

Mystic Responses - Issuance Criteria

File No. 22629 Comments received during the public comment period regarding issuance criteria and sent to Mystic Aquarium on January 13, 2020. Mystic Aquarium's final responses received March 26, 2020.

Comment 1 - Georgia Aquarium's role on the application: The regulations at 50 CFR §216.41(a)(2) require that "For any scientific research involving captive maintenance, the application must include supporting documentation from the person responsible for the facility or other temporary enclosure."

Comment 1(a): Comments were received that the application presents documentation about Georgia Aquarium including a facility description and transport plan in addition to the Memorandum of Understanding (MOU) between Georgia Aquarium and Mystic Aquarium, but appears to lack documentation from the person who would be responsible for the beluga whales at Georgia Aquarium (if sent there). If a transfer to Georgia Aquarium were needed to occur, what personnel at Georgia Aquarium would be involved to provide oversight and/or carry out the proposed research and care of the animals (i.e., as Co-investigators)? Please provide the names of the personnel at Georgia Aquarium who would be Co-investigators, their duties, and their qualifications (via the qualifications form).

Mystic Response 1(a): The person responsible for the husbandry care of belugas at Georgia Aquarium is Dennis Christian and his RQF form is attached. In the unlikely contingency that a beluga needs to move to Georgia Aquarium, Dennis Christian would be a Co-Investigator, overseeing the care and husbandry of the beluga. In this unlikely case, Mystic Aquarium Principal Investigators, as defined in the permit, would be present to carry out and oversee this research initially for each study and longer as necessary. On arrival, the PIs would set up the studies, ensure quality control, collect samples, validate initial processing at Georgia Aquarium, and test equipment. This would include training and overseeing the Georgia Aquarium staff in sample collection to ensure full capability and consistency for sampling methods and techniques and initial processing and archiving.

Comment 1(b): Commenters stated that it is not clear under what specific circumstances Mystic Aquarium might deem it necessary to transport beluga whales to Georgia Aquarium (i.e., specifically, what does "if deemed in the best interest of an individual imported beluga whale or the captive U.S. beluga whale population for social, health, or welfare reasons" mean?).

Mystic Response 1(b): Commenters raise the conjecture that "at least the three whales Georgia Aquarium would 'own' would indeed be transferred (sooner than later) to Georgia Aquarium". This supposition is not supported by the permit application, which presents no plan for moving the whales. There is no intention to move whales to Georgia Aquarium. Instead, the permit application describes the contingency for cases of emergency threatening the health or well-being of a whale or whales and only then would they be moved. For social animals such as belugas, health and welfare needs are dictated, in part, by the requirement to maintain optimal social groupings and this may be a factor requiring a move, since the welfare of the animals is the highest priority. In the unlikely case that a whale needs to move, Mystic Aquarium

investigators, as defined in the permit, would be present to carry out and oversee this research, at least initially for each study. They would be present to set up studies, conduct quality control, collect samples and validate initial processing at Georgia Aquarium and test equipment. They would need to train and oversee the Georgia Aquarium staff for sample collection with the idea that eventually Georgia's staff, over time, once they demonstrate full capability and consistency for sampling methods and techniques and initial processing and archiving, would be able to be added to the permit for sample collection.

Our statement refers primarily to adverse developments among imported whales either in behavioral conflicts or health problems that cannot be resolved on-site at Mystic. Secondly, the contingency provides also for the standard practice of moving whales to assure optimal social groupings, which may be required by cases of emergency threatening the health or well-being of the whales at Georgia Aquarium. For social animals such as belugas, health and welfare depend, in part, on maintaining optimal social groupings, which may necessitate moving whales from Mystic to Georgia (or the other way around).

It is not possible to detail all situations that could necessitate the move of a whale from Mystic Aquarium to Georgia Aquarium; however, in broad categories, these include:

- An individual or subset of animals experiencing harmful stress or other risks within the social group, where behavioral means have not successfully addressed the problem.
 - This scenario is highly unlikely because the individuals suggested for this project were selected for their social compatibility. The group coming is comprised of 4 females ranging in age from 4 to 10 years of age and 1 male aged 7. The animals have lived together, and all were selected due to their tendency to adapt well in new scenarios and get along. The male was identified additionally as one that would thrive in a smaller social group. As belugas are highly social, we believe that the social group dynamics will be enhanced for the three whales currently residing at Mystic Aquarium by the addition of these 5 whales from Marineland. Additionally, Mystic Aquarium employs highly competent trainers adept at managing beluga populations further decreasing the likelihood of this scenario.
 - Mystic Aquarium has been successful at introducing new belugas to our social group over the past 30 years. Our introduction plans are carefully thought out using systematic, behavioral, and skilled approaches evaluating behavioral components on social dynamics that have yielded 100% successful outcomes. Also, Mystic Aquarium is a spacious environment allowing whales choice over location and interaction with conspecifics.
- A health issue in any of the three whales currently at Mystic Aquarium or in the whales identified to travel to Mystic Aquarium that requires a type of animal separation that is not possible in the beluga habitat at Mystic Aquarium.
 - This is not anticipated as all whales are currently healthy. Mystic Aquarium also has 3 pools within its beluga habitat that can be separated, if necessary, for the health and wellbeing of a beluga, and these would be utilized as a priority before considering movement to another facility.
- A critical need to establish an optimal social grouping at either Mystic Aquarium or Georgia Aquarium.

- As belugas are highly social animals, maintaining the animals in an optimal social grouping is essential for assurance of their welfare.
- It is standard practice among US beluga holding institutions to move belugas between facilities in order to assure optimal social groupings and animal welfare.

Comment 1(c): Commenters stated that there is no documentation of the lease agreement between the two facilities to demonstrate financial resources. The “Resources Need to Accomplish Objectives” sections of the application instructions state: “Attach copies of any relevant formal research proposals, contracts, grant awards, or letters of agreement that would demonstrate **financial** or logistical resources.”

Mystic Response 1(c): Sea Research Foundation, Inc, the parent organization of Mystic Aquarium, and Georgia Aquarium are 501(c)(3) non-profit corporations. In accordance with federal law, both organizations file a public record of their financial activities each year to the Internal Revenue Service using the required form 990. This serves as the public record of each organization’s financial activities. Both organizations are financially viable. A copy of the MOU between both organizations has been provided in the permit application and addresses the business and mission partnership between Sea Research Foundation, Inc. and Georgia Aquarium.

Comment 1(d): Commenters cited a quote from Georgia Aquarium stating that “A fivesome is likely the largest this beluga crew will grow at Georgia Aquarium. It’s a number that seems to be quite comfortable.” How does this impact the request for additional whales to potentially be moved there?

Mystic Response 1(d): The statement attributed to Georgia Aquarium has no effect on the potential for whales to be moved there. The Aquarium’s capacity for beluga whales is determined by management decisions overseen by experts in animal care and regulated under law. The Aquarium’s commitment to a role in the proposed permit is consistent with these decisions, guidance, and requirements.

The size of the beluga population at Georgia Aquarium, and at Mystic Aquarium, and at any other U.S. facility is managed according to the circumstances of the health and well-being of the whales at a given time and within the requirements of the law. The Animal Welfare Act directs USDA to determine the allowable population for all beluga habitats, including the Georgia Aquarium beluga habitat. At no time will the Georgia Aquarium exceed this allowable population. Further, Georgia Aquarium abides by the cetacean standards of the Alliance of Marine Mammal Parks and Aquariums and the Association of Zoos and Aquariums, ensuring their population is always managed optimally. This will remain the case should circumstances arise necessitating the addition of whales to the Georgia Aquarium facility.

There are no plans at present to move current belugas at each facility or the belugas proposed for import. A beluga move would occur only as an emergency contingency for the health or welfare of a whale or subset of whales on this research permit. Should this unlikely scenario present, optimal population dynamics will be evaluated by experts in beluga husbandry and health to ensure the health, wellbeing, and welfare of all whales presently at Georgia Aquarium and those that would travel there.

Comment 2 - Issuance Criteria (humane determination and unnecessary risks to health and welfare): 50 CFR §216.34(a)(1) requires that the applicant demonstrate that “The proposed activity is humane and does not present any unnecessary risks to the health and welfare of the marine mammals.” The MMPA defines humane, in the context of the taking of a marine mammal, as “that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved.”

Comment 2(a): With respect to these criteria, commenters stated that transport and integration into new surroundings with unfamiliar conspecifics is stressful and represents significant risks to cetacean health and welfare (commenters cited Spoon and Romano, 2012; Noda et al. 2007; Small and DeMaster 1995; Waples and Gales 2002). The proposed transfer (i.e., import) is not humane and presents *unnecessary* risks to the health and welfare of the animals when other options are available. (See comments below regarding conducting the research at other facilities.)

Mystic Response 2(a): Commenters allege both that significant risks are present and that these are unnecessary. We find both allegations unfounded. First, the risks involved are similarly innocuous to those presented by routine veterinary care, which are guarded against by accredited, qualified practices. Second, the necessity of these minor risks is justified by the major contributions to conservation research to be gained by taking them.

Peer-reviewed, published research by the principal investigator contradicts the commenters’ premise. Their assumption is incorrect that the stress on captive beluga whales in transport is greater than the chronic stress of living in crowded conditions or greater than routine stress responses to veterinary care. Based on our publication record we are confident that the proposed research presents no unnecessary risk to the health and welfare of the whales to be transported.

In the studies cited by the commenters, transport and integration into new surroundings with unfamiliar conspecifics, caused an *expected* physiological response that *returned* to baseline as whales adapted to the setting. The fact that the whales exhibited this transient physiological response indicates that they exhibited a healthy response and could adapt to transport, novel environments and new social groups (Spoon and Romano, 2012). This work supports that transports can be accomplished safely and without harm to the belugas.

The field of stress physiology is complicated and can be confusing because the term stress in common usage implies the negative connotation of duress. As a scientific term, “stress” refers to exertion or reaction to stimuli in the maintenance of homeostasis and survival. The neural, endocrine, and immune systems exhibit complex interactions that adaptively respond to environmental challenges in order to maintain homeostasis. For the most part these are normal, adaptive responses that allow for animals (and humans) to respond to environmental, natural and anthropogenic challenges (Chapman et al., 2008; Fair et al., 2014; Romano et al., 2004). Pathological effects of the neuroendocrine response are more often associated with chronic exposures and long-term responses (Dhabar, 2018; Romero et al., 2009; Seyle 1936). The principal investigator carried out the pioneering work on cetacean neuroimmunology (Romano et al., 1993a,b, 1994, 2002, 2004; Spoon and Romano, 2012; Fair et al., 2014) and

continues to investigate and understand the physiological response to stressors in cetaceans including sound, changes in temperature, pollution, shipping traffic, and other stressors. In order to understand how these stressors affect cetaceans in the wild and to interpret findings in wild animals, controlled studies have been and are still needed on the basic physiological response.

The scale of the known stress response to transportation is similar to that exhibited by belugas removed from the water for a minimally invasive veterinary diagnostic procedure lasting approximately 1 hour (Schmitt et al., 2010). Schmitt et al., 2010 found a physiological response in belugas that were taken out of the water for veterinary physical exams. Pursing this finding, we observed belugas being transported from one facility to another to better understand the hormones involved, their levels, and their time course. This put neural-immune measurements in context before and after transport, compared to loud sound exposure, capture and release, and stranding. This is an example of the information we can gain from controlled studies with Aquarium whales that we otherwise would not be able to obtain.

Exercise also causes a rise in hormones such as cortisol. This has been measured in belugas engaged in prolonged and heightened bouts of physical activity during the capture and transport process compared to resident belugas that showed no significant rise in cortisol. The hormone changes displayed by the transported belugas, in contrast to the pattern observed in the resident belugas, likely resulted from exercise-induced increases (Spoon and Romano, 2012). Even more so, the fact that the transported belugas upregulated their immune response to the new environment enabled the whales to adapt and maintain immune competence to the novel outdoor environment, further supporting that belugas can be transported and acclimated in a new habitat successfully.

In the transports referenced above, animal welfare was the top priority for the sending facility in choosing a destination for these whales. Mystic Aquarium was chosen, because of our exceptional animal care. Similarly, with the Marineland whales, the population was identified as at capacity and thus it's in the best welfare interest of both the animals proposed for import, and the whales remaining, for this move to occur. Specifically, moving five whales from Marineland to Mystic Aquarium allows more space for and focus on the whales at Marineland, including 4 recent births. Additionally, the imported animals will receive excellent and individualized attention and care at Mystic Aquarium.

The other papers that are cited by the commenters, Noda et al., 2007 and Waples and Gales (2002) concern dolphins. Our work with both dolphins and belugas suggests they display different temperaments, behavior, and physiological differences. For example, Romano et al., 2004 investigated impulsive sound and sonar as a physiological stressor in both a beluga and dolphin. The species responded differently physiologically. Moreover, immune function parameters developed within our laboratory and others show differences in applicable immune markers and differences in immune response between the species (Romano et al., 1992, 1999, 2002; DeGuise et al., 2002). For example, dolphin lymphocytes require longer incubation times for measuring proliferative responses as compared with belugas (96 vs 72 hours respectively) and dolphins appear not to respond to the B cell mitogen Lipopolysaccharide while beluga cells do show a response. Antibodies for identifying specific immune cell types are not all cross-

reactive between dolphins and belugas (e.g. CD21 for B cells). Thus, comments based on dolphin literature have no bearing in this case.

Small and DeMaster (1995) is another inappropriate reference. While the paper does include belugas, authors discuss survival rates among animals brought from the wild to an aquarium environment, not the transport of animals born *within* aquaria. These scenarios are completely different. Wild-caught whales will exhibit a higher stress response and may not necessarily be healthy whereas only healthy and well-adapted captive-born belugas are proposed for import. They also focus on survival rates of dolphins in the wild compared to human care. A recent study shows survival rates and life expectancies for dolphins in US zoological facilities today are at least as high as those for wild dolphin populations for which there are comparable data (Jaakkola and Willis, 2019).

US zoos and aquaria, including Mystic Aquarium, have over 30 years of experience transporting belugas among facilities for beluga health and welfare reasons, including for the establishment of optimal social groups and contributions to beluga research and conservation. Aquarium professionals have the expertise and training necessary for this process with the primary goal of animal safety and welfare. There is no better-trained expert group to accomplish this important import to support conservation research.

Belugas are transported utilizing the shortest timetable for handling, transporting, and introduction into the new environment, and according to USDA/APHIS, AZA, AMMPA, IATA, and AH standards at all times. Throughout these experiences (transports and change in social structure), animal care specialists, veterinarians, and researchers have scientifically studied, observed and documented that belugas demonstrate an appropriate behavioral, clinical and physiological response as described above (Spoon and Romano, 2012) and return to baseline.

As experts in the behavior and training of beluga whales, we condition them to respond positively to events they may encounter in transportation to a new facility or introduction into a novel social structure and environment. We employ operant conditioning, positive reinforcement, small positive approximations, and familiarization with the event, so it becomes a neutral - neither positive nor negative - effect. Belugas are trained to swim into comfortable stretchers and fed inside them to establish a familiarity and comfort while traveling during a transport. During transports, belugas are suspended in a stretcher in water to relieve any pressure from their body and the stretcher maintaining comfort, kept wet and cool, and monitored throughout travel by experienced animal care staff familiar to the whales, and a veterinarian experienced in beluga medical care. Documentation from the numerous transports that have been conducted to date indicate belugas travel very well, are comfortable, have normal respiration rates, and can be found “resting” while in transit. This is a direct effect of the training process and desensitization to the elements of the transport as described above. All the techniques and procedures above will be applied to the whales proposed for import such that they are accustomed to their temporary transport environment in order that this transport occur without any harm to the belugas.

There is no scientific basis for or premise in the commenters' assertion that the belugas are being treated inhumanely and are enduring unnecessary stress, pain and suffering; in fact, the contrary is evident. Belugas at Mystic Aquarium are treated with outstanding care, with no expense spared, to provide them with the highest husbandry and medical care, stimulating environments, the highest quality of food and supplementation, and optimal groupings such that they thrive as individuals and as well as in a group.

It is also important to point out that the transport time from Marineland to Mystic Aquarium is relatively short (approximately, 1-2 hour flight time, with total transport including land travel of approximately 10 hours) vs. longer flight times experienced for successful prior transports of belugas among beluga holders in the US. In fact, some of the commenting organizations supported transport of belugas spanning multiple days from a facility in China to a holding facility in Iceland. The transport proposed in this permit application will occur in a fraction of that time.

Comment 2(b): Commenters expressed concern regarding stress from disruption of social groups including the potential removal of young beluga whales from their mothers stating that: "In the wild, beluga whales and other cetaceans are highly social, forming wide-ranging communities or societies built on complex structures and interdependence formed from strong social bonds (Krasnova et al. 2014; Cantor and Whitehead 2013; Whitehead 2011). In addition, commenters stated that new research on wild beluga populations indicates that in some areas, lifelong associations of closely-related individuals may form, and information such as migratory patterns may be culturally inherited (O'Corry-Crowe et al. 2018)." Also, "...in the wild beluga whale calves may nurse for up to two years, but juveniles are likely to remain in the maternal pod after weaning (see, e.g., Colbeck et al., 2013). Calves should only be separated from mothers to address ***obvious animal welfare concerns, e.g., social incompatibility leading to aggression...***" Commenters stated it is unclear how researchers would measure the impacts of stress from such a transfer on research results.

Mystic Response 2(b): Beluga whales move themselves in and out of social groups, including young whales that separate from their mothers, and ample research shows this is normal. Based on research and experience we expect any stress response in behavior or physiology will return to normal during a short adaptation to new environments. We will track this process during and after transport. Our protocols are designed specifically to identify and remedy harmful social interactions.

Expert and proper reference to the scientific literature reveals that beluga social group behavior is not rigid and not confined to the assertions of the commenters. Furthermore, commenters cite studies of wild beluga whales with different conclusions than those concerning whales born under human care. Mystic Aquarium's interpretation of the complete scientific record on this topic, and through consultation with other expert scientists in the discipline of beluga social dynamics, is that there is no concern regarding stress from disruption of social groups including the "potential removal of young beluga whales from their mothers" once they are weaned.

While belugas in Hudson Bay do appear to form wide-ranging communities that appear to be based on kin during migration (Colbeck et al., 2013), other beluga stocks exhibit a residential

affinity (i.e., Cook Inlet stock) compared to other stocks that migrate seasonally (e.g., Hudson Bay, North Pacific). Genetic work performed with Hudson Bay stocks has indicated that during migrations relatedness of animals is higher than when present in summering grounds, suggesting that related Hudson Bay belugas may stay together during migration and then disperse during the summer (Colbeck et al., 2013). O’Corry-Crowe et al. (2018) found different dispersal patterns with decreased relatedness during migration corridors where multiple stocks can overlap, and increased relatedness at summering grounds. These time-sampled genetic data suggest that belugas may have several different types of social structures depending on their stock and geographic location. In both geographic regions, adult males were more likely to be unrelated. These findings suggest that belugas may have more of a fission-fusion system like bottlenose dolphins (Mann et al., 2000) in which social interactions, and potentially bonds, are fluid, especially with adult females.

Strong social bonds exist between mothers and their unweaned offspring, but bonds between weaned juvenile offspring and their mothers have not been assessed behaviorally. Current speculation suggests that weaned juvenile belugas may stay with their mothers as they learn migration routes for a couple more years, but this conclusion has not been confirmed. There is no evidence that the mother-calf bond formed during the first two years of life continues in the same nature once another calf is present. Proximity is not sufficient to define a social bond; affiliative interactions involving time engaged in synchronized, coordinated activities, such as play bouts, contact, and protective interactions are necessary to define a social bond in any species (Bowlby, 1969). Research with wild belugas has suggested that males disperse from the natal pod at some point, but the specific age class has not been identified (Colbeck et al., 2013; O’Corry-Crowe et al., 2018), most likely after 4-5 years of age if one extrapolates from the information provided. The male proposed for transport is 7 years old. Females are presumed to stay in their natal pods although this has not been ascertained with certainty. However, it is unclear if females are bonded in any way or simply stay in proximity to one another for protection or due to resource availability. There is currently no documented behavioral evidence of the types of interactions that occur between adult or juvenile females in the wild. In any event, no recently weaned belugas are being proposed for travel to Mystic Aquarium.

All the references the commenters have provided refer to beluga social structure in the wild, which we discuss above. However, as the whales proposed to be transported were born in human care and are living under human care in an aquarium, inheritance of migratory routes as a social structure is irrelevant. Information detailing social structure in aquariums is more relevant to address these concerns.

Direct, systematic evidence collected independently at two different beluga care facilities longitudinally with multiple offspring living together with their mothers demonstrates that the mother-calf bond changes substantially as weaned juveniles spend significantly less time with their mothers and more time engaged in their own activities and interactions with others (Hill et al., 2018; Hill & Ramirez, 2014; Mazakowski et al., 2018). In human care, adult females have the lowest association rate of all belugas examined across two different facilities whether one looks at general social interactions, contact, or social play (Hill et al., 2016; Hill et al. 2018; Hill et al., 2019). It has been shown that in aquarium settings, the mother-calf interaction gradually decreases over the first year of life with young calves demonstrating early

independence (Hill 2009). Aside from mother-calf bonds, male-male bonds between belugas may be similar to the bonds bottlenose dolphin males form in some populations (Connor and Krutzen, 2015), but more work needs to be performed on this topic (Hill et al., 2016; Lomac-Macnair et al., 2015; Mazakowski et al., 2018).

We are confident of the response expected from the belugas to be transported because they have been studied consistently since their births at Marineland of Canada (Hill, personal communication). Their behavior has been documented as part of a group and as individuals (Hill et al., 2016; Hill et al., 2019; Mazakowski et al., 2018). All belugas to be transported have been integrated in a variety of social groupings for various lengths of time, including since being weaned from their mothers. All belugas to be transported have been observed as members of different social groupings on hourly, daily, monthly, and yearly scales, suggesting that social groupings are dynamic and fluid and part of their everyday life, not stress-inducing. Dominance hierarchies do not seem to be a prominent aspect of beluga social structure unlike other cetaceans especially if being integrated with familiar conspecifics as part of the social grouping.

The belugas that are suggested for importation from Marineland:

- 1) Have been managed in changing social groupings since their birth
- 2) Have exposure to stretchers and transport elements
- 3) Are over the age of 4, past the observed nursing dependency of 1-2 years
- 4) All have been in a social grouping together and will be grouped together prior to being imported, therefore, creating a familiar social group for these 5 animals

There are also cases when removing a beluga from its familial group saved the animal's life from an unhealthy social bond. As an example, a young beluga (1.5 yrs old) being rejected by its mother for nursing as soon as the mother had another calf declined in health until it was moved to a different social group (without the mother) at the age of two (personal observations, Laurie Macha, Mystic Aquarium Curator). This 2-year-old beluga is currently thriving, gaining weight, and eating while also pair-swimming with another 4-year-old beluga. There are other similar instances of less dominant young belugas encountering the same response from other animals in a beluga social group to which they were born, being moved into a different social group of no familial relation and thriving in the new environment with a new social group.

Considerable planning goes into moving belugas into a new social group within a facility or to a new facility to ensure that new and resident belugas are adapting well and thriving in the new environment or social grouping. Animal welfare is always the top priority. Planning includes monitoring the safety, comfort, nutrition, and response to novel stimuli of the belugas and their ability to express natural behaviors. The following is an example of the degree to which Mystic Aquarium will provide and ensure that the highest level of animal welfare is maintained throughout an acclimation period and would be used to introduce the 5 imported belugas to the resident belugas:

- When the belugas arrive, one beluga at a time will be carefully lowered into the holding habitat in its stretcher. A hydraulic lift will be raised up to ~3-4 ft. of water to provide a smooth, slow and controlled entry into the habitat. The stretcher will be lowered into the

water; animal care professionals will assist in lowering the sides of the stretcher so the beluga can comfortably swim out of the stretcher and into the habitat.

- Animal care staff will be positioned around the pool to provide any assistance or guidance.
- Once the beluga is observed swimming, the lift will slowly be lowered to provide more depth in the habitat. This will be continued until the lift is completely in the lowest position giving the beluga the full depth of the habitat. This process will be used for each beluga until all 5 belugas are swimming in the large holding habitat.
- Animal care staff will monitor the belugas constantly recording behavior, respirations, defecation and any other notable behaviors.
- After ~ 1hr. post transport, the familiar trainer(s) from the beluga's originating facility will attempt to offer food. From prior experience with beluga transports, belugas usually will begin eating immediately, indicating they are comfortable in their environment.
- For the first 2-4 days the belugas will be held in the holding habitat, while teaching each beluga to shift reliably between medical habitat and holding habitat, allowing for behavioral observations, and the building of other foundational behaviors. At this time, the belugas will have visual and acoustic exposure to Mystic Aquarium's resident belugas with the ability to interact through clear acrylic gates. This provides a safe introduction and starts to build a familiarity between the two groups.
- While building the foundation of shifting, the resident belugas will be brought to the acrylic gates under stimulus to allow controlled visual introductions, building positive reinforcement history between the beluga groups.
- After approximately 4 days, or when behavior indicates appropriate time to advance, the resident females will be introduced to the 5 new belugas and monitored by staff. This will be carried out by bringing each female into the medical habitat, under stimulus – closing the gate, and opening the medical habitat gate and bringing the resident female into the larger holding habitat with 5 new belugas.
- If the 5 new belugas are shifting between medical and holding habitats, then the 5 new belugas will be introduced to the main habitat, with the resident male and females restricted to the holding habitat. The 5 new animals will be allowed to explore the large main exhibit and to become familiar with the new surroundings and habitat.
- If baseline behavior is observed, then the same introduction process will ensue with the resident male beluga.
- Once all belugas are introduced, a variable social grouping will be maintained on a regular basis giving all the belugas the ability to thrive, elicit normal behavior, and be in a stimulating enriching environment.
- This plan and the beluga's condition are monitored constantly and will be adjusted as needed for optimal animal acclimation and introduction.

This introduction schedule is flexible and can be advanced or extended based on the behaviors that each beluga is eliciting. Study of behavior will be conducted daily via ethograms. This process has been done successfully in the past with the introduction of new belugas into the social group while quantifying behavior and physiological responses (Spoon and Romano, 2012).

Comment 2(c): Commenters stated that the young age of the whales proposed for import puts them at risk from mating before sexual maturity, compromising their health and welfare.

Mystic Response 2(c): Animals cannot breed before they are sexually mature. If the concern is stemming from the behavior associated with mating, there is no evidence of social interactions between adult male and juvenile female belugas leading to reduced welfare. It is apparent from what little research observation that is published that beluga mating is not coercive (Richard, 2016; Hill et al, 2015), as has been noted in some populations of bottlenose dolphins. In cases where there have been qualified interactions between adult males and juvenile females, their relative frequency was low, copulation was not observed, aggression with the exception of open mouth displays was not reported, and the female initiated 31% of interactions (Hill et al, 2015). Regular behavioral observations by trained and experienced beluga husbandry and veterinary professionals would be able to identify if any animal was being harassed and management changes would be made to mitigate the behavior if it occurs.

We know from previous work (Robeck et. al, 2005) that aquarium belugas have their first conception at similar ages to wild belugas (Suydam, 2009). For Chukchi belugas, the age at first birth was 8.27 +/- 2.88 years (Suydam, 2009), so the age of conception would be around 7 years of age. For aquarium belugas, the first detection of luteal activity indicating sexual maturity occurred at 6.9 +/- 1.5 years, with age at first conception at 9.1 +/- 2.8 years (Robeck et al, 2005). There is no data to suggest that aquarium belugas conceive any earlier than wild belugas and certainly no evidence to suggest that belugas at Mystic Aquarium would conceive any earlier than belugas at Marineland as is being asserted.

No data suggests that breeding impairs the health or welfare of belugas, so this is not a concern. Like other species, belugas are adapted to maximize their lifetime reproductive success, so making an argument that normal physiological processes, including pregnancy, lead to a reduction in welfare is a contradiction. Good animal welfare is, in part, defined by providing for normal physiological functioning.

Comment 3 - Issuance Criteria (significant impact on species or stock and taking beyond permit): 50 CFR §216.34(a)(4) requires that the applicant demonstrate that “The proposed activity by itself or in combination with other activities, will not likely have a significant adverse impact on the species or stock.” 50 CFR §216.34(a)(4) requires that the applicant demonstrate that “Any requested importation or exportation will not likely result in the taking of marine mammals or marine mammal parts beyond those authorized by the permit.” Commenters stated that Mystic Aquarium has not demonstrated this criteria has been met because any trade in beluga whales will increase the demand for beluga whales around the world, with the greatest risk of takes in the Russian Far East to meet the anticipated demand in China.

Mystic Response 3: The issuance of the proposed import permit would more likely narrow the volume of trade by demonstrating the strict requirements for its approval. Commenters speculate broadly that any trade in beluga whales will increase the demand for beluga whales around the world. It is far more likely that the volume of trade is controlled by the degree of regulation on trade. Highly regulated trade, such as the import we propose, controls demand by limiting approvals to defined and justified purposes.

Commenters are speculating on decisions yet to be made by parties with no role concerning the proposed permit and therefore that are beyond the control of Mystic and beyond scope of this decision. It is the behavior of the shipping and receiving facilities that is relevant to the cited criterion - in particular, the consideration the foreign shipping facility may replace these animals with additional animals of the same species. In the 1993 Proposed Rule to amend NMFS regulations for permits to take or import marine mammals for the purposes of scientific research this criterion included an explanation that “the import or export is not likely to result in replacement takes or otherwise increase demand for protected species or protected species parts resulting in takes to meet such anticipated demand.” We have complied with requirement used in the past to obtain confirmation from the exporting party (i.e., the foreign facility that is shipping marine mammals to the U.S.) that they have no intention of replacing the animals they are exporting with animals of the same species. In fact, Marineland Canada has provided a sworn legal affidavit to this effect and has adopted new policy under guidance of an Animal Care Committee to reduce the size of its beluga population. Our showing on this criterion exceeds that for previous imports of beluga whales (from Mexico, Germany, and Canada).

Additionally, Canadian law now prohibits the import of belugas into Canada for public display, which is the only purpose for which Marineland would currently qualify. The only other legal purposes for custody or control of a cetacean are for the welfare of the animal or research.

Furthermore, this research permit would involve only captive-born whales intended for transport from Canada to the United States. No wild-caught animals are proposed for transport. There is no effect on wild populations.

Whales are only being imported for research under a research permit. Any other facility that tries to do the same, should have to meet research and animal care standards that equal or exceed Mystic Aquarium’s beluga research program and animal care and welfare.

Comment 4 – Issuance Criteria (justification for using a depleted species): Commenters stated that the application fails to meet the issuance criterion found in § 216.41(b)(5)(i) (i.e., the applicant must demonstrate that the proposed research cannot be accomplished using a stock not designated as depleted). The following comments were received:

Comment 4(a): Commenters stated that it is unclear if the applicant has done an exhaustive search of potentially available, non-depleted beluga whales that might be suitable subjects for the proposed research; this should be assessed for use of depleted marine mammals for research.

Mystic Response 4(a): Mystic Aquarium considered only captive beluga whales as suitable subjects of the proposed research as explained below. Mystic Aquarium never considered importing whales from a wild stock, but our application intended to indicate that at least one parent of each whale to be imported had potentially been captured from the Sea of Okhotsk. This is the larger area encompassing the wild stock designated as depleted years after the parents had been captured. We have exhaustively considered this question of origin and its relevance to the application as explained below. In sum, the proposed research does not involve whales from a stock designated as depleted, it will have no adverse effect on any depleted

stock, and it will fulfill research needs by contributing significantly to knowledge of beluga whales.

First, Mystic Aquarium explicitly avoided involving whales from a depleted stock in designing the proposed research program. Mystic confined the search to whales already under human care. To find an ideal cohort we reviewed annually in conference with other beluga facilities the situations of all managed whales. The consortium of beluga facilities shares information on the location, social grouping, and well-being of beluga whales. From this, Mystic has determined that Marineland Canada, due to their crowded conditions, is the only population of belugas currently where transport of that size group of belugas to Mystic Aquarium was possible.

The same consortium that tracks the well-being and change of location of belugas under human care also collaborates on needs for beluga research and care, which informed the proposed research agenda. The only remaining alternative for transporting whales to Mystic is to collect them from the wild, which Mystic did not consider.

Second, although Mystic ruled out of its search wild stocks of beluga whales, including the two stocks designated as depleted, we have thoroughly considered the presumption that the captive belugas named in the application can be considered as subject to the protections of a depleted designation.

We propose to import five beluga whales that were captive-born and legally maintained in Canada. They are not being removed from any wild stock of belugas, much less either of the two wild stocks designated as depleted. As these whales were born in captivity and are currently in captivity, their removal will have no direct effect on the wild population. If anything, the research studies proposed will only benefit wild belugas including those in depleted stocks.

We have also exhaustively considered the origin of the parents of the captive-born whales proposed for import. At least one parent of each whale to be imported potentially was captured from the Sea of Okhotsk, which is the larger area encompassing the wild stock designated as depleted after the parents were captured. There is more than one stock of belugas in the Sea of Okhotsk and there is no documentation that the parental belugas at Marineland were collected from the stock later designated as depleted. Furthermore, regardless of which stock they originated from, the parental whales were captured prior to any designation, so they were not taken from a depleted stock: imports to Marineland ended in 2008; designation did not occur until 8 years later in 2016.

We have investigated this question to the exhaustion of available records and genetic tests. The investigation is inconclusive: the genetic tests plausibly identified the parents of the captive-born whales named in the application, but the records on the parents do not fix their origin specifically enough to a stock within the Sea of Okhotsk to locate their particular stock of origin. Therefore, it is unknown whether the source stock of the parents was among those later designated as depleted.

Lastly, again, the whales to be imported were captive-born in Canada. The designation of the Russian stocks explicitly identifies wild stocks. Stocks are defined in MMPA as individuals in

common spatial arrangement, indicating in this case the wild populations and not the captive ones. NOAA has the option under the law to designate entire species as depleted and has not done so for the beluga whale as they have done for other species. Even if the regulations for a depleted stock were applied presumptively to the parents, the regulations would not apply to their captive-born progeny. NOAA sensibly explained, in issuing the depleted designation for the Sakhalin Bay-Nikolaya Bay-Amur River stock, that progeny of wild whales in that wild stock are protected by the depleted designation. This emphasizes the obvious intent of the law to protect all members of an entire stock at the moment of designation and in the future as new members are born. Nothing in law or policy justifies interpreting this to mean that prohibitions on a depleted stock apply retroactively to animals previously removed and prospectively to the progeny of those previously removed animals.

Finally, even if the captive-born whales proposed for import were presumed as protected under the depleted designation for wild whales in Russia, our application and this response demonstrates (a) an exhaustive consideration of alternatives, (b) that the research will have no adverse effect on any depleted stock, and (c) that the proposed research fulfills and contributes significantly to research needs.

Comment 4(b): Commenters stated the applicant can accomplish the objectives with the existing beluga whales in the United States (approximately 30 whales). While the applicant deems these five beluga whales to be an “ideal cohort” because they are captive born and trained or trainable, those same qualities apply to beluga whales in the United States (including at Georgia Aquarium). Commenters also state that samples could be acquired from other facilities to meet the desired sample size and this seems to be a feasible alternative to importing whales; samples have been received from other facilities in the past.

Mystic Response 4(b): The proposed research objectives cannot be accomplished by collecting samples from whales in dispersed facilities. Individual samples could be collected from an individual facility that is equipped to run the trials, but the overall study could not rely on gathering these for analysis. Such a sample design would be unreliable and unreproducible. Results would not be publishable and therefore could not be approved under MMPA.

Mystic developed its research proposal from factual analysis of research needs under the constraints of rigorous, reproducible, and reliable methods. We are not required to demonstrate the impossibility of speculative alternatives. However, the impossibility of this speculation can be characterized by summarizing the technical requirements of our proposed research. Occasional, opportunistic sampling will occur across multiple facilities to collect biological samples (e.g. blood, breath, saliva), but this can only supplement the focused study of the five whales to be imported. There is no substitute for the design involving belugas born at Marineland to come under the care of Mystic Aquarium. Samples obtained from other facilities continue to be a challenge for the following reasons:

- External research sample requests are not as high a priority for staff at other institutions.
- Adherence to sample collection protocols cannot be assured when conducted at and by other facilities.

- Samples may not be able to be collected at the frequency requested which leads to gaps in data and the inability to compile longitudinal data sets, which is especially important when trying to obtain baseline data to compare with wild belugas.
- Quality control may be compromised thus contaminating the sample. With researchers on site to observe, this compromise can be eliminated. This especially impacts samples taken for RNA in the event gloves are not worn, as RNAses normally found on human hands will degrade RNA.
- Minimum necessary volumes (saliva, blow) or amounts (feces) are not always obtained even though requested, rendering samples unusable.
- Samples may sit for unknown or variable amounts of time before being transferred to proper temperature (4°C, -20°C, -80°C).
- Variations in sample collection, handling, and storage all have effects on results, making data hard to interpret. Validation of the methods proposed for the permit requires samples to be collected and handled in a consistent manner which is a given at Mystic Aquarium.
- In the past, blood samples have arrived warm from other facilities due to delays in shipping of samples, reducing the number of viable white blood cell buffy coats (WBC) and limiting assay capabilities with questionable results.
- Due to shipping delays, blow samples collected in petri dishes have arrived dry and unusable.
- Blow samples collected and processed at outside institutions have been at volumes that are too low to be used in our assays.
- Due to shipping delays, fecal samples have arrived warm, which can impact downstream hormone measurements.
- Some facilities are not able to collect fecal samples for research.
- Facilities will collect samples at a time convenient to them causing variation in the times requested in the research protocol.
- Many facilities do not have the infrastructure including necessary equipment to process research samples in the appropriate manner so that they remain viable upon arrival at Mystic Aquarium.

Obtaining samples remotely has been notoriously problematic mainly due to the lack of control over the sample collection protocols from the animals under another aquarium's care. The reason stems from the fact that the husbandry and animal care teams understandably prioritize their own needs to access animals first, before collecting samples for other institutions. In addition, it is not feasible to carry out a long-term seasonal sample collection study in these locations due to logistical and financial constraints of travel and sampling protocols and shipping. Having

animals on site enables our scientists to observe the behavior, directly communicate with the trainer, and modify protocols as necessary to maximize the efficiency, which will eventually yield in a more solid scientific study without data gaps in a more reasonable amount of time. This also eliminates variability in samples collected at other facilities making for stronger data.

Importantly, most of the studies proposed for the permit, call for in-depth animal training, dedicated personnel and resources, and researchers on site to move the research forward in an efficient manner. Prioritization and efficiency of research training is guaranteed at Mystic Aquarium based on the commitment of the facility to beluga research and conservation. For any other facility to participate in this research, it would need to commit staff and other resources to sufficiently complete the following training objectives already accomplished at Mystic. See an illustration of the time commitment and prioritization needed just to train the animals for the research below:

Study 1 (Neuroimmunological Response to Environmental and Anthropogenic Stressors)

- Blood samples:
 - 2:1 Trainer to animal ratio for proper desensitization to veterinary/research staff needed for sample collection
 - ~18 months of training time per animal

Study 2 (Development of novel non-invasive techniques to assess health in free ranging, stranded and endangered belugas)

- Breath samples:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~2 months training time per animal
- Saliva samples:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~1-month training time per animal
- Fecal samples:
 - 2:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection
 - ~ 8 months training time per animal
- Skin samples:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~1-month training time per animal

Study 3 (Hearing and Physiological Response to Anthropogenic Sound)

- Layout with dorsal suction cup attachment/desensitization to recordings:
 - 3:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection

- ~12 months training time per animal for layout/suction cup attachment, novel object (i.e. acoustic recording equipment, presence of speaker in water at animal's head, sounds emitted from speaker during recording, duration of layout 5 min in length)
- Breath samples:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~2 months training time per animal

Study 4 (Photogrammetry Body Condition Studies)

- 2:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection
- ~12 months training time per animal for forward dorsal swim for length of 20 feet, desensitization to camera/pole at a minimum of 19.6 ft (6m) in height, 6 different morphometric measurements

Dorsal swims for photography need to utilize ~20 feet of unobstructed habitat space. Animal swims upright (dorsal) straight at the surface of the water to mimic wild beluga surface swim behavior. Any deviation from this distance due to proximity of adjacent animal(s) would not allow for accurate measurements to be taken from photo(s) as it would not accurately represent wild beluga behavior needed to estimate measurement.

Body weights are more feasible at Mystic Aquarium due to installation of hydraulic lift and ease of access to animals. Animals are behaviorally shifted into the Arctic Coast Medical Pool and isolated for approximately 1 hour for weight procedures. Weights are conducted quarterly on each whale.

Study 5 (Diving Physiology)

- 3:1 Trainer to animal ratio for execution of active and passive dive behaviors
 - ~12 months training time per animal for both active and passive dive behaviors

Active dive behaviors require at least 60 feet of unobstructed habitat space allowing the animal to travel underwater for a determined amount of time.

- Blood samples pre and post dive behavior:
 - 2:1 Trainer to animal ratio for proper desensitization to veterinary/research staff needed for sample collection
 - ~18 months of training time per animal
- Breath samples pre and post dive behavior:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~2 months training time per animal

Study 6 (Microbiome)

- Oral swabs:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~ 1 month training time per animal
- Skin swabs:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~ 1 month training time per animal
- Anal/Vaginal swabs:
 - 2:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection
 - ~ 4 months training time per animal
- Blowhole swabs:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~8 months training time per animal

Study 7 (Behavioral and Reproduction Studies)

- Ultrasounds:
 - 2:1 Trainer to animal ratio for proper desensitization to veterinary staff needed to perform ultrasonography
 - ~10 months training time per animal
- Vaginal swabs:
 - 2:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection
 - ~ 4 months training time per animal
- Blood samples:
 - 2:1 Trainer to animal ratio for proper desensitization to veterinary/research staff needed for sample collection
 - ~18 months of training time per animal
- Saliva samples:
 - 2:1 Trainer to animal ratio for proper desensitization to research staff needed for sample collection
 - ~1-month training time per animal
- Fecal samples:
 - 2:1 Trainer to animal ratio for proper desensitization to staff needed for sample collection
 - ~ 8 months training time per animal

Study 8 (Testing of prototype telemetry and imaging devices before deployment on wild whales)

- Layout with deployment device attachment:
 - 2:1 Trainer to animal ration for proper desensitization to staff needed for sample collection
 - ~12 months training time per animal

Mystic is already prepared for this work. Samples from each imported beluga will be collected as described in the permit application as soon as the behaviors are trained. Partial samples can be collected from these belugas immediately and sample sets will increase over time as the belugas' training develops. This may vary by individual beluga as the younger animals have fewer developed behaviors than the older animals. See table below for the behavioral repertoire of the belugas proposed for import. Moreover, all studies will not be conducted at one time. Behaviors for some of the research studies may be undergoing the training process, while data is being collected for another study.

The training status of the whales to be imported is shown as follows:

<u>Behavior</u>	<u>Status</u>
Blood Collection	All do this behavior; will need to increase duration and reliability of behavior to be able to collect enough for research sampling, and at the frequency needed. None have done more than one sample in a given day, so this will need to be trained.
Respiratory Exhale Collection	Frankie, Mira, and Qila all do this behavior; Havana and Kharabali are currently in training for this behavior.
Open Mouth and Oral Swab	All do this behavior.
Anal Swab & Vaginal Swab	All will do a layout with their ventral side at the water surface and hold the position. None are yet trained to accept a swab.
Fecal Collection Via Tube Insertion	All will do a layout with their ventral side at the water surface and hold the position. None are yet trained to accept a tube.
Skin Swab	All will accept but only on certain areas so behavior needs to be further developed.
Dorsal Layout	All are trained to do this except Kharabali, but none have a solid behavior.
Side Layout	All except Kharabali are in training for this behavior.
Ventral Layout	All have this behavior. Kharabali's is not reliable and still needs training.
Allowing suction cup or tag placement on body	None trained for this.
Forward slow swim over 20 feet	None trained for this.
Desensitized to 6 m pole overhead	All desensitized to this.
Morphometrics using soft tape on and around body	None trained for this.
Trained Dives	None trained for this.

<u>Behavior</u>	<u>Status</u>
Reproductive Ultrasound	None trained for this; but have some layouts that would facilitate this training.

As illustrated by the training time budgets, the amount of dedicated staffing and time per day to accomplish all training associated with data collection for the 8 proposed research studies is extensive. Georgia Aquarium is the only facility that has committed, if necessary as a contingency, to dedicate this much time, money, and effort to these projects.

Mystic Aquarium will continue to seek and receive biological samples from belugas in other facilities to supplement the focused effort on the five whales to be imported (e.g., blood, respiratory exhale, saliva) to support research objectives. However, this is a means of supplementing our work and is not feasible to support the entire study design. Obtaining enough high-quality samples can be accomplished only by importing the proposed belugas born at Marineland to come under the care of Mystic Aquarium. The challenges have been well-detailed in the previous responses above.

Below is a specific case scenario used to illustrate the difficulties in relying solely on samples from other institutions and how this practice severely delayed and limited research:

- In Dec 2016 an initial request for blood and blow samples to support two beluga research projects was submitted to another beluga holder institution in the US.
- It wasn't until 10 months later (10/20/17) that a response was given by the facility after numerous follow-ups and an in-person meeting to discuss the research and samples occurred in which it was explained to Mystic Aquarium scientists that research is not the main priority of their institution.
- There was no decision or samples forthcoming until December 2017, approximately one year later from the time of the initial request.
- Samples were sent and received for only one of the two research projects requested.
- Moreover, the sample amounts requested were not received. Only partial samples were received, reducing the number and types of research assays which could be run.
- An additional project request for blow, blood, and fecal samples was not supported.

Although it seems desirable and practical to obtain samples from other facilities, and this is a scenario utilized whenever possible, obtaining samples have been notoriously problematic mainly due to the lack of control over the sample collection protocols from the animals under another aquarium's care.

In addition, careful consideration and attention is needed for sample collection. Without staff members dedicated to this, quality and consistency of sample collection cannot be guaranteed.

Importantly, most of the studies proposed in the permit, call for in-depth animal training, dedicated personnel and resources, and, most importantly, researchers on site to move the research forward in an efficient manner. Prioritization and efficiency of research training is guaranteed at Mystic Aquarium based on the long-term commitment of the facility to beluga

research and conservation. Training time for behaviors that support the research studies have been described above.

Mystic Aquarium is a world leader in beluga whale research and is the only beluga holder in the US to maintain a research license under the USDA to conduct bona fide research on our animal collection. The amount of resources, including staff hours, dedicated training time during the workday, and unobstructed habitat space needed to condition animals to participate to the extent required for the proposed research to occur in these voluntary, non-invasive behaviors is extensive.

Comment 4(c): Commenters state that much of the research requires only biological samples for analysis, as opposed to living whales. The commenters state that sample integrity might be compromised by shipping samples from Marineland holds true for samples shipped from any location including Georgia Aquarium; the applicant could develop state-of-the-art shipping protocols, which would benefit field researchers needing to ship samples collected from free-ranging cetaceans.

Mystic Response 4(c): Mystic has already developed the state-of-the-art protocols for shipping samples. As experts in these methods, we know that samples shipped from Marineland or other facilities are inadequate to support the proposed research to the extent that results would be likely to be published. Our study design cannot be replaced by a set of multiple facilities, even if a sufficient number were equipped to conduct the trials and collect the samples. No facilities exist that all have the space, labor, and configurations necessary for implementing the design and training whales to participate.

All samples will be taken from living whales in controlled conditions. Conditions for the study cannot be recreated at Marineland. We propose to study diving physiology and hearing studies, photogrammetry, testing of telemetry devices, behavioral studies, sampling blood and other tissue matrices before, during and after an event such as sound exposure, veterinarian examination and diving (before and after only), to quantify the neural-immune response.

The PI developed state-of-the-art shipping protocols for beluga tissues and organs during her PhD dissertation (Romano et al., 1993 a,b; Romano et al., 1994; Romano et al., 2002a). Archiving and shipping protocols are always being re-evaluated and improved. However, there are factors which are out of our control. One major issue is shipping samples across international borders more so than within the US, although any delay due to weather, extreme cold or hot temperatures, mechanical failure of transport carrier e.g., airline, or carrier fault will compromise samples shipped within the US which the PI has personally experienced. Beluga tissues need to be inspected by US Fish and Wildlife, go through a port of entry and go through customs. All these requirements result in time delays and often, as the PI has experienced, *major* time delays which can ruin the integrity of the samples no matter how well prepared and packed the samples. This happened as recently as 2019, when wild beluga samples were carried by hand from the Department of Fisheries and Oceans in Winnipeg, Manitoba to Mystic Aquarium. There were delays even hand carrying the samples and most of the samples had thawed by the time of arrival at the Aquarium.

Weather, particularly in the winter, is unpredictable and can lead to delays in shipments especially on the east coast of Canada and the US. The upstate NY/Niagara Falls area where Marineland is located, has harsh winters and can see 70 inches of snow between December and March with temperatures reaching below freezing (World Climate Guide; climatestotravel.com/climate/united-states/Niagara-falls). The weather leads to the closing of the facility during winter months. Animals are still cared for; however, there is no opportunity for extensive research sampling during this time.

Shipping companies can also be unreliable. For example, following a live-capture health assessment of belugas in Alaska that our team participated in, a shipment of wild beluga samples was lost by FedEx for 2 weeks (shipping Anchorage to South Carolina) with none of the samples viable upon arrival.

There is also a great deal of processing and strict adherence to protocol that needs to be carried out before shipping samples properly (see responses above). One specific example is White Blood Cells (WBC) for beluga immune studies. WBC must be isolated from the whale in a sterile manner and subjected to a two-step freezing process (-80°C to liquid nitrogen or dry shipper) that is critical to keep cells alive and suitable for subsequent assays. Other samples such as blow and saliva also must be processed before shipping and requires trained laboratory personnel, equipment, and dedicated workspace which may not be found in other institutions.

Comment 4(d): Commenters state that training animals at other facilities is feasible, especially at Marineland, where most of the beluga whales are not included in performances and a larger sample size is available.

Mystic Response 4(d): Training, which is a single aspect of a complex study design, requires a lengthy time commitment of enough qualified staff. Where these resources do not exist, training is not possible. Where training is possible, other aspects of the design may not be. Marineland currently lacks all requirements.

Also as stated above, some samples from other facilities have been received and have contributed to our research; however, the compliment of sampling required for the conservation research proposed in this application have not been achievable to date.

As referenced previously and in the submitted application, Mystic Aquarium is the only beluga-holding facility in the United States to hold a USDA Research License. Founded as a research institution, research is a top priority, hand and hand with animal welfare. The research proposed in the submitted permit application is extensive and time-consuming. As stated above, we will continue to seek and receive samples from other institutions. It has not been possible to get the necessary samples from other US facilities to date, in a way that doesn't affect the research itself, though we have worked towards this for over a decade and will continue to work towards this goal. While samples will continue to be sought from US facilities to add to our research whenever possible, these samples would not be of the same scope and would not replace the valuable complete sample sets that can be achieved through study of whales at Mystic Aquarium with consistent collection and processing. The detailed behavioral training information provided above demonstrates the time commitment to training this research; in many cases, it is not

realistic to expect other facilities to re-direct their goals and initiatives towards this data collection. Additionally, submission of samples from numerous varying environments has an increased likelihood of confounding the data. Data collected from belugas in a consistent environment (i.e., where all whales are exposed to the same exact conditions or potential changes in conditions) is less likely to be confounded by external factors (McDonald, 2014). Examples of external factors include changes in water chemistry, diet, air and water temperatures, weather, overall changes in animal health or behavior, etc. and events unique to a facility that we wouldn't necessarily know about.

Comment 4(e): The commenters state that the applicant argues that it is necessary to import the whales because it is infeasible to conduct the research at other U.S. facilities but states that if the beluga whales need to be moved to Georgia Aquarium, the identical research would continue without exception. The commenters state that these assertions are irreconcilable.

Mystic Response 4(e): To clarify, the conduct or continuation of the research at Georgia Aquarium requires reallocation of resources there. They have committed by agreement with Mystic to reallocate as necessary in the contingency that the research must be moved to their facility. This repurposing is not necessary now as Mystic is ideally prepared for the proposed work. By comparison, other facilities would need to develop capacity or change priorities before any reallocation of resources could qualify those locations to conduct the research, making these infeasible as current locations.

The proposal details that belugas would travel to Mystic Aquarium to take part in critically needed conservation research. The goal is for belugas to reside at Mystic Aquarium for the duration of the proposed research permit and beyond. Only in an urgent situation would a beluga be moved to Georgia Aquarium. We do not anticipate needing to move any belugas to Georgia Aquarium; however, it would be irresponsible to have no backup plan to ensure animal welfare if belugas needed to be moved, as detailed in responses above. Mystic Aquarium and Georgia Aquarium are both highly committed to ensuring the highest animal welfare in all situations; as such, a plan must be in place for contingency to ensure both welfare and the research if a whale needed to be moved.

If, in the unlikely event there is an animal welfare concern which deems moving a whale necessary, Georgia Aquarium is committed to continuing the research at its facility. Georgia Aquarium's high-quality programs and commitment to our research ensure both the highest degree of animal welfare and management as well as continued complete sample collection, which is an ideal backup scenario, and underscores Georgia Aquarium's commitment to supporting our research.

Should any of the 5 belugas need to be moved to Georgia Aquarium, it would likely be after a significant amount of time, as no moves are anticipated. In this case, necessary behaviors to support the proposed research projects would be complete or close to completion. This would mean that Georgia Aquarium staff would need to spend less time training the whale(s) to support these projects as the behaviors would already be conditioned and would focus on maintaining the behaviors and sample collection. With the permit and agreement between Georgia Aquarium and

Mystic Aquarium, the priority of the 5 imported whales is conservation research at Mystic Aquarium.

Comment 5 - Value of Research to Conservation of Endangered and Depleted Populations. Commenters questioned the value of research on these captive whales to protected wild populations. The following comments were received:

Comment 5(a): Commenters noted that the whales proposed to be imported are all captive-born and four (or three) of the five have parents from two geographically and genetically separated populations. Commenters stated that this minimizes the value of results related to the genetics *or* environment of the depleted population as it naturally occurs in the wild and the applicant fails to address these confounding variables.

Mystic Response 5(a): The premise of this comment is that genetic differences within a species limit the applicability of research findings. This is true concerning specific traits and behaviors coded by genetic predispositions. It is not significant, nor practically relevant, concerning common traits and behaviors such as those proposed for study.

To justify receiving this research permit, Mystic is proposing research that will contribute significantly to understanding the basic biology or ecology of the species; or, that will contribute significantly to identifying, evaluating, or resolving conservation problems. It is not a requirement to achieve explicit understanding and control of the myriad factors in complex systems. It is not a disqualification to be bound by the limits of which factors can be identified and controlled in a study design.

Nevertheless, the genetic differences asserted by the commenter are not significant. While the Cook Inlet population and the ancestral population of the proposed transported belugas are reproductively isolated, there is a mitochondrial DNA haplotype that can be found in both populations (Meschersky et al. 2008). Similarly, breeding between populations of belugas is unlikely to affect key physiological and behavioral processes targeted by this permit; studies of nuclear DNA have revealed more gene flow between beluga populations than was previously understood (O’Corry-Crowe et al., 2010). Regardless, a lack of current genetic connectivity should not preclude the application of findings in one population to another, especially when the potential for ever directly studying Cook Inlet belugas in similar ways is minimal. Studies of physiology and behavior of belugas in more accessible regions have been used to better understand other populations for many decades. For example, within the Cook Inlet Beluga Draft Recovery Plan, NMFS draws on knowledge gleaned from belugas from many populations, including aquarium populations, when describing potential reproductive rate in this species. Animal Welfare Institute also does this within this comment by using findings from Hudson Bay belugas to argue that this species can form long term associations and so these belugas, descended from another population and living in a different environment, should not be transported. Realistically, advancing our knowledge of endangered populations of belugas will require the study of other populations, including those in aquaria.

Moreover, the molecular research that is proposed in the permit application will be at the gene expression (RNA) level which depends on the functional gene product generated by the same

DNA sequence within the species. Gene expression is therefore a quantitative measure representative of the animal's response to internal or external stimuli and does not refer to the nucleotide base changes in DNA. The genetic differences among different beluga populations are based on changes in a portion of DNA and refers to relatedness (O'Corry Crowe et al., 1997, 2018), but cannot provide information about the health and physiology of the animal. The gene expression studies proposed here refer to changes in the quantity of the gene products, which are directly related to the physiological response of the animal to environmental factors or internal stimuli including hormones and neurotransmitters (Unal et al., 2018).

It should also be pointed out that the ability to directly study the immune system genes of belugas of the Barents Sea and/or Sea of Okhotsk, may reveal important information to help understand the basis for phenotypic variation in susceptibility to disease. Genetic polymorphisms on certain genes may contribute to prevalence in some common diseases in certain populations through interactions with the environment (e.g., cancer in St Lawrence beluga population). Major Histocompatibility Complex (MHC) genes of the immune system are the most polymorphic genes in vertebrates, encoding molecules that play a crucial role in immune response against pathogens, including pathogen resistance (Klein, 1986; Janeway et al, 2001). MHC genes not only code for a variety of genes with specialized functions in immunity, conditions other than infections and autoimmunity are also associated with the MHC, including some cancers (Trowsdale and Knight, 2013). Therefore, studying the expression of certain genes of the immune system based on their genetic lineage is very valuable in identifying phenotypic presentation in endangered or depleted populations with declined health.

Comment 5(b): Commenters stated that there is no genetic relationship between the whales to be imported and Cook Inlet beluga whale population; and therefore, the applicability of certain research results to that endangered population would require caveats.

Mystic Response 5(b): As stated, we are aware of the limitations of science and respectful of the peer-review publishing process to hold us accountable for conclusions. Our requirement in obtaining a permit is to propose research that will contribute significantly. Later, in publications, it will be our responsibility to draw reliable conclusions. We have a solid track record at publishing important and valid data and that will be true for this research as well.

While the Cook Inlet population and the ancestral population of the proposed transported belugas are reproductively isolated, there is a mitochondrial DNA haplotype that can be found in both populations (Meschersky et al. 2008). Similarly, breeding between populations of belugas is unlikely to affect key physiological and behavioral processes targeted by this permit; studies of nuclear DNA have revealed more gene flow between beluga populations than was previously understood (O'Corry-Crowe et al. 2010). Regardless, a lack of current genetic connectivity should not preclude the application of findings in one population to another, especially when the potential for ever directly studying Cook Inlet belugas in similar ways is minimal. Studies of physiology and behavior of belugas in more accessible regions have been used to better understand other populations for many decades. For example, within the Cook Inlet Beluga Draft Recovery Plan, NMFS draws on knowledge gleaned from belugas from many populations, including aquarium populations, when describing potential reproductive rate in this species. Animal Welfare Institute also does this within this comment, using findings

from Hudson Bay belugas to argue that this species can form long term associations and so these belugas, descended from another population and living in a different environment, should not be transported. Realistically, advancing our knowledge of endangered populations of belugas will require the study of other populations, including those in aquaria.

Moreover, the research that is proposed to be carried out will be at the gene expression (RNA) level which depends on the functional gene product generated by the same DNA sequence within the species. Gene expression is therefore a quantitative measure representative of the animal's response to internal or external stimuli and does not refer to the nucleotide base changes in DNA. The genetic differences among different beluga populations are based on changes in a portion of DNA and refers to relatedness (O'Corry Crowe *et al.*, 1997, 2018), but cannot provide information about the health and physiology of the animal. The gene expression studies proposed here refer to changes in the quantity of the gene products, which are directly related to the physiological response of the animal to environmental factors or internal stimuli including hormones and neurotransmitters (Unal *et al.*, 2018).

Comment 5(c): The application included a statement that research results would be shared for conservation of the depleted beluga whale. Commenters state that this is unsupported and require confirmation that Mystic Aquarium researchers, e.g., Dr. Tracy Romano, have contacted Russian researchers, e.g., Drs. Olga Shpak or Dmitri Glazov, and Russian authorities in the Far East, for this purpose.

Mystic Response 5(c): Mystic's long history of contributing to beluga conservation research and convening the community of experts in the field supports the statement that results will be shared widely. The pre-existing professional relationships of the principal investigator support the particular statement that results will be shared with Russian researchers.

Dr. Romano and Dr. Olga Shpak are colleagues. They attend the same beluga workshops and conferences and meet to discuss beluga research, the most recent being the World Marine Mammal Conference (December 2019), the Alaska Marine Science Symposium and the NOAA Cook Inlet Beluga Whale Workshop in Anchorage, AK (January 2020). Dr. Romano invited Dr. Shpak to be a keynote speaker in the 2nd International Workshop on Beluga Whale Research and Conservation hosted by Mystic Aquarium in 2019 as one of the leading experts on belugas in Russia. She also consulted with Dr. Shpak to determine other Russian scientists and managers who should be invited to attend the workshop. Once research results are available from the whales, data will be shared and disseminated in the form of presentations at workshops and conferences and scientific publications. Moreover, discussions, dialogue and data sharing will continue with Dr. Shpak. Please see letters of collaboration and support attached from Dr. Olga Shpak and Dr. Sergey Naidenko, the Deputy Director of A.N. Severtsov Institute of Ecology and Evolution of Russia Academy of Sciences.

Comment 5(d): Commenters state that the application makes reference to management plans and recovery plans for the Sakhalin Bay-Nikolaya Bay-Amur River stock; however, NMFS has not developed any such plans and they are unaware of any comparable plans in Russia.

Mystic Response 5(d): The application refers to the Cook Inlet Recovery Plan, NMFS. Our research results will contribute to the needs identified in that plan, as well as contributing

significantly to understanding basic biology or ecology, and other critically important research needs. Research results will be applicable to wild beluga populations including those that are stable and those on the decline (i.e., endangered, depleted and threatened). This will be applicable also to developing conservation strategies where they do not currently exist.

The research proposed contributes to the objectives in the Cook Inlet Recovery Plan (details of the identified research can be found in our submitted permit application and online in the document at https://www.circac.org/wp-content/uploads/cib_recovery_plan_final.pdf) as well as for the Sakhalin Bay-Nikolaya Bay-Amur River belugas (Bettridge et al., 2016; Reeves et al., 2011). Moreover, in the petition to NMFS to designate the Sakhalin Bay-Amur River stock of belugas as depleted under the MMPA from Whale and Dolphin Conservation, the Animal Welfare Institute, Cetacean Society International, and Earth Island Institute it alleges that the causes of the stock's decline includes threats which can be addressed through the research proposed in the permit application e.g., health impacts from anthropogenic threats such as oil and gas development, pollution, and climate change. In a report from the IUCN (Reeves et al., 2011) the report states: "it seems appropriate to check levels of fat-soluble contaminants in beluga blubber as well as to test beluga blood for hormonal reactions to toxins" given the wide array of pollutants and rapid development to which the Sakhalin Bay-Nikolaya Bay-Amur River belugas may be subjected. The studies we are conducting on hormone levels and immune system function will lay the foundation for baseline levels and direct comparison with endangered and depleted belugas when the opportunity arises (i.e., live-capture release studies, stranding, non-invasive and/or remote sampling from wild whales).

Comment 5(e): Commenters state that Study #3 does not acknowledge limitations of the applicability of hearing studies in captive settings to two different wild populations (the Sakhalin Bay-Nikolaya Bay-Amur River stock and Cook Inlet beluga whale DPS), citing Parsons et al. (2008) and Wright et al. (2009); and find this study to be duplicative with limited value to free-ranging animals.

Mystic Response 5(e): The objectives of the hearing studies proposed in the application call for investigating hearing responses in Aquarium whales that will occur in the same exact way as in wild populations; therefore, there is no limitation of applicability to wild animals. Wild belugas exposed to different types of noise will unavoidably experience an increased hearing threshold due to masking. Our approach will quantify that hearing change. Studies by the Co-PIs (Castellote et al., 2014; Mooney et al., 2016; Mooney et al., 2018 a, b; Mooney et al., 2008) suggest that belugas hear similarly whether within a certain population or when compared between populations. This suggests that a specific "population" to which a beluga belongs has little to no effect on hearing abilities. To the extent these questions have been studied in the past, further study is not duplicative. Science depends on reproducible results as part of hypothesis testing and development.

Comment 5(f): The application states on p. 19, "Many of the threats defined in the ESA recovery plan for Cook Inlet are also likely factors in the productivity problems that lead to a Depleted finding under MMPA." Commenters were unsure if the reference to a depleted finding was for the Sakhalin Bay- Nikolaya Bay-Amur River stock, and if so, that the statement is unlikely given these populations are affected by different threats and that "...claiming loftily

that *all* research results will be applicable *everywhere* is at best imprecise and at worst specious.”

Mystic Response 5(f): Depleted designations have been based on assessments of the productivity of wild stocks to determine their condition relative to sustainability as a population. The research Mystic Aquarium proposes in the permit application is relevant to productivity and therefore to all belugas including those beluga populations that are stable as well as those that are on the decline (e.g., Cook Inlet and Sakhalin Bay-Nikolaya Bay-Amur River beluga populations).

Given the rapid changes in their environment, e.g., increasing anthropogenic concerns such as loud sound, shipping traffic and pollution, emerging pathogens, etc., the studies proposed on the beluga neuroendocrine and immune system are critical to understanding health implications of these stressors. Even though, for example, the specific type of pollution may vary in different beluga habitats (e.g., agricultural run-off for Sakhalin Bay-Nikolaya Bay-Amur River belugas vs. heavy metals, etc. as a probable source of contaminant exposure) an understanding of the beluga immune system overall is necessary for understanding health implications. In addition, many of the sounds included for investigation in the proposed sound studies are common to different geographic areas where belugas reside. Testing of telemetry devices and developing non-invasive techniques for assessing health in wild belugas is useful and important for all beluga populations in their respective environments. Behavioral and hormonal studies on reproduction and photogrammetry studies to assess body condition and reproductive status in wild belugas are applicable to all beluga populations.

The Cook Inlet Beluga Recovery Plan (NMFS, 2016) identifies the sources of mortality and threats to recovery in Cook Inlet Belugas including oil and gas, waste and discharge from urban areas, vessel interactions, fisheries interactions and competition, noise, changes in the environment (e.g., water temperature), emerging pathogens and likely cumulative effects of multiple stressors and combination of several factors. Several of these same factors are also potential threats in the Sea of Okhotsk including e.g. climate change (Laidre et al, 2015), pollution, run-off (Reeves et al., 2011; Bettridge et al., 2016), oil and gas which includes both oil pollution and noise (Kachur et al., 2019). Moreover, in the petition to NMFS to designate the Sakhalin Bay-Amur River stock of belugas as depleted under the MMPA from the Whale and Dolphin Conservation, the Animal Welfare Institute, Cetacean Society International, and Earth Island Institute it alleges that the causes of the stock’s decline includes threats which can be addressed through the research proposed in the permit application e.g., health impacts from anthropogenic threats such as oil and gas development, pollution, and climate change.

Comment 5(g): The application states that “Hearing studies applied under controlled conditions on a later-designated Depleted stock lineage will allow for audiograms and masking studies specific to belugas from a Depleted stock lineage and comparison with whales from other populations.” Commenters asked if the applicant purporting that the stock lineage affects the hearing abilities of animals?

Mystic Response 5(g): We do not assert lineage affects hearing ability. However, should research results demonstrate a difference in hearing between whales of this lineage and another, this finding may be a basis for exploring a genetic explanation.

Also, background noise, which varies from one place to another, affects hearing sensitivity. Hearing studies conducted by the Co-PIs on Bristol Bay belugas and other populations (Castellote et al., 2014; Mooney et al., 2016; Mooney et al., 2018 a, b; Mooney et al., 2008) show hearing sensitivities are comparable to what has previously been published from belugas in aquaria to belugas in Canada or Russia (Castellote et al., 2014; Mooney et al., 2016; Mooney et al., 2018 a, b; Mooney et al., 2008).

Comment 5(h): The application states that hearing studies will help define industrial underwater noise emission regulations. Commenters state that the methods described in the application would not achieve this. NMFS does not define thresholds associated with masking and could not regulate or manage such an impact.

Mystic Response 5(h): Results from the hearing studies will highlight the current concerns on the potential negative effects of low-level chronic noise exposure in beluga hearing and loss of communication space. It is a fact that masking is not currently regulated. However, by quantifying and characterizing masking levels, the proposed research will contribute to the growing body of literature showing how level B take needs to be revised, and new understanding on the negative effects of noise such as masking, cumulative of synergistic effects, should be considered in the revision. Recommended revisions are a means of redefining regulations.

Comment 6 – Breeding. The following comments were received against breeding these whales:

Comment 6(a): Commenters asked for clarification that none of the adult females will be pregnant when they are to be imported.

Mystic Response 6(a): No pregnant animals will be imported for the proposed research.

Comment 6(b): The application states that mating, pregnancy, birth, and calf rearing are not critically important to the proposed research and may not occur at all. Commenters stated that it is not clear, and should be explicitly stated, whether a breeding program would be established for the imported whales.

Mystic Response 6(b): No formalized breeding program will be established or conducted for the imported whales.

The purpose of the import of these whales is to provide a critical mass of belugas to conduct important conservation research. They are not being imported to breed.

Allowing the possibility for breeding to occur is necessary for the study design and for Mystic Aquarium's commitment to the highest welfare for every animal at its facility. The only means of preventing breeding would corrupt the sample design by manipulating hormone levels or disrupting social groups. Ensuring welfare extends beyond minimizing suffering and includes

allowing animals to exhibit natural behaviors, defined as “behavior that animals have a tendency to exhibit under natural conditions, because these behaviors are pleasurable and promote biological functioning” (Bracke and Hopster, 2006). Breeding is included among these natural behaviors and, as such, Mystic Aquarium does not prohibit this behavior under most circumstances. Neither does Mystic Aquarium allow animals to breed indiscriminately. Breeding opportunities at Mystic Aquarium occur only pursuant to genetic analysis and input and approval from the Association of Zoos and Aquariums Marine Mammal Taxon Advisory Group according to accepted population management criteria. The only breeding that occurs intentionally at Mystic Aquarium is among African penguins, under the guidance of the African Penguin Species Survival Plan breeding aimed at preventing extinction of this endangered species.

Reproduction is not central to the research proposed in the research permit; however, there is much benefit to the inclusion of any incidental calves for part of the research, as detailed in the permit, as much remains to be known about beluga calf development than can aid conservation of belugas in the wild. Breeding would not occur for the purpose of the research to be conducted; however, we would opportunistically collect samples from any calves at Mystic Aquarium during this research permit, as detailed within the permit, to maximize the information gained.

Comment 6(c): The application stated that Mystic Aquarium will be the owner of all of beluga Qila’s odd-numbered offspring with the owner of the sire owning all even numbered offspring. Commenters asked for clarification whether the intended sire would be the male, Frankie, requested for import, or the male that Mystic Aquarium currently has?

Mystic Response 6(c): Frankie is among the whales requested for import. Should breeding occur afterwards, Frankie may be the sire although we consider the older male, Juno, the more likely to breed. Mystic has not identified a definite sire for breeding that may occur because breeding is not planned.

Qila would be sharing the Arctic Coast habitat with 2 males- Juno and Frankie. The older male Juno would be the likely sire of any incidental offspring. Typically, smaller males like Frankie would not breed when another dominant male is present. However, should this occur, as Frankie and Qila are not related, this possibility presents no concern.

Comment 6(d): Mystic Aquarium currently holds two 38-year-old female belugas and “Juno,” a male born at Marineland in 2002. If Mystic Aquarium anticipates breeding between any of the four females proposed for import and Juno, commenters asked if there are any concerns about inbreeding as the whales may be closely related.

Mystic Response 6(d): Since submission of the permit application, Mystic has determined that Juno is not the offspring of any of the female belugas to be imported. Should any of the females breed, this possibility presents no significant concerns.

Comment 6(e): Given breeding would occur, commenters stated that this adds to the impression that at least a secondary impetus for seeking the permit is to obtain depleted marine mammals for purposes of public display once the research is completed.

Mystic Response 6(e): Breeding may occur; it is not true that “breeding would occur”. Allowing for the possibility of breeding is necessary for the proposed research because any measures to prevent it would corrupt the study design either by manipulating hormone levels with contraceptives or by disrupting social groups and behaviors. Furthermore, the rigorous design of the research has been developed based on decades of investment in facilities, completed research, and expert staff. The assertion that accomplishing these prerequisites for conducting bona fide publishable research are in some way a scheme for fraud is beyond reason.

Impressions of Mystic’s intent are immaterial to the law and policy for issuing the permit.

Mystic Aquarium was founded as a research organization and has been a research facility since its inception. Mystic Aquarium is the only beluga holding institution to hold a USDA Research License. Mystic Aquarium has conducted beluga research for decades, both in our habitat and in the field, and employs a team of researchers whose focus is beluga conservation and health. Mystic Aquarium’s researchers have published dozens of peer-reviewed articles on belugas and contributed greatly to the understanding of their health and their response to anthropogenic stressors and other situations, which are critical in order to conserve belugas in the wild. The research is truly bona fide as defined by the law. This permit is being sought in order to continue to maximize the information we can learn about belugas to benefit the conservation of their Depleted or endangered wild counterparts, before it is too late for their recovery. For Animal Welfare Institute to assert that the decades of work, substantial resource, and research effort on belugas by Mystic Aquarium have been performed with the goal of public display is simply egregious.

Public display is not a purpose of the proposed permit. Mystic’s research occurs in our habitats which are visible to the public. There is no other location where this research can be conducted. This is incidental to the authorized purpose of the permit and will not interfere with the objectives. Our situation is well within the discretion provided to NOAA under MMPA to consider the visibility of the whales as incidental to the research. The openness of our research program to the public also offers the opportunity to educate the public. Education is another contribution our program can make to the conservation of wild belugas, such as Cook Inlet belugas, for which education is among the goals of the recovery plan (Cook Inlet Beluga Recovery Plan, NMFS, 2016).

Comment 6(f): A member of the Canadian Parliament stated it is likely that Canada’s Minister of Fisheries and Oceans will reject an application to export the animals to Mystic Aquarium if breeding, public display, and transfer of the whales to other facilities once research is complete will occur. Has Marineland applied for, or obtained, the all the appropriate export permits (CITES and/or Fisheries Act)?

Mystic Response 6(f): The expectation of Member of Parliament Elizabeth May is immaterial to the review of the application primarily because the review is governed by U.S. law and, secondarily, because MP May has no role in relevant decisions under Canadian law.

Our permit application is subject to U.S. law to which we have thoroughly made all necessary representations. An eventual export-import project is subject to CITES, to which both countries are signatories. NMFS does not require that applicants submit their CITES permits along with their MMPA applications. We know that CITES export permits for the belugas listed in the research permit are in hand, which favorably anticipates a requirement for this to be included in a permit. We are confident, having entered into an agreement with Marineland Canada, that they are pursuing all necessary approvals for the project under Canadian law. The disposition of those approvals is under the authority of the Minister of Fisheries, Oceans and the Canadian Coast Guard and delegated to the appropriate agency there.

MP May has no authority over the administrative decisions of the Canadian government and is unlikely to obtain such authority. Her affiliation within Parliament holds no official status as a party, occupying only 3 of the required 12 seats.

Comment 6(g): Mystic Aquarium states that beluga calf development has been “rarely studied” but commenters stated that a number of beluga calves have been born in captivity in North America with the assumption that veterinary and husbandry records are available for analysis. Therefore, a commenter stated that “*New* births should not be necessary to study such basic biology well into the sixth decade of holding belugas in captivity.”

Mystic Response 6(g): The commenter’s view on the sufficiency of knowledge on this or any topic is irrelevant to the requirement that our proposed research be of publishable quality contributing to continuing research needs.

Nevertheless, while some aspects of beluga calf development have been documented, calves have rarely been included in the types of studies proposed under the permit application. Table 1. shows a summary of PubMed literature searches with keywords used regarding proposed research on beluga calf development. Results obtained are generally within only the last 10-15 years, indicating that beluga calf development has not been a major focus prior. While some aspects of behavioral development are moderately well documented, such as nursing, spatial relationships between mother and calf, and physical development (e.g. Russell et al. 1997; Hill et al. 2013; Robeck et al. 2005; Noren and Suydam 2016), sample sizes remain small. An emphasis recently has been on the development of social behavior in beluga calves (e.g. Hill et al. 2018). However, calves have hardly ever been included in the types of studies proposed under the permit application. Sound studies in belugas, including calves, have mostly focused on vocalizations and there is lack of information on hearing capabilities. Physiological studies of calves are rare, and while they will not be targeted research subjects, any contributions to the proposed projects by calves participating in routine husbandry (i.e. blood draws associated with preventative veterinary care) would create valuable research opportunities. The dearth of useful, documented beluga calf developmental information was recently underscored when seeking out data to help assess Tyonek, the live stranded Cook Inlet Beluga (2017) as well as several recent calf carcasses in Cook Inlet (Goertz, personal communication). Information on the development of endocrine and immune responses in calves is important and applicable to wild belugas to understanding calf survival and disease risk, etc. Moreover, studies of the cetacean immune system are few and far between. Even if archived samples were available, chances are they were not collected and archived following appropriate protocols for the proposed studies.

Finally, veterinary and husbandry records are not a substitute for the biological samples needed to answer important relevant questions included in the permit application.

Table 1: Summary of PubMed literature searches regarding proposed research on beluga calf development.

Research Topic	Search Terms	Number of Results	Relevance
Calf development	Beluga calf development	9	Hill, 2009, Hill et al., 2019; Hill et al., 2017; Mishima et al., 2015; Hill et al., 2013; Karenina et al., 2010; Krasnova et al., 2006; Robeck et al., 2005, Russell et al., 1997: focused on vocalizations, mother-calf interactions, other calf social interactions, behavior and growth
Immune Function	beluga calf immune function	1	DeGuise et al 1996- not actually about calves
	beluga immune function development	3	all beluga sturgeon references (<i>Huso huso</i>)
	Delphinapterus leucas immune function development	0	
	beluga whales immune function development	0	
	Immune function development in beluga calf	0	
Endocrinology	beluga calf endocrinology	0	
	beluga calf cortisol	0	
	beluga calf neuroendocrine	0	
	beluga calf hormone	1	O'Brien et al 2008- artificial insemination
	beluga hormone development	7	4 results are for fish (sturgeon); Stimmelmayer et al 2019- chromosomal disorder in a mature beluga; Ball et al., 2017- genes related to blubber stress in bowhead and beluga; Katsumata et al., 2011- testosterone in males (1 animals was 2 years old at start of study, no calves)
Hearing	beluga calf hearing	0	

Research Topic	Search Terms	Number of Results	Relevance
	beluga hearing development	0	
Diving (opportunistic and in vitro)	dive development beluga	2	Noren and Suydam, 2016- myoglobin in muscle; Noren et al., 2018- body mass and hematology
	dive development in beluga calves	1	Noren and Suydam, 2016- myoglobin in muscle
Calf research	beluga calf	12	7 results dealing with calf behavior and interactions or parental behavior (Hill et al., 2019; Hill et al., 2017; Krasnova et al., 2014; Hill et al., 2013; Karenina et al., 2010; Leung et al., 2010; Krasnova et al., 2006); 1 result specifically on vocalizations which focused on various ages but included a calf (Mishima et al., 2015); 1 report on a twin pregnancy and the survival of a single calf (Osborn et al., 2012) and several less relevant results including Cadieux et al., 2016- (transfer of contaminants through lactation); O'Brien, et al., 2008- (artificial insemination); Deguise et al., 1996- (immune function in adults but mentions fetal calf serum)
	beluga nursing behavior	2	Leung et al., 2010- allonursing; Kelly et al., 2009- contaminants in arctic food web
	beluga calf behavior	6	Hill et al., 2019; Krasnova et al., 2014; Hill et al., 2013; Karenina et al., 2010; Leung et al., 2010; Krasnova et al., 2006
	development of social behaviors in beluga	5	Lilley et al., 2020- socio-sexual behaviors; Hill et al., 2019; Hill et al., 2013; Karenina et al., 2010; Krasnova et al., 2006
	development of social behaviors in beluga calf	4	Hill et al., 2019; Hill et al., 2013; Karenina et al., 2010; Krasnova et al., 2006.
Pregnancy	beluga pregnancy	16	2 results were human studies; 4 studies on artificial insemination (Krasnova et al., 2014; Osborn et al., 2012; Robeck et al., 2010; O'Brien et al., 2008); 1 result on oligosaccharides in milk (Urashima et al., 2002); 4 results dealing with hormone measures (Goertz et al., 2019; Legacki et al., 2020; Richard et al., 2017; Katsumata 2010); 5 studies on contaminants or pathology (Lair et al., 2016; Burek-Huntington et al., 2015; Desforges et al., 2012; Lebeuf et al., 2004; Wade et al., 1997)
	beluga fetal development	6	2 results were either human or sturgeon studies; Stern et al., 2005- contaminants; Solntseva 1999- comparison of development of auditory and vestibular structures in belugas (article in Russian, no abstract); Igumnova 1975- embryonic development; 1 result on acid phosphatase in digestion (Gadzhiiev and Khasaeva 1983).

Research Topic	Search Terms	Number of Results	Relevance
Vocalizations	beluga calf calls	1	Mishima et al., 2015- calls in various age belugas including a calf
	vocalizations in beluga calf	0	
	vocalization beluga calf	0	
	vocal development in beluga	1	Mishima et al., 2015- calls in various age belugas including a calf
	whistle development in beluga	0	
	beluga calf contact calls	1	Mishima et al., 2015- calls in various age belugas including a calf

Comment 8 – Legality of beluga whale parents: Commenters state that the parents of the whales requested for import appear to have been captured in Russia between the late 1990s and 2005. Based on information on CITES permits obtained by the commenter, they state it is likely that the parent whales were captured in violation of the Russian law in effect at that time, which prohibited captures and exports of whales for purposes other than “scientific” or “educational.” These commenters state that according to CITES records, beluga whales were exported to Canada in 1999, 2000, 2003, 2005, and 2008 and in three instances, CITES records list “commercial” (with the letter “T”), “Q” (for a circus or traveling exhibition), and “hunting trophy” (H). Commenters state that these purposes violate Russian law and, in the 2008 case, Canada did not report the import to the CITES tribunal.

Mystic Response 8: The only basis for judging the legality of the origin of any whale to be imported for consistency with MMPA is a finding by a legal authority. The record of CITES permits indicates such findings are positive. CITES requires that a country’s Management Authority determine that an export “...will not be detrimental to the survival of that species” (Article IV.2.a.). Furthermore, CITES requires that a country’s Management Authority is satisfied that “...any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment” (Article IV.2.c.). Original CITES permits for the parents are not available; however, these do not provide meaningful information beyond what is detailed in the CITES database - see attached table.

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16 February 2020

To Dr. Tracy Romano
Vice President of Research
& Chief Scientist
Mystic Aquarium

Dear Tracy,

I am writing this letter to verify our collegial and collaborative relationship in regards to beluga research and conservation.

Belugas in Russia are undergoing similar threats (e.g. pollution, noise, shipping, climate change, etc.) as belugas in Cook Inlet, Alaska, USA and beyond. The studies that you propose in the Beluga Research Permit Application (File #22629) related to health, including studies on the immune system, microbiome, behavior and reproduction, non-invasive techniques for assessing health, diving physiology, photogrammetry, testing of telemetry devices and tags, as well as acoustic studies, will be valuable with the results applied to beluga populations in Russia as feasible.

I appreciate the discussions we have had regarding beluga research and conservation at prior meetings and workshops and was most grateful for the invitation and opportunity to be a keynote speaker at the 2nd International Workshop on Beluga Whale Research & Conservation to relay the status, research needs and issues impacting beluga whales in Russia. I look forward to meeting with you at future meetings to discuss our more recent efforts in regards to beluga research and conservation.

Sincerely,

A handwritten signature in blue ink that reads "Olga Shpak". The signature is fluid and cursive, with the first name "Olga" being more prominent than the last name "Shpak".

Olga Shpak, PhD,
Research Associate
A.N. Severtsov Institute of Ecology and Evolution
of Russian Academy of Sciences

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19.02.20 № 0609/12

To Dr. Tracy Romano
Vice President of Research
& Chief Scientist
Mystic Aquarium

Dear Tracy,

Our Institute has been conducting beluga research for many years. Dr. Oleg Lyamin and I were leading physiological and health-related studies with belugas under controlled conditions. Dr. Olga Shpak and Dmitry Glazov supervised different projects on wild beluga populations, including Western-Okhotsk and Shelikhov populations of the Okhotsk Sea. The Institute has been involved in sleep, behavior and anthropogenic noise studies, health-assessments, abundance estimates, genetic studies, distribution and movement studies, acoustic research etc.

With this letter, I would like to confirm that our Institute is keen to collaborate with Mystic Aquarium on health-related research on beluga whales, which can contribute to recovery of wild beluga populations. We are also very interested in developing non-invasive techniques to sample and tag wild belugas.

Growing industrial activities in the Russian Far East pose new risks to belugas. Learning about masking and physiologic effects of noise will help to implement sustainable regulations.

The results of the studies by Mystic Aquarium under The Beluga Research Permit Application (File #22629) will be valuable to our research and to the conservation and management of all wild beluga populations.

Sincerely,



Sergey Naidenko, Prof., PhD,
Deputy Director of
A.N. Severtsov Institute of Ecology and Evolution
of Russian Academy of Sciences