriorating because members of the public (including those who regularly visit dolphinariums) do not recognize or understand their role in protecting it. *Millions* of people visit dolphinariums yearly and have done so for two or three generations. Their current reach is very wide, yet, based on the steadily declining quality of the marine environment, seemingly ineffective at changing people's conservation-related behavior.

Claiming dolphinariums are essential to saving a species such as the vaquita is highly cynical. In the past 20 years, the baiji – the Yangtze River dolphin in China – declined in number every year until it was declared functionally extinct in 2009. During this period, dolphinariums in the EU and elsewhere made the same claims the EAAM makes here – that they were an invaluable resource for education and conservation and were vital to keeping species (like the baiji and the vaquita) from going extinct. Yet the baiji is gone and the vaquita is rapidly disappearing. Dolphinarium rhetoric *clearly* does not match reality.

Dolphinariums are *not* helping prevent the extinction of cetacean species on the brink. They are numerous and they are wealthy, but they are not spending their revenue on conservation (most are for-profit and their revenue goes to owners and shareholders). These claims about saving the vaquita (or the baiji) are mere propaganda. They *do* little or nothing to save truly endangered species (note that the bottlenose dolphin, the most commonly held cetacean species, is not endangered and its biology is very different from the baiji's or the vaquita's and what is learned regarding husbandry from maintaining them in captivity did and does little or nothing to help endangered species).

Finally the last argument is hypocritical. The EAAM is claiming that breeding is a fundamental behavior whose expression is essential to maintain cetacean welfare and health. Yet earlier it claimed that diving deep or traveling far were *not* fundamental behaviors whose expression is essential for dolphins' welfare or health. This is cherry-picking facts. The industry does not get to pick and choose which behaviors are essential for welfare and which are not, based on what *dolphinariums* need (more dolphins) and can supply (small, shallow tanks). Animal welfare science examines what the *animal* needs to determine what is in fact essential for welfare and should be applied here.
