



FACT BOOK ON MARINE MAMMALS

[Click here to view pdf version of this report](#)

[Other conservation projects](#)

(Underwater World Singapore would like to thank the Alliance of Marine Mammal Parks and Aquariums for kind permission to use the information in the following fact book)

DOLPHIN AND WHALE LIFESPANS IN AQUARIUMS ARE SIMILAR TO THOSE IN THE WILD

Dolphins and whales in public display facilities have a better chance of being healthy, hence it is not surprising that studies indicate that they live as long in marine life parks, aquariums, and zoos as they do in the wild. These marine mammals do very well when they are in the care of responsible public display facilities. They breed successfully, form complex social groups, and exhibit excellent physical health.

The dolphins and whales in marine life parks, aquariums, and zoos consume consistently high-quality, nutritional food; receive excellent medical attention; and are kept free of debilitating parasites. This is in stark contrast to the predators, disease, pollution, well-documented commercial fishing and recreational boating dangers, and other stress they face at sea, resulting in thousands of deaths each year.

A study focusing on the bottlenose dolphin by Drs. Deborah Duffield of Portland State University and Randall Wells of the Chicago Zoological Society shows that the average age of dolphins in marine life parks, aquariums, and zoos is similar to that of dolphins in their natural environment. The study is based on comparative demographic census data for dolphins in public display facilities and a wild Sarasota dolphin population studied by Dr. Wells. (IMATA Conference Proceedings, 1990) This work corroborates a study published in 1988 by DeMaster and Drevenak who pointed out that survival of dolphins in aquariums "may be better than or equal to survival in the wild." (Marine Mammal Science, 4:297-311, 1988)

Similarly, a November 1992 report by the Canadian Advisory Committee on Marine Mammals concluded that the survival rate of both beluga and killer whales in zoological facilities is similar to that estimated for wild stocks. (Capture and Maintenance of Cetaceans in Canada, A report by The Advisory Committee on Marine Mammals for the Minister of Fisheries and Oceans, November 30, 1992)

The marine mammal community has learned much about dolphin and whale physiology and developed or adapted many veterinary technologies since the pioneering early seventies. These advances have been made possible by research conducted at public display facilities. The research is also essential to the rehabilitation of sick and injured wild marine mammals as well as to the management of wild populations of marine mammals.

A 1995 longevity report based on the U.S. National Marine Fisheries Service inventory report reflects the marine mammal community's continued advances in science and husbandry. The report indicates that survival rates for five species of marine mammals commonly held in public display collections, including whales and dolphins, increased from 1988 to 1992. The report, "Survival of Five Species of Captive Marine Mammals," by Robert Small and Douglas DeMaster was published in Marine Mammal Science.

Impartial, scientific researchers expect future studies on the lifespans of dolphins and whales to show that lifespans of animals living in zoological environments surpass their counterparts at sea. Dolphins and whales have only been in public display facilities for a limited period of time. Scientists do not know what their maximum lifespans in these facilities will be. However, there are many animals in collections that are in their 20's and 30's--some of which are still breeding successfully--and an increasing number of seniors over 40 years old.

Data on the longevity issue are frequently misrepresented. Critics often compare average lifespans in aquariums with maximum lifespans in the wild. These are two different measures. Dolphins, for example, can live into their 40's, but modern public display facilities have only been in existence for 25 to 30 years. The oldest, scientifically aged dolphin in the wild studied to date was estimated to be 48. This is a maximum age, comparable to a human living to be about 100. Dr. Wells' studies have found, however, that only 1-2% of the animals will reach that age at sea. The oldest dolphins in marine parks are fast approaching this mark.

Marine mammals, like all animals in the wild, suffer more mortalities during the first two years of their lives, a time when they are particularly susceptible to disease, predators, and adverse climate. For example, studies of beached, dead dolphins in the Indian/Banana River system of Florida indicate that 38% died before they reached two years of age. Sixty-four percent of the dolphins studied died before they were 10 years old.

Studies of deaths in aquariums in the 1970s, often quoted by activists, found that 48% of the dolphins collected died in their first two years. Research and experience with dolphins and whales, enhanced by commitment to the animals, has taught the community a great deal in 25 years. A look at more recent data indicates that almost 97% of the dolphins collected adjust well to aquarium living.

DOLPHIN LIFESPANS FAR SURPASS THE 5-YEAR FIGURE OFTEN INCLUDED IN MEDIA REPORTS

While the data is clear that dolphins live long and healthy lives in marine life parks, aquariums, and zoos, it is often reported that dolphins only live for about five years in these facilities. This appears to be an understandable but unfortunate misreading of two reports.

In both studies in which this number is mentioned, the five-year figure simply represents the "mean" or average age of dolphins studied from the time the animal came to an aquarium until the completion of the research.

This figure is meaningless in discussions of lifespans, and has nothing to do with longevity. The use of it as a longevity indicator is a misinterpretation of the research.

For example, if a dolphin was born in a facility early in 1985 and the study ended in late 1987, the young, healthy animal was given a "longevity" of three years. Similarly, one institution studied reportedly had an average "longevity" of 6.93 years when the study was completed in 1987, though all of the eight dolphins in the research project were alive at the end of the project.

The studies cited by those using this five-year figure are a peer-reviewed publication by DeMaster and Drevenak funded by the Marine Mammal Commission, and a report by Karen L. Steuer while she was with the Center for Coastal Studies.

DeMaster and Drevenak, who published their study in 1988, have themselves discouraged the use of their "mean" statistics as an indicator of dolphin longevity. They recognized that the numbers were "sensitive" to the substantial proportion of animals born or newly acquired during the research, which lowered this "mean" data substantially. They explicitly stated that the mean figures in their study were not representative of the animals' longevity.

In fact, both studies show that the annual survival rate for bottlenose dolphins is more than 93%, a figure that is identical to that for wild populations. Yet, the "mean" figures in the Steuer report is 5.04 years. Though the sample size is much smaller for whales, Steuer found the mean annual survivorship for belugas to be 96% and 98% for killer whales.

Steuer reported that survivorship was 100% for captive born dolphins during the time frame studied if stillbirths and deaths during the first year after birth were excluded. Steuer's data is based on acquisition date and date of death taken from the National Marine Fisheries Service Marine Mammal Inventory from January 1975 to December 1987.

A LOOK AT DOLPHIN SOCIAL GROUPS

Dolphins are very social animals, yet their social groups are flexible and fluid, not static. It is not uncommon for individual animals to move between social groupings or pods.

Dolphins have been chased, preyed upon, and their groups disrupted long before humans appeared on earth. Moreover, the tuna purse-seining techniques and drift nets that have destroyed millions of dolphins over the last few decades have had no effect on the social structure of dolphin populations. It is, therefore, not logical to assume that the minuscule number taken for public display and scientific research could adversely affect their behavior or social structure, nor is there any scientific evidence to substantiate this claim. In fact, the last bottlenose dolphins (3) collected for public display in U.S. waters were taken in 1989.

Richard Connor, PhD, and his co-workers have made extensive studies of wild bottlenose dolphins in Australia. This research suggests that dolphins live in "fission-fusion" societies, and that "assemblages of dolphins...are typically ephemeral and poorly defined."

Deborah Duffield, Ph.D., a leading geneticist at Portland State University, notes that of the populations studied, pod members are not necessarily closely related. Some of the animals may be kin, but not the majority. At its core, a

dolphin "family" consists of a mature female and her most recent offspring. In some instances, a second, older offspring may also stay with its mother. To use the term "family," as humans experience it, is not appropriate with dolphins.

MARINE MAMMALS LIVE HEALTHY LIVES IN MARINE MAMMAL FACILITIES FREE OF THE STRESS IN THE WILD

Responsible marine mammal facilities dedicate extensive resources to meeting the physiological and social requirements of their animals, and house them in facilities that allow them to exhibit a full range of natural behaviors. If ulcers are a measure of stress, then it can be concluded that marine mammals in marine life parks, aquariums, and zoos face much less stress than in the wild.

Marine mammal pathologists have seen more gastric ulceration in stranded, wild animals by a wide margin. An examination of National Marine Fisheries Service data on mortalities from gill and tuna nets confirms this.

The infrequent pattern of ulceration found in marine mammals housed in aquariums does not fit the pattern of stress-related ulcers. These conditions can be clearly differentiated through microscopic examination.

If animals in public display facilities were under stress, there would be some very obvious indicators. In contrast, animals in zoological environments breed very successfully, form social groupings, and exhibit excellent mental and physical health.

Their good health and lack of stress results from stimulating environments in public display facilities, a consistently high quality diet, excellent medical care, and freedom from parasites, predators, and pollution. In these facilities, the animals do not have to face danger from fishing nets, injury by recreational boaters, being shot for sport, ingestion of neurotoxic fish, or adverse climatological conditions -- all known factors that cause serious stress to animals in the wild.

PUBLIC DISPLAY PLAYS AN ESSENTIAL ROLE IN THE CONSERVATION OF MARINE MAMMALS

In addition to the 36 million people who visit Alliance facilities throughout the world each year and learn about marine mammals and the need for their conservation, over two million children participate in specially designed, on-site education programs. These include field trips to public display facilities, summer camps, and other targeted courses, lectures, and education programs. An estimated 800,000 individuals, including community groups, teachers, and students, receive educational information through off-site, outreach programs yearly. Alliance members also reach over 100 million people annually with educational messages about marine mammals through the internet, computer learning programs, publications, satellite television, and other such vehicles.

Visitors young and old walk away from these institutions with a strong interest in the conservation of marine mammals and a determination to see that the animals are kept safe and protected in our oceans and rivers. A Roper poll published in 1995 confirms this. Most people (79%) feel that if the public learns more about these animals, they are more likely to become concerned about them and their conservation.

When the Marine Mammal Protection Act passed in 1972, the U.S. Congress recognized that certain species of these animals were in danger of extinction or depletion as a result of commercial fishing and pollution. In that year alone, it is estimated that over 400,000 dolphins died in the tuna purse seine fishery in the eastern tropical Pacific Ocean. Congress searched for a balance. The legislators knew that without seeing marine mammals people just would not care as much about them, and that education through public display was a practical answer.

Congress also understood the inadequacy of research needed to conserve these animals and protect them. There is much to be learned from marine mammals in marine life parks, aquariums, and zoos to help keep wild populations healthy and safe and to help the thousands of animals found stranded on beaches across the country each year.

Researchers were never certain of a killer whale's length of pregnancy until reproductive studies could be conducted at public display facilities. Yet this information is vital to understanding the animals' ability to sustain a healthy population in the wild.

In the last five years, Alliance members have spent over \$20 million for research on ways to improve animal husbandry, health, diet, and reproductive biology and to study animals in the wild. Research at public display facilities has led to a vaccine for pasteurellosis, a potentially fatal bacterial disease of pinnipeds. A study of fluids used for off-shore drilling resulted in the stoppage of usage of the most toxic component, which was damaging to marine mammals. A cooperative research project focused on the endangered Florida manatee. Scientists needed to learn more about the population's energetics to determine when and how to release orphaned manatees or calves raised in zoological institutions. Animals in public display facilities also have been involved in numbers of studies on devices to alert wild marine mammals to fishing nets.

In addition, baseline data collected from blood, fecal, and urine testing at public display facilities allows marine mammal veterinarians to interpret the needs of stranded animals, and experience with anesthesia and surgery techniques saves

the lives of many stranded, sick and injured animals.

This research assures that marine mammals in public display facilities have quality health care and is the foundation of the community's excellent breeding programs. As a result of these breeding successes, almost half of all whales and dolphins in aquariums were born in marine life parks, aquariums, or zoos.

Educational programs at these institutions teach visitors about pollution that kills and endangers thousands of marine animals and wildlife. They teach about how fragments of fishing gear, polystyrene cups, plastic bags, and other trash carelessly cast into the sea can become killers when marine mammals ingest or become entwined in them. Programs also focus on habitat destruction, which is a significant threat to the manatee, gray whale, vaquita, and other endangered marine mammals.

Our collective goal should be to strive daily to educate the new generation of young people to the delicate balance between humans and wildlife and to their responsibility to protect the environment. The continued educational display of marine mammals and funding of important research by public display facilities is critical to the animals' future well being.

DOLPHINS AND WHALES CAN ADJUST THEIR SONAR TO COMPENSATE FOR ANY ENVIRONMENT

Numerous studies conducted over 40 years prove that dolphins and whales know exactly how to compensate for their environment, using their sonar only when they choose to do so.

Echolocation has been well researched by the scientific community, and the evidence clearly demonstrates that dolphins and whales (cetaceans) can use their sonar at will; turning it on or off as they need to find food, navigate, and avoid predators.

Dolphins' sonar abilities or echolocation was first discovered at Marineland of Florida (Dolphin Societies edited by Pryor and Norris). Simply put, dolphins use their sonar to produce sound and bounce it off objects, which the animals then interpret. This echolocation is used to search for food, escape predators, navigate, stay with their pod, acoustically communicate with each other, and define the forms that make up their environment.

Patrick Moore reports his research showing that dolphins have voluntary control over the frequency and amplitude of their signals in one chapter of Dolphin Societies. He documented that they can echolocate loudly, quietly, or not at all -- as they choose. In the same book, Drs. Kenneth Norris and Randall Wells have shown that dolphins in the wild echolocate often while fishing and moving, but that they periodically go silent, especially while resting.

In the book Animal Sonar Systems, edited by Fish and Busnel, W.W.L. Au describes research establishing that the amplitude of sounds dolphins emit in pools is 1/100 of the amplitudes they emit in the open ocean, evidence that dolphins are able to control the sounds they produce.

Dr. Au and his colleagues reported in the Journal of the Acoustical Society of America that dolphins can detect drift nets with their sonar. The problem they found, ironically, is how to get a dolphin to turn on its sonar to find and avoid these deadly nets.

In the face of these studies and others, it is inaccurate to suggest that the sophisticated sonar of a dolphin or whale is like a horn that cannot be turned off and that the resulting "noise" and echoes annoy or injure the animals.

In educational programs at marine life parks, aquariums, and zoos, dolphins and whales voluntarily demonstrate their echolocation abilities to find objects at their trainers' direction.

Research on echolocation and other acoustic behaviors has been fundamental and vital in understanding the nature of acoustic behavior at sea. For 30 years, the Navy has been training dolphins and whales to use their sonar for tasks related to underwater surveillance for object detection, location, and recovery purposes. These natural behaviors are beyond the capabilities of human divers. Dolphins and whales trained in these tasks save millions of dollars in retrieving expensive equipment used in military exercises.

DECISIONS TO RETURN MARINE MAMMALS TO THE WILD SHOULD BE MADE WITH GREAT CARE

The issue of releasing to the wild whales and dolphins that are currently cared for in marine life parks, aquariums, and zoos can be challenging both emotionally and scientifically. However, to experts concerned about the risks to which release exposes both the individual animal and the wild population, the issue is a simple one. Without a compelling conservation need such as sustaining a vulnerable species, release may be neither a reasoned approach nor a caring decision.

The survival of marine mammals in the wild requires an elaborate series of skills including the ability to detect and avoid predators and to forage for food. Many animal care experts believe marine mammals that have spent a substantial portion of their lives in zoological parks and aquariums most likely have lost their ability to find food. Additionally, the animals may have diseases that are transmittable to wild populations, and may not be immune to diseases for which wild animals have immunities.

A November 1992 report of the Canadian Advisory Committee on Marine Mammals concludes that the release of whales and dolphins that have been in marine life parks for extended periods is "inappropriate." The committee reviewed a number of exploratory projects to learn something of the problems and potential of the concept. The advisory group noted that retraining to kill prey is essential, though not a "sufficient capability." Survival, the Committee pointed out, "requires a series of complex skills plus physical and physiological competence. Concern for the individual includes making sure that the animal can kill its own prey. But much more difficult is to teach the individual to find its prey today, tomorrow, six months from now and so on when that may require moving long distances to secure seasonally available food resources." The committee also expressed concern that an animal, after years of a sheltered life, "may have lost its skill at detecting and avoiding predators" and that for wild dolphins and beluga whales, predators are "a fact of life."

The U.S. Navy published a technical report on reintroduction based on input from 28 independent experts. (Technical Report 1549, Brill and Friedl, 1993) In addition to concluding that there is no compelling scientific justification for reintroducing non-endangered species, the participants made some practical observations -- success would depend on enormous resources and untested methodologies. Also, telemetry technology needed to track a whale or dolphin and quantify the long-term success of any reintroduction cannot yet be accomplished with certainty. (Monitoring for one year is recommended in a U.S. government draft outlining criteria for the release of stranded whales and dolphins.)

The Alliance does not oppose proper, scientifically-based reintroduction programs that are anchored in principles of conservation biology and have the ultimate goal of sustaining marine mammal species. Such programs utilize recognized methods of conservation biology in efforts to re-establish or reinforce an endangered native wild population. Also, the Alliance understands the value of using surrogate non-endangered species to conduct an experimental return to the wild for the purpose of generating data and developing technology applicable to future projects aimed at conserving endangered species.

The Alliance knows of no responsible conservation organization that supports releases of non-endangered species, except under specific protocols used to develop reintroduction techniques for closely related species. For example, the International Union for the Conservation of Nature emphasizes in guidelines that "it must be determined that returning [animals] to the wild will make a significant contribution to the conservation of the species, or populations of other interacting species."

In contrast to reintroduction, some critics of public display advocate the release of individual whales and dolphins to the wild. Scientists generally define release as placing an animal in the wild without a compelling conservation purpose or a science-based protocol. Others advocate what scientists call an experimental return to the wild, a release to the wild without a compelling conservation purpose but one that is well-planned with a documented scientific process.

The Alliance does not support the casual release of any marine mammal because the very real risk of death to the animal profoundly outweighs any perceived benefit. Also, such a release may jeopardize wild populations of marine mammals through disease transmission, disruption of long-established social systems, use of limited resources such as food, and through artificial genetic mixing. However, should an organization such as the Free Willy Keiko Foundation decide to return to the wild a dolphin or whale for which it has ownership, the first step should be an evaluation of whether the animal is a good candidate for release. A number of important factors should be considered: the animal's age and years out of the wild; the animal's health and immune status relative to local disease; its ability to catch live fish in amounts sufficient to sustain its health, to forage as the seasons change, and travel long distances to find prey fish; and the animal's experience and social skills with conspecifics.

Alliance members have acquired much knowledge about releasing animals and the criteria for release from their experience with stranded marine mammals. In the U.S. for example, more than 1600 stranded marine mammals have been successfully rescued, rehabilitated, and released in the past five years. The longer a stranded animal is in rehabilitation, the less chance of a successful release, many experts have found. The U.S. government recognizes the importance of quickly returning marine mammals to their natural habitats by requiring that stranded animals be released within six months of their rescue or a veterinarian must explain why the animal's health or injury requires a longer rehabilitation. The release of older whales and dolphins that have been in public display or research facilities for decades would be unlikely to succeed as older animals have increasing difficulty coping with disease, stress, and change. The collective experience of Alliance members and other experts indicates that the release of younger, healthier marine mammals is also risky.

After determining whether an animal is a good candidate for return to the wild, the second consideration is the process. Scientifically established and accepted protocols for returning a marine mammal to the wild and evaluating the success of such an effort are still in the developmental phase. The world's scientific community should have the opportunity to review and comment on any protocols and its expertise should be integrated into a comprehensive document.

Given that a return to the wild would likely be scientifically controversial and could set precedents for other such returns, an Environmental Assessment should be conducted. The possibility of disease transmission to wild animals should be evaluated carefully. The U.S. government has also expressed concern about unwanted genetic exchanges between released and endemic stocks/populations and any behavior patterns that could prove detrimental to either the social structure of the local population or the social assimilation of the released animal.

Alliance member knowledge of marine mammals suggests that any decisions about an animal's release or return to the wild be made with caution and compassion and with paramount consideration for the continued well-being of the wild host population.

TRAINING OF MARINE MAMMALS IS ALWAYS DONE IN A POSITIVE MANNER AND IS ESSENTIAL TO MAINTAINING THE ANIMALS' HEALTH

An important aspect of training marine mammals is conditioning the animals to voluntarily participate in routine physical examinations and sampling procedures that are essential to maintaining the animals' health.

These learned behaviors involve procedures that are conducted on a regular basis, and may include mouth and eye examinations, the collection of blood, blowhole, urine, and fecal samples, as well as ultrasound examinations necessary for monitoring pregnancies in females.

Although training may serve a variety of purposes, it is also a form of exercise for the animals, stimulating them mentally and physically.

The training of marine mammals is done in a positive manner. Successful relationships develop when the animal and trainer have a good rapport, based on mutual respect and trust. Anything but positive interaction would abrogate that bond.

Desired behaviors are rewarded or reinforced to increase the probability that the animal will repeat them when asked to do so in the future. If an animal does not respond or offers the incorrect response, the behavior is ignored.

Every animal is fed a highly nutritious diet specific to its daily needs. Food rewards during training are simply a portion of that balanced diet.

Food is, by definition, a primary reinforcer for marine mammals; however, it is not the only reinforcer used in marine mammal training. Tactile stimulation, toys, or the opportunity to perform favorite behaviors are just a few of the other possible reinforcers available to trainers. Dolphins, for example, often continue to offer behaviors long after they have eaten all of their food, seeming to do so simply for the positive interaction with their trainers.

Among the many educational programs offered to the public, some marine life parks, aquariums, and zoos offer a presentation in which animals demonstrate their physical capabilities and behaviors they have learned to help facilitate procedures necessary for their good health.

Participation by an animal in any training program, project, or show is voluntary.