

Toki Health and Welfare Report

Friends of Toki

December 13, 2022

Friends of Toki and The Dolphin Company are collaborating in unprecedented ways to provide Tokitae, the whale also known as Lolita, with the highest quality of life possible. The collaborative nature of this undertaking for the benefit of a single captive killer whale is truly meaningful.

Executive Summary

Friends of Toki, founded and supported by Pritam Singh, initiated conversations with Eduardo Albor, the CEO of The Dolphin Company upon The Dolphin Company's purchase of the Miami Seaquarium in March 2022. With the support of the Miami-Dade County Mayor, Daniella Levine Cava, and The Dolphin Company, Friends of Toki invited independent veterinarians, Dr. James McBain and Dr. Stephanie Norman, to visit the Miami Seaquarium (MSQ) to assess and consult on the health and welfare of Tokitae (Toki). Toki has been at MSQ for more than 50 years and is one of the two oldest whales in captivity. At the time, Toki was reported to be in ill health and earlier reports issued in 2021 and early 2022 had suggested that she was gravely ill.

What began as an effort to bring independent veterinarians to assess Toki's health and to bring transparency to her condition, has now grown to be a full collaboration between Friends of Toki and The Dolphin Company encompassing all aspects of Toki's quality of life: her health and welfare, the life support systems and water quality in her tank, her enrichment program, her medication, and the animal care staff.

Today, Dr. McBain and Dr. Norman are working closely with the MSQ attending veterinarian and consulting veterinarian. Although Toki has had a number of health challenges throughout this year and her vets have determined that she is suffering from a chronic infection, her therapy and current medication appear to have resulted in significant improvement, especially most recently while improvements in her water quality and expansion of her enrichment program have been simultaneously introduced. Toki is active, she is eating well, and engaged with her trainers. She is still dependent on medication so her veterinary team cautions that we cannot assume she is out of the woods, but we all feel much better about her future prospects.

As an example of the extent of the effort to provide her with the best medication available, she has received an oral antibiotic produced in Japan that had not been approved in the U.S. Friends of Toki secured compassionate authorization from the U.S. Food and Drug Administration to import this oral antibiotic for Toki with the assistance of the U.S. State Department, the Consulate of Japan in Miami and the Miami-Dade County Mayor's office.

Friends of Toki has also embarked on extensive repairs and parts replacement for Toki's life support system to improve the reliability of the systems that support her water quality. This includes changing the sand filter media and operational procedures (like backwashing) to improve the water's pH and sustain normal marine water ranges, the installation of two new chillers to enable better water management and the addition of an ozone system to eliminate the use of chlorine.

Toki's enrichment and training regimen is now a sustained collaborative effort of the Friends of Toki onsite full-time staff and the Miami Seaquarium trainers. Friends of Toki have developed an enrichment and conditioning plan that is being implemented. Already Toki is more active; she is engaged with her trainers; and she is very responsive. All of which complements and supports the efficacy of the veterinary care she is receiving.

Friends of Toki is committed to doing everything to support Toki for her life and provide her with the highest quality of life possible. Pritam Singh has made the emotional and financial commitment that makes this possible.

Today, we are all focused on her immediate health and welfare at the Miami Seaquarium. If her expert veterinarians and government regulators make the determination that she can and should be moved, every possibility for her will be considered, including moving her to a protected area in her home waters of the Salish Sea, where the indigenous people consider the orcas to be their relatives who live beneath the waves.

As Pritam Singh has said, Toki did not choose to be where she is. She cannot make her own decisions on her future. She is dependent upon us and we must all do everything we can for her health and welfare.

Veterinary Report

Beginning in late December 2021 Toki suffered an acute onset of illness which remains with her today. The decline was first noted with slight changes in her routine blood test results, that was followed by a decline in her behavior. The illness has long been suspected being of respiratory origin.

During this prolonged illness Toki has received antibiotic treatments based on the sensitivity patterns of the pathogenic bacteria found in her respiratory cultures that demonstrated a positive response to therapy on multiple occasions. However, on each occasion when therapy was discontinued, illness has returned. Despite having continuing evidence of respiratory disease, periodic gastrointestinal illness has served to complicate therapy and diagnostics.

Molecular pathogen (DNA) testing of blood, stool, and respiratory samples was implemented to provide an additional and more sensitive means of identifying the microorganisms that were challenging Toki's health. The results of these DNA tests provided unique information on resistance genes that some of the bacteria or fungi might be carrying.

In most animals in which a respiratory disease is suspected, the next step might be to perform a bronchoscope examination, which involves inserting a camera through the blowhole and into the respiratory tract to visually evaluate the airways and obtain direct samples. This procedure would be a risky task and has not been implemented because of the set-up of her pool, the difficulties associated with her size, access, and the limited expected value of bronchoscopy in her case. Therefore, clinicians must rely on cytology, cultures, and ultrasound exams. The DNA analysis (new technology) is expected to make up for the absence of bronchoscopy.

While we are inclined to think the cause of Toki's illness is of bacterial origin, we have maintained anti-fungal therapy as well. Under the circumstances, the use of antifungal drugs is expected to be of prophylactic value as well as therapeutic.

Trained behaviors have provided access for ultrasound examination of Toki's lower lung fields. These examinations in the fall of 2021 revealed the presence of caveated lesions (presumably from pneumonia scars) prior to clinical signs developing. The lung lesions have been monitored routinely with little change since their initial discovery. We do not know for certain that these lesions are involved in Toki's current illness, but we continue to monitor them. This type of lesion is not rare in older cetaceans, but it cannot be overlooked.

In early October 2022, Toki experienced another health event appearing more serious than preceding episodes. This time she presented with gastrointestinal signs as well as a complete loss of appetite. This situation made it virtually impossible to adequately provide medical treatments. A rare pool drop was undertaken in order to reestablish therapy. Toki and her training staff managed this situation efficiently with minimal stress. This approach was continued for a week and discontinued when her lab test results began to improve, and her appetite returned. We all hope we do not have to repeat this situation anytime in the future.

With the approval of the U.S. Food and Drug Administration and assistance from the U.S. State Department, the Miami-Dade County Mayor's office, and the Japanese Consulate in Miami, an oral antibiotic was acquired and administered. While on this oral antibiotic she seemed to be tolerating it well and her blood test results improved. It is too early to become overly optimistic, but the direction is encouraging and she is no longer receiving this medication. She is currently eating well and actively involved with her trainers. Toki's environmental enrichment program is operational and adding new dimensions to her daily life. In spite of the things that are going well, past history tells us that treatment is likely to be prolonged and there could be more disappointment in the future, but we look to a time when she will not require medication.

Her veterinary team is cautiously optimistic. We know she has a very resistant infection and if her current therapy fails our options will be limited. For now, Toki is clinically stable, improving, and doing well. She continues to go through very close monitoring of blood/fecal/exhale/gastric samples, ultrasounds, and physical exams. She currently receives oral antibiotics, antifungal agents, and a decreasing dose of anti-inflammatory medications. She has a thick blubber layer and remains in good body condition.

Whale & Dolphin Water Quality/Life Support System Update

Further enhancement to Toki's life support system (Fig. 1) continues to provide sustainable and optimal water quality. The Team has worked diligently to upgrade Toki's water quality with minimal operational disruption and supply chain issues as quickly as possible. Featured below are the conceptual drawing upgrades for her exhibit.

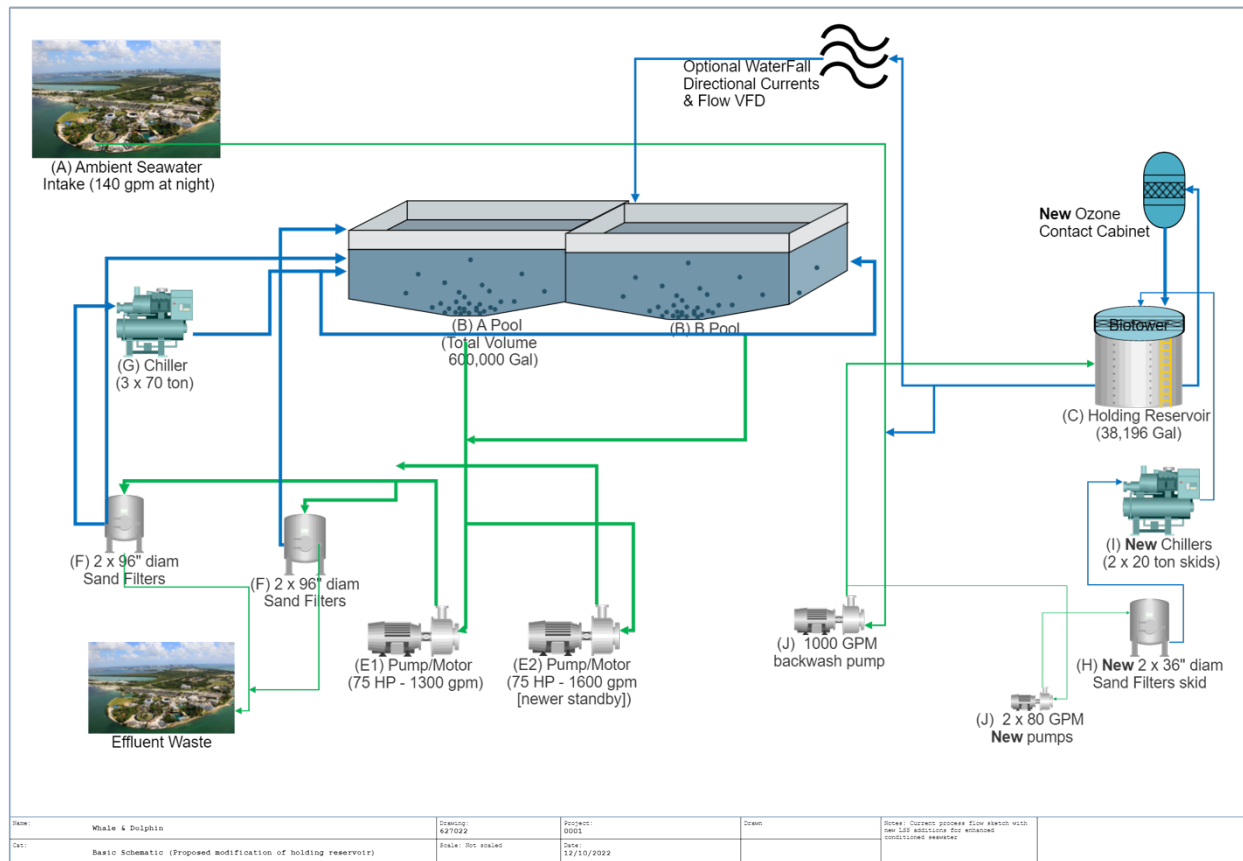


Figure 1. Proposed life support system upgrades to enhance and sustain Toki's water & environmental quality

Several key areas of change to Toki's habitat are in progress to improve and sustain her water quality long term.

Life Support System

In Progress

- Upgrade electrical service upgrades for operation of new chillers/ozone system/filter pumps. 12/14/22.
- Estimated 12/10/22 for completion. Already installed new chillers [I] skids onsite to cool incoming ambient seawater [A] to holding reservoir [C]. This new water supply source will aid in balancing Toki's pool water temperature demand, pH, salinity, alkalinity, and increasing water microbiome diversity. The new system installation has begun adjacent to holding reservoir [C].

- Estimated 12/20/22. Install/energize new ozone disinfection system [OCD] to treat water from new chillers [I] and supply holding reservoir [C]. This new disinfection system will replace chlorine as main source of disinfection.
- Installing a new multiple outlet water fall system to create new currents, waves, and surface water mixing. There will be options to change the water temperature of this system dependent on seasonal demand.

Close to completion/Completed

- Replaced old heat exchanger to existing chiller to increase water cooling efficiencies [G], completed 12/06/22.
- Upgrade existing large sand filters with new media to improve particulate removal from water (clarity & color), enhance biological filtration, reduce backwash water loss (conserve chilled water volume) [F]. Completed 11/21/22.
- Installed Riprap 12/05/22 to prepare graded pad for new Life Support skids.
- Replaced mechanical seals of main circulation pumps for optimal flowrates and pump performance [E1/E2].

Relevant Water Quality Changes

- Water temperature is now within optimal range for Toki. The new life support system will provide additional/sustainable options to cool her pool based on animal care requirements.
- Water pH/alkalinity remain comparable to ambient seawater.
- Water microbiome is beginning to shift closer to ambient seawater and Flipper habitat.
- Chlorine demand has been reduced to historically low concentration and still provide very low total coliform levels. Ozone disinfection will replace chlorine as the main treatment once completed.
- Water clarity (as turbidity) has improved significantly with changes to sand media and operational procedures of filtration.
- Water color is transitioning to that found in the Gulf of Mexico – emerald green.
- Water current have increased throughout both pools enhancing both vertical and horizontal mixing of the water column.

Enrichment Plan

The animal care plan including enrichment and training is a working document that is intended to address immediate behavioral goals for Tokitae (Toki). The behavioral goals are based on the observations made during the cooperative effort by the Miami Seaquarium staff and Friends of Toki team during Toki's health decline immediately after hurricane Ian and her subsequent health rebound. These behavioral goals will help in promoting and optimizing Toki's cooperation while tending to her veterinary needs. As a working document this plan will be

continually revised and updated based on Toki's trainers' experience with her including the design of a broader enrichment and training program that will include increased choice in her enrichment activities, increased choice and control in acquiring toy objects and interactive activities with training staff, stretcher training, and exposure to live fish and other foraging opportunities.

Many of the ideas suggested in this plan will be introduced gradually and behavioral goals will be targeted in small steps. We will take an adaptive approach, tailored to Toki's history and informed by her responses at each step. Toki's team (Miami Seaquarium staff and Friends of Toki staff working as a collaborative team) are working together to determine the pace and method of any changes to her routine or current enrichment, as well as the introduction of new sources of enrichment. We will closely monitor Toki's responses, and adjustments to the plan will be implemented based on Toki's needs. This will be an ongoing process.

Immediate Behavioral Goals

- High Responsiveness to Tactile Interactions – Toki should be responsive to and motivated by tactile interaction and reinforcement. She should be responsive to tactile reinforcement from all of her care staff and in both pools A and B. This is a very high priority and has been initiated by her care team. Cetaceans are highly social and spend time engaged in tactile interactions with conspecifics, members of their social groups. In cases when cetaceans may not eat due to illness, they will often continue to respond to tactile interaction with their human caregivers and this can greatly facilitate medical exams and care.
- Increased Activity Level – Toki's normal daily activity level should be sufficient to maintain physical and mental health as well as maintain her strength for training activities at the guidance of the veterinary staff.
- Increased Acceptance of Varied Feeding and Hydration Methods – Toki should be interested in obtaining food and hydration via a variety of different methods other than only eating fish in case she refuses to eat. This will allow the training staff to have more tools available to them if she becomes less interested in food or becomes dehydrated due to medical issues or stress.
- Increased Reliability of Medical Behaviors – Toki should be well trained for regular animal care (husbandry) practices and procedures, such as layouts for exams, full body including oral examinations, dropping the pool to allow for medical access in the event Toki is unable to be safely accessed any other way. By being well-trained for these activities, Toki may be more accustomed to these activities when they are medically necessary, and stress will be minimized.

Key Considerations with all Enrichment & Conditioning Activities

- All activities will be continually monitored closely and Toki's behavioral response will be documented as objectively as possible by Toki's team. Proper monitoring includes end of day reports completed every day. End of day reports should include behavior rating, appetite level, types and numbers of sessions conducted (i.e. medical training, tactile sessions at pool side, waterwork, etc.), interacting trainer and spotter, etc. The names of the trainers working with Tokitae and Lii will be listed for all sessions. Toki's response

should be evaluated and discussed, in the daily team meetings, and changes to the activities should be made accordingly. These protocols have begun and are being refined based on the daily experience of the team with Toki's activities.

- Training staff are increasing the amount of time spent present and interactive at poolside with Toki and Lii, including time spent brainstorming enrichment/training sessions.
- Toki's participation in activities and training sessions should receive both food (primary) and tactile reinforcement. Tactile reinforcement in small increments while being paired with primary reinforcement should hopefully become a more motivating part of her day. Toki's team should engage in tactile interactions in a variety of different training sessions based on Toki's response. When tactile interaction/reinforcement is given from the poolside or in the water, another trainer should always be in the area.
- Lii, the Pacific white-sided dolphin who is Toki's pool mate, is attended to by an additional animal care staff member during most of the suggested activities. It may be necessary for Lii and Toki to be separated for select activities, and it should be ensured that Lii is getting the same level and quality of attention that Toki is receiving. There may be some level of competition between Lii and Toki that could be advantageous to enrichment and training activities.
- One of Toki's favorite toys is currently a bit of wetsuit material. This toy is continuing to be utilized for the time being as it may provide an advantageous tool while new activities are introduced, but the long-term plan should be to phase out this particular toy, so its current use should not be increased in any of the suggested activities. This is strongly suggested because currently Toki playfully pulls the wetsuit down into the water column, which could be generalized by her in playfully pulling down a wetsuit a diver is wearing. All tug of war behaviors should not be promoted.
- Enrichment activities geared toward "Increased Acceptance of Varied Feeding and Hydration Methods" should be alternated so that the activities are new and stimulating for Toki. The goal should be to include enough variety among and within each activity to provide a new stimuli to Toki each day (e.g., gelatin frozen in a toy one day, snowballs from a snow machine offered the next). However, her response to these new activities should be closely monitored to ensure that she does not become frustrated.

To summarize, our collaborative enrichment team, comprised of Friends of Toki and members of the MSQ training team, is looking for more and new opportunities to create a dynamic environment with exposure to new and welcome stimuli, all of which, collectively, allow Toki the opportunity for more choice in how she experiences her environment. In this, we have had to take an individualized approach because of her advanced age and personal history. Our enrichment efforts to provide these opportunities are informed by, and tailored to, her responses. Effectively, Toki is guiding us in this process. We are exploring more deeply what she does and does not like. Immediate opportunities that we have identified so far include the quantity and quality of time spent with her caretakers, creating a stronger and meaningful bond with Lii, her companion, expanding the diversity of enrichment items available to her and her care staff, promoting mental fitness through learning opportunities and lastly, increasing interactions with humans, given her positive response to the presence of humans and need for social interaction. These near-term victories will help us before we can build the diversity and

amount of novel stimuli in her environment, as well as laying the foundation for future opportunities to enrich Toki's life using intrinsic enrichment, cognitive challenges and positive operant conditioning.

Financial Commitment

Friends of Toki is committed to doing everything to support Toki and provide her with the highest quality of life possible. Pritam Singh has made the emotional and financial commitment that makes this possible.

Financially, this commitment has required investments in her medicine and veterinary care, in the life support systems that control water quality in her tank, in her enrichment program, and the animal care staff.

To date, these investments include:

Medicine:	\$100,000
Veterinary care and related costs:	\$ 75,000
Life Support Systems & Water Quality	\$350,000
Enrichment Team & Personnel costs	\$200,000
Facilities Upgrades	\$ 45,000
Total:	\$770,000

These investments have had a tremendous impact on the quality of Toki's care and on her health. Looking ahead, Friends of Toki anticipates monthly costs of approximately \$100,000 plus additional unexpected expenditures that will be necessary.

Conclusion

What we stated at the beginning of this report bears repeating. Toki did not choose to be where she is. She cannot make her own decisions on her future. She is dependent upon us and we must all do everything we can for her health and welfare. That is the Commitment that Friends of Toki is making.

Addendum

Killer Whale Medicine Considerations and Limitations

Diagnostics

- Natural history dictates that killer whales may mask signs of illness until they are so sick that they can no longer hide it.
- History is limited in animals due to the limited ability to communicate. In whales, the aquatic environment impairs the caretaker's ability to provide complete history. In human medicine history can be considered ~80% of the diagnosis.
- Physical examination limited - Palpation, auscultation, and percussion are of limited value due to large size, breathing pattern, and blubber layer. Visual inspection is limited by the aquatic environment.
- X-ray of limited value for other than for dentistry due to size.
- Ultrasound is an excellent diagnostic aid that is somewhat limited by animal size and the previously mentioned limitations of history and physical examination.
- There is an excessive dependence on hematology and chemistry test results imposed by limitations of history and physical examination.
- The limited number of diagnostic tools available results in the use of some methods (cytology and culture of chuff/blow, gastric, and stool samples) which can be challenging or confusing to interpret and even misleading.

Therapy

- There are no pharmaceuticals that are FDA approved for use in killer whales. This does not mean the drug cannot be used, it means that there is little or no information regarding pharmacokinetics and/or side effects.
- Baseline studies can be done by veterinarians working with killer whales. These studies are always limited by the lack of testing prior to actual use on clinical cases. Information on blood levels, peaks and troughs, can be minimal or unknown.
- Drug administration is often limited or skewed toward the oral route. Intravenous administration generally depends on a very cooperative animal which the ill often are not. Intramuscular or subcutaneous injection usually requires some form of physical restraint which complicates administration multiple times per day.
- Occasionally, the preferred drug is not available in the United States and needs to be imported for the treatment of a single individual.