



October 5, 2020

Robert Spottswood
Chair
Florida Fish and Wildlife
Conservation Commission
620 South Meridian Street
Tallahassee, FL 32399-1600

Re: Shark Feeding in Draft Environmental Impact Statement for Florida Keys National Marine Sanctuary: A Restoration Blueprint.

Dear Commissioner Spottswood,

I am writing on behalf of the Diving Equipment and Marketing Association (DEMA), as well as the hundreds of dive-related businesses and the millions of divers in Florida and throughout the United States regarding the Florida Keys National Marine Sanctuary Restoration Blueprint.

As you know, DEMA is a non-profit trade association representing the business and consumer interests of the recreational scuba and snorkel diving industries. DEMA's mission is to bring businesses together to grow the diving industry worldwide, and we are actively engaged in promoting recreational diving of all kinds throughout the US and globally. Inherent in this mission is an ongoing effort to create public awareness of the need to protect the marine environment and marine life, acknowledging that diving depends upon sustainable interaction with the marine environment for its very existence.

DEMA is generally supportive of National Marine Sanctuaries when science indicates the need for such sanctuaries and when non-consumptive activities such as diving are not unnecessarily restricted. In this regard, DEMA is highly concerned with the proposed restriction on feeding fish by divers contained in the FKNMS Restoration Blueprint.

This unnecessary proposal appears to be designed to prevent thousands of divers each year from actively and safely engaging in observing sharks to gain a better understanding of this creature. Research by independent and credible scientists indicates that "provisioning ecotourism" – introducing small amounts of food in the water to interest sharks for the purpose of observation – does NOT create an increased risk for non-divers and swimmers not directly engaged in provisioning ecotourism activities. In fact, shark feeding sites are generally located many miles away from popular swimming sites.

By prohibiting shark feeding for essentially all purposes except harvesting (killing), this proposal will have a detrimental impact on consumers, the shark population in the US and businesses that serve the recreational diving industry, including dive operators, vessels used to transport customers to diving locations, hotels, restaurants and transportation services near FKNMS.

Shark feeding for observation purposes

It appears that the fish (shark) feeding prohibition language added to the FKNMS Blueprint has been introduced on the mistaken concept that feeding sharks for purposes other than harvesting “trains” the animal to associate swimmers and divers with a source of food. The contention that this creates a situation dangerous to swimmers and others who encounter sharks in settings different than those in which the sharks were originally fed is not proven, and in fact, scientific data indicates to the contrary. The concept that sharks can be “trained” or “conditioned” to associate people in the water with food, analogous to Pavlov pairing a neutral stimulus (a bell/metronome) with a non-neutral stimulus (food) to condition dogs is erroneous. Various research efforts on numerous shark species, cited herein, indicate that sharks do not associate swimmers under completely dissimilar circumstances with the small amounts of food introduced so that divers and snorkelers can observe and photograph sharks. The FWC has always based decision making on scientific evidence, and in the case of feeding sharks, the science does not support the FWC staff recommendation to ban shark feeding.

What does the research indicate?

[In a study published in 2012 in *Functional Ecology*](#), Dr. Neil Hammerschlag¹, *et al* conducted satellite telemetry studies and movement analysis to examine the long-range migrations and habitat utilization of tiger sharks (*Galeocerda cuvier*) originating in the Bahamas and Florida. These two areas were selected because they differ considerably with regards to the presence and absence of “provisioning ecotourism.” Florida banned shark diving in state waters beginning in January 2002 but continues to allow feeding of sharks in order to harvest them, while the Bahamas does not prohibit shark diving. The study concluded that, “in light of the potential for conservation and public awareness benefits of provisioning ecotourism, this practice should not be dismissed out of hand by (fisheries/site) managers. Given the pressing need for improved understanding of the functional ecology of apex predators relative to human disturbance, empirical studies of different species’ sensitivities to disturbance should be used to guide best-practice ecotourism policies that maximize conservation goals” (rather than relying on perceived but unproven opinion).

While studies indicate that conditioning seems unlikely when using provision ecotourism, should such conditioning actually occur, danger to swimmers and divers still remains unlikely. [In a study of Great White Sharks \(*Carcharodon carcharias*\) published by Ryan L. Johnson of the University of Pretoria](#), South Africa, Allison Kock of the South African Shark Research Centre and Iziko Museums, *et al*, the authors state that, “It is highly improbable that ‘conditioning’ of sharks to a cage diving vessel would increase danger to human water-users such as swimmers, scuba divers and kayakers. This is due to the olfactory dissimilarity of these humans to the conditioned neutral stimulus (i.e. the cage diving vessel and associated structures).”

[In a Hawai’i-based study of cage diving](#) with sharks, which included provisioning ecotourism, researchers Carl G. Meyer, University of Hawai’i System, and Yannis P. Papastamatiou, Florida International University found that, “Galapagos sharks (*Carcharhinus galapagensis*) and sandbar sharks (*Carcharhinus plumbeus*) were the most common species seen at cage diving sites (98% of all sharks observed). These species are rarely implicated in attacks on humans. Sharks remain at cage diving sites throughout the day and disperse at night. Sharks that visit North Shore cage diving sites also migrate seasonally to deep waters off the West side of Oahu, and range as far afield as Maui and Kauai. Inshore movements by sharks associated with cage diving operations are extremely rare. There is no evidence of sharks following boats back to the harbor. [There is no evidence indicating Haleiwa shark cage diving operations are a threat to public safety.](#)”

¹ Dr. Hammerschlag is considered by many to be the preeminent shark research scientist in the country. Dr. Hammerschlag currently serves as Director of the Shark Research & Conservation Program at the University of Miami. His background work can be reviewed at: <https://sharkresearch.rsmas.miami.edu/about/about-neil/>

These studies suggest that shark diving, which most often includes provisioning ecotourism, does not create the risk to swimmers, divers and kayakers as supposed by proponents of the shark feeding prohibition contained in the FKNMS Restoration Blueprint.

Is there economic value in diving with sharks that includes provisioning ecotourism?

While it should now be clear that there is little to suggest that provisioning ecotourism to attract sharks creates a risk to swimmers, divers or kayakers, there is an abundance of research that indicates this practice is economically beneficial to the nearby communities.

Almost 200,000 new divers are trained and “certified” in the United States each year (*Source: DEMA Certification Census*), and there are about 2.715 million currently active divers in the US (*Source: 2020 Sports and Fitness Industry Association*). As stated, the Diving Industry depends on sustainable interaction with the marine environment, and is aware of the need for long term sustainability of these resources for all citizens of the U.S. The Industry is dedicated to a healthy marine environment and protection of aquatic resources, including sharks. For these reasons DEMA’s annual goals include a mandate to engage in activities which promote the health of aquatic resources while protecting diver access to those resources.

Divers contribute to local economies by paying to dive and vacationing in areas near dive sites. According to a [study published by Oceana](#), conducted in collaboration with Duke University, and quoting a [study conducted by the Cline Marketing Group](#), as a group scuba divers take an estimated 1.7 million dive vacations each year at an average cost of \$2,424 per trip, thus spending more than \$4.1 billion dollars in dive-related vacations annually. Divers contribute to tourism and tax revenues by purchasing day outings, extended dive trips, diving equipment, and by spending on hotels, food, airfare and ground transportation, and more. Through such purchases, diving also creates tourist-related jobs, which contribute to the general economy where such tourism spending takes place. In total, including purchases of equipment, travel, training and other activities, recreational diving and snorkeling contribute about \$11 billion to the US gross domestic product.

Divers obtain personal value from seeing marine life when they dive and quantifying this value is important, in part, because it provides economic justification for the protection of marine wildlife. All one must do is be present on one of these dive boats as divers, both young and old, come back from seeing these rare and majestic creatures – a life changing experience for all that participate.

[The Duke University/Oceana study](#) assessed the value to divers of seeing healthy corals, sea turtles and sharks. Divers were asked the maximum amount of money they would be willing to pay, in addition to their normal dive costs, for an increased likelihood of seeing a particular species (“willingness to pay” or WTP). The study found that, assuming the total dive expense was \$100, the maximum amount of additional value for a diver to increase the likelihood of seeing a shark while diving was an additional \$35.56 per diver. The total annual value was cited as \$212.2 million.

In [Socio-economic value and community benefits from shark-diving tourism in Palau: A sustainable use of reef shark populations](#), authors G.M.S. Vianna, M.G. Meekan, *et al* determined that sharks may be more economically valuable as a non-harvested resource. On the small island of Palau alone, “shark diving was shown to be a major contributor to the economy of Palau, generating US \$18 million per year and accounting for approximately 8% of the gross domestic product of the country. Annually, shark diving was responsible for the disbursement of US \$1.2 million in salaries to the local community and generated US \$1.5 million in taxes to the government. If the population of approximately 100 sharks that interact with tourists at popular dive sites was harvested by fishers, their economic value would be at most US \$10,800, a fraction of the worth of these animals as a non-consumptive resource. Fishers earn more selling fish for consumption to shark divers than they would gain by catching sharks. Shark diving provides an attractive economic alternative to shark fishing, with

distribution of revenues benefiting several sectors of the economy, stimulating the development and generating high revenues to the government, while ensuring the ecological sustainability of shark populations.”

According to the Cline Group Study, in the Bahamas, where shark diving with and without cages is conducted regularly, operations contribute in excess of \$78 million dollars annually to the Bahamian economy.

Clearly, sharks are far more valuable alive, with the added incentive of conservation and the opportunity for people to better understand this unique creature, than if they are harvested.

A missed conservation and learning opportunity

Provisions in the Blueprint seek to prohibit an activity that can consistently bring everyday persons – trained divers but also novice snorkelers – into contact with these animals for observation, photographic and study purposes. And, far differently than would be suggested by popular misconceptions about shark behavior, it is actually quite unusual to see sharks closely enough for near observation or photography without being able to attract them through controlled provisioning – simply put, sharks are normally either too shy or disinterested in divers and snorkelers for such close encounters to occur on a regular basis.

Persons participating in such activities see sharks first-hand and learn more about them. We believe, and virtually every resource cited herein agrees, as a result of this benign ecotourism activity, all participants gain an appreciation for these animals that would otherwise be impossible. Such appreciation can lead to a greater understanding of the importance of these animals in maintaining a healthy aquatic environment.

When people dive with sharks, they can observe them in their natural surroundings where they quickly learn that these animals are not “insidious monsters” as they are often depicted. The impact of movies such as “Jaws” and Discovery Channel’s “Shark Week” still drive the average citizen to believe, at least initially, that the only good shark, is a dead shark. Shark diving, which includes provisioning ecotourism, gives a broad segment of the population a better understanding of sharks and their role in the ecosystem and thus contributes directly to the protection of these animals and their natural habitat.

Attracting sharks through provisioning ecotourism has **not** been shown to encourage aggressive shark behavior toward swimmers and others, and studies indicate that this activity does not increase the risk of shark encounters or bites when other persons are swimming or are otherwise in the water where these creatures live. The studies also indicate a great potential for economic value and conservation efforts.

The decline in shark population

As virtually everyone is aware, due to shark harvesting for the purpose of removing their fins, an abhorrent practice still continuing in waters throughout the world, the shark population is declining. Estimates are that approximately 26 to 73 million sharks are being killed worldwide each year to satisfy the demand for shark fin soup. This point is made clear [in this infographic](#), which shows that worldwide fewer than 12 persons per year are killed by sharks, while at the same time, approximately 11,000 sharks killed worldwide by people, every single hour of every day.

A better alternative

There is an alternative. As is suggested by researchers in the [2015 study published in Marine Pollution Bulletin](#), with only speculative evidence of behavioral changes in sharks from provisioning ecotourism, there is more to be gained if ecotourism operators were required to implement safe marine interaction practices. For several years the Global Interactive Marine Experiences Council (GIMEC), including leading industry experts – many from Florida - have recommended the use of safe marine life interactive practices. The FKNMS could adopt these as minimum guidelines and would have the support of diving professionals and the industry.

Requiring use of these [GIMEC Guidelines](#) or similar guidelines found in [Responsible Shark and Ray Tourism: A Guide to Best Practices](#), jointly created by World Wildlife Fund (WWF), Project AWARE and Manta Trust, would be a much better alternative to banning provisioning ecotourism, while still addressing the initial concerns of the Restoration Blueprint proposal. Such requirements would avoid denying thousands of US citizens the opportunity to participate in a marine experience that positively changes the lives of both the citizen and the shark.

In summary of this topic, there should be no prohibition on fish (shark) feeding as found in the FKNMS Restoration Blueprint. This section is clearly designed to prohibit divers and others from seeing sharks swim unmolested in the water but allows sharks to be harvested (killed) by fishers. Given the scientific evidence and the economics of observing sharks through “provisioning ecotourism” – the act of temporarily attracting sharks by concentrating a small quantity of food – the logic of allowing sharks to be killed as a result of such feeding, but prohibiting divers from viewing or photographing them, escapes those with an understanding of this creature and this activity.

While DEMA strongly opposes the restriction on feeding sharks (fish) as proposed in the Restoration Blueprint, DEMA is generally supportive of the Restoration Blueprint for the Florida Keys National Marine Sanctuary. With the changes suggested herein, we believe the diving community would be strongly supportive as well.

We welcome the opportunity to work with you and your team as these suggested changes are implemented to the Florida Keys National Marine Sanctuary Restoration Blueprint.

Thank you for your consideration,

A handwritten signature in black ink, appearing to read 'Tom Ingram', with a stylized, flowing script.

Tom Ingram
President and CEO
tom@dema.org

cc: The Honorable Ron DeSantis, Governor of Florida
DEMA Board of Directors
Bob L. Harris, Esq., Governmental Consultant, DEMA

ADDITIONAL REFERENCES

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