

Richard L. Pyle
25 February 1992

2/25
FINANCE
Committee

Testimony on H.B. No. 2878 HD1, HSCR 435-92
"Making an Appropriation for Shark Hunting"

My name is Richard Pyle and I work as a Collections Technician at the Ichthyology collection of the B. P. Bishop Museum. The Honolulu Star Bulletin describes me as a "Shark Expert". I am not. To me, a shark expert is someone who has been involved specifically with sharks on a very regular basis over a long period of time - either in a scientific capacity as a researcher, or in a professional capacity such as a commercial fisherman. There are several such individuals here who I would certainly consider to be true "Shark Experts". I do, however, happen to know a great deal about sharks. I have been fascinated by them for literally as long as I can remember, and continue to be so today. Also, I was born in Hawaii and spent much of my life in the ocean, both as a surfer and as an avid diver. And, I have had close, sometimes terrifying encounters with Tiger Sharks during both of these activities.

Shark attacks, especially fatal ones, are terribly tragic events. I sincerely wish that they would never happen. But they do happen. There is some evidence, mostly anecdotal, which indicates that Tiger Shark populations have slowly increased over the past decade. Some people jump to the conclusion that the shark increase is a result of an increase in the sea turtle population. George Balazs, in his testimony, has voiced the opinion that this is not the case. I don't know anyone more familiar with Hawaii's sea turtles than George, so I have very high regard for his opinions concerning turtles. But the truth is, we know very little about Tiger Shark biology, and as far as I know, no one can definitely say anything about causes and effects when it comes to incidents involving Tiger Sharks. Shark attacks on humans are very singular events - there are very few trends, very few generalities, they are entirely unpredictable. The proposed effort to hunt sharks and reduce their numbers is a very general attempt at a solution. I am not convinced that a general reduction in shark numbers will have any significant effect on the singular incidents of attacks on humans. Furthermore, Tiger Sharks are an integral component of Hawaii's marine ecosystem, and any efforts to reduce their numbers will undoubtedly affect the whole system - probably for the worse. In my opinion, the only reasonable way to go about reducing shark attacks is to understand the attacker. It is glaringly clear that more research should be done on Tiger Shark biology to find out things like: Do they really occupy small home ranges, or do they wander over great distances? Also, we should try to learn more about their feeding behavior, especially with regard to how they cue in on turtles as prey. For instance, do they see colors, and do they associate certain colors with potential prey? If we knew this, perhaps surfers and body-boarders could reduce their chances of being attacked by coloring the bottom of their boards a certain color. Finally, I am not opposed to efforts at

catching one shark in an area of an attack on a human, immediately after an attack, provided the concerns of the Native Hawaiian community are taken into consideration. First, if it is true that sharks live in small home ranges, then this might reduce the likelihood of an attack (but as of yet, I am aware of no evidence suggesting that a single Tiger Shark is responsible for more than one individual attack in Hawaiian waters). But more importantly, if confirmed human-attacking Tiger Sharks can be captured and examined for sex, state of health, and various other parameters, we may learn more about what kinds of sharks attack people. The bottom line is, we just don't know much about Tiger Shark biology at all. Maybe, with a greater understanding of how Tiger Sharks live, breed, and feed, we can make intelligent suggestions to reduce, or eliminate shark attacks in Hawaii. At this time, I must say that I feel that money would be better spent towards efforts at understanding how Tiger Sharks live, rather than trying to eliminate them. These are my own opinions, and are not necessarily those of the B. P. Bishop Museum.

A handwritten signature in black ink, appearing to read 'Richard L. Pyle', written in a cursive style.

Richard L. Pyle

TESTIMONY FOR HOUSE FINANCE COMMITTEE ON HB 2878 - PROPOSED SHARK CONTROL

My name is Brad Wetherbee and I am a Ph.D. student in the zoology department at the University of Hawaii and a research assistant at the Hawaii Institute of Marine Biology (HIMB) on Coconut Island. I have been studying the biology of sharks since 1985. I am submitting testimony on shark control legislation as a private citizen and the views expressed are my own and not those of the University or HIMB.

The history of shark attack in Hawaii has recently been documented by employees of the National Marine Fisheries Service, Honolulu Laboratory. This report listed 94 shark attacks (39 involving fatality) in Hawaii beginning in 1779. The report lists 9 attacks (4 fatal) between 1960 and 1969 and 11 attacks (3 fatal) between 1970-1979; an average of 1 attack per year (0.4 per year fatal) from 1960-1979. Since 1980 there have been 31 attacks (12 fatal), an average of 2.6 per year (1 per year fatal). Thus, it would seem that shark attacks in Hawaii have more than doubled during the last 12 years. However, two factors should be considered before making this conclusion. First, is the definition of what constitutes a shark attack. A number of attacks included in the list involve a fatality that was probably caused by something other than a shark. People who drowned and were later attacked by sharks greatly increase the number of shark attacks listed. If these incidents are excluded, the total number of attacks for 1960-1969 drops to 5 (0 fatal) and for 1970-1979 drops to 8 attacks (0 fatal), for an average of 0.7 attacks per year with no fatalities for that 20 year period. Attacks for 1980-present drops to 20 (1 fatal), an average of 1.7 per year. Four additional "attacks" included in the list involved fishermen that were attacked by sharks they had captured, giving a more realistic total of 61 attacks between 1779 and the present. Secondly, the National Marine Fisheries employees first compiled the list of Hawaii attacks in 1979. It would have been surprising if the average number of shark attacks reported per year did not increase after individuals had begun actively seeking information about attacks. Rescue workers, hospitals and media personnel are among those who have become aware that a Hawaii shark attack file now exists. It is unlikely that the increase in shark attacks reported since 1979 is not related to the establishment of this network of interested informants. This documenting of attacks most likely represents a more reliable estimate of attacks, but is not a reliable indication that the rate of shark attacks has increased during the past 12 years as some people contend.

A number of shark control programs have been conducted in Hawaii over the last 33 years in response to attacks. A fatal attack off Lanikai in 1958 prompted the Billy Weaver Shark Research and Control Program which operated in 1959 and 1960. In

this program a total of 697 sharks (87 tiger sharks) were caught in waters off Oahu at a cost of about \$39 per shark. Between 1967 and 1969 the Cooperative Shark Research and Control Program, Hawaii's most comprehensive control program, was conducted in waters around the main Hawaiian Islands. A total 1727 sharks (280 tigers) were caught in this program at a cost of \$121 per shark. In 1971 another control program around the main islands resulted in the capture of 238 sharks (109 tigers) at a cost of \$200 per shark. In the summer of 1976 a limited shark utilization - abatement - student training program was carried out in waters off Oahu, Maui and Kauai, with a catch of 95 sharks (46 tigers) at a cost of \$158 per shark.

During the 5 years following the Billy Weaver control program there were 4 shark attacks. During the 5 years following the extensive 1967-69 program there were 8 attacks (the 1971 control program was also conducted within these 5 years). The average number of attacks per year in the 5 years following the two most extensive control programs (after 367 tiger sharks had been removed from Hawaiian waters) was 1.2 per year. Compared to the overall average for the years 1960-1979 (1.0 attacks per year) one could argue that shark attack was more prevalent following shark control than it was prior to shark control programs in Hawaii.

The shark problem in Hawaii is much less severe than in other areas of the United States. For example there are several fatal shark attacks annually in California and Florida has more shark attacks each year than any other state. South Africa and Australia have spent millions of dollars on extensive and long term anti-shark measures, but attacks still occur each year in these countries. Considering the number of people entering Hawaiian waters over a limited length of coastline (the Hawaii Visitors Bureau reported more than 6 million visitors to Hawaii in 1990) the odds of a person being attacked by a shark are quite remote. Far fewer people have been killed by sharks in Hawaii than have drowned while surfing, bodysurfing, body boarding, sail boarding, swimming, diving, boating and fishing.

However, the fact remains that people are attacked by sharks, and probably will be as long as people and sharks are in the water together. History has shown that shark attacks are going to occur in Hawaii even if extensive shark control programs are implemented. The most significant effect of shark control programs in Hawaii has been the reduction of shark populations around the islands. Shark catches dropped substantially over time even when only one boat fished for sharks during the early control programs. Rapid decreases in shark populations is common. Sharks are especially susceptible to overfishing because of the way they reproduce and grow. Sharks grow slowly, have a large adult size, take years to mature, and give birth to few,

well-formed young. These characteristics make shark stocks similar to whales and dolphins, and virtually every shark fishery initiated around the world has lasted only a few years before populations were drastically reduced. As a result of the depletion of shark populations on the U.S. east coast, the National Marine Fisheries Service has developed a Federal Management Plan for the U.S. Atlantic, Gulf of Mexico and Caribbean shark fisheries. The state of Florida Marine Fishery Commission has proposed even more strict limits on shark fishing off Florida.

The effects of heavy shark fishing on an ecosystem are not well understood. In South Africa the removal of large predatory sharks by protective gill netting is thought to be responsible for a proliferation of smaller sharks, and in turn the abundance of fish sought by fishermen has decreased. Maintenance of healthy shark populations is important in some areas. An abundant supply of sharks has a positive influence on the tourist industry in areas where diving with sharks and fishing for sharks are popular. This may be true even for areas in Hawaii. Molokini Crater off Maui is a popular spot for tourists to dive with sharks, and the tiger shark is one of the few species of sharks included as a big game fish by the International Game Fish Association.

Recent media coverage of sharks and attacks in Hawaii has perpetuated a number of misconceptions about sharks. The accounting of attacks in Hawaii from a more practical perspective has already been discussed. "Sharks are territorial, especially tiger sharks" - The idea that sharks are territorial and patrol a particular area has not been demonstrated for any species of shark. Sharks have been found to remain in a certain area, or return to a particular landmark, but these observations are limited to short time scales. A number of tiger sharks tagged in New York and New Jersey have been caught later off Florida and Cuba and one covered this distance at a rate of 15 miles per day. Newspaper articles have quoted "experts" remarking that tiger sharks come into shallow water at night and move into deeper water in the day. While this may be true in many cases, the only tiger shark that has ever been tracked (by University of Hawaii researchers coincidentally) spent the majority of time in shallow water during the day and moved into deeper water at night. There have also been a number of references about the dramatic increase in shark populations in Hawaii (especially tiger sharks). The rudimentary studies of shark populations in Hawaii do not provide enough information to accurately judge fluctuations in shark populations. Concerted efforts to catch and destroy sharks during past control programs have certainly reduced local shark populations. Slow rates of growth and reproduction limit the speed with which shark populations can rebound from such intense fishing. Hence, the idea that there has been a recovery and proliferation of sharks since the cessation of control programs

is pure speculation based on anecdotal information.

There have been 5 shark control programs of varying intensity in Hawaii. Each of these 5 programs was conducted with the objective of "research" as well as "control", but the research aspects of these programs were not as heavily emphasized as control. As a result, the state of Hawaii still has very little information upon which to base decisions about the shark problem despite these considerable control and research efforts. Based on statements reported by the media, it appears that neither the Department of Land and Natural Resources, or the National Marine Fisheries, Honolulu, has any better understanding of how to control sharks than their predecessors did in 1958. Essential questions remain about how many and what kinds of sharks are found in what areas in Hawaii. The length of time sharks remain in particular areas and how long it will take for other sharks to replace them if they are removed is also unknown. Understanding these aspects of shark biology is imperative for successful operation of "selective" shark fishing, as has recently been suggested by a number of individuals. If money is to be appropriated by the legislature for shark control it would be more prudent to spend that money on research that would answer some of these basic questions. In this way state officials would be in a much better position to make wise decisions about what can be done in particular instances or over the long term, rather than relying on past policies of questionable effectiveness.

In my opinion the state should determine whether the negative impact sharks have on humans in Hawaii has reached an unacceptable level. Considerations other than tourist dollars should be taken into account. If the impact is great enough to warrant action by the state, then a course of action should be selected which will reduce the negative impact of sharks most effectively and with the most efficient use of taxpayers money. A program aimed solely at the destruction of sharks is going to do just that - destroy sharks. The effectiveness such a program would have in eliminating shark attack is doubtful based on the success of extensive control efforts in the past. The environmental effects of a control program remain unknown, but are likely to be detrimental. Money spent on public education and dissemination of the best available information may quell fears as effectively as a destructive control program, and may meet with greater public approval given the present popularity of environmental concerns.

I urge the state of Hawaii to take a modern approach to this controversy and learn from past experiences in Hawaii and elsewhere around the world and to make an environmentally responsible, fiscally sound decision that will be beneficial to residents, visitors and inhabitants of the marine environment in Hawaii.

TESTIMONY SUBMITTED BY CHRISTOPHER LOWE IN OPPOSITION OF
HB 2878 "MAKING AN APPROPRIATION FOR SHARK HUNTING"

COMMITTEE ON FINANCE
LEGISLATIVE HEARING FEBRUARY 25, 1992

My name is Christopher Lowe and I am currently a PhD. candidate at the University of Hawaii and a research assistant at Hawaii Inst. of Marine Biology. I have been actively studying shark biology for 7 years. I received my Master's degree in Biology from California State University, Long Beach under the direction of Dr. Donald Nelson, a well known shark behavioralist. I am currently studying the energetics and behavior of scalloped hammerhead sharks in Kaneohe Bay. The views presented in this testimony are solely mine and may not reflect those of the University or HIMB.

As a concerned citizen and a shark biologist, I am disheartened to see the way the recent issue of shark control has been handled. Shark attacks on humans are horrible events and I truly sympathize with the families of victims, but they are far from being common incidents. One has a much higher chance of being killed or maimed in a car accident on the H1 highway than being attacked by a shark. The true fact is people take their chances any time they go in the water just like they take their chances when they drive on our highways.

It is my professional opinion that the proposed "shark hunting program" will not be successful in decreasing the number of shark attacks. This statement is based on the fact that there just is not enough known about the targeted shark species that may be responsible for attacks on humans.

Unfortunately, the concept of shark control is not a new one for the state of Hawaii since they have previously funded several shark abatement programs (1959, 1967-69, 1971, and 1976). During the first two abatement attempts, 3125 sharks were killed, supposedly decreasing shark populations around the main Hawaiian Islands, whereas the last two programs (funded for 6 month periods) yielded 336 sharks. However, shark attacks still remained at the pre-abatement rate (before 1959) of approximately 1 attack per year. The number of shark attacks rose during the post-abatement period (1978 to present) to 2.7 attacks per year, however, this may be an artifact of record keeping. There may be some correlation between the development of the official Hawaiian shark attack list, which was first started in 1979 and the increase in the numbers of attacks. For example, it is possible that the increase in the number of attacks may be an artifact attributed to the greater interest and investigation in documenting shark attacks. In addition, for many of the attacks listed after 1979, it is questionable as to whether the victim was actually attacked and killed by a shark or had drowned first and was then bitten. If the latter were true, then one would be hard pressed to consider that an actual shark attack. If the unconfirmed and provoked attacks were removed from the list then the number of shark attacks per year drops to 1.2 for the post-abatement period. Although the tax payers of Hawaii have paid over \$250,000 for the last four programs, which have shown little effect in decreasing the numbers of shark attacks, I am surprised

to see that the state still considers implementation of a costly shark control program.

The most important variable not considered by the state on this issue is still the lack of knowledge concerning many of the species of sharks that inhabit the waters around the Hawaiian Islands. It is my understanding that the proposed program calls for "selective hunting" in populated areas to reduce the supposed "increased" numbers of tiger, Galapagos, and grey reef sharks. However, there is currently little scientific evidence verifying the actual population densities of any of these sharks around the main Hawaiian Islands. In addition, little or nothing is known about the life history or behaviors of these sharks, which the proposed program intends to target. For example, no one knows the extent of a tiger sharks home range, how far they travel, or even if they are territorial. Tag and recapture studies conducted on the East Coast have shown that tiger sharks may range up over a 1000 miles. Therefore, just eliminating tiger sharks from the waters around one particular area does not mean that sharks from other parts of the island(s) will not move into that area. One may claim that by simply removing tiger sharks from one area will decrease the probability of an attack, but that may not be true because there is no scientific evidence that supports how mobile these sharks really are. There is also no scientific evidence that tiger sharks are territorial and actively defend resources. This simply is not known. It is known that sharks are top-level predators in the marine

environment and removing them from the reef ecosystem may ultimately create problems with the health of our reefs and fish populations.

It is in my opinion, based on the evidence at hand, that this program would be unsuccessful in decreasing the number of shark attacks. Without knowing more about the home ranges, movement patterns, and population densities of the target species, programs such as this would be a thorough waste of tax dollars. Unfortunately, I fear the state may initiate the program to kill sharks simply to quell the public's fear and do so under the guise of scientific research. However, much more can be learned about these animals if they are alive. The state would be wiser to put its money into shark research so that they would know something about the organisms that they wish to control.



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 521
HONOLULU, HAWAII 96809

February 25, 1992

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

JOHN P. KEPPELER II
DONA L. HANA'IKE

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
CONSERVATION AND
ENVIRONMENTAL AFFAIRS
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
PROGRAM
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

TO: The Honorable Joseph M. Souki, Chairman
House Committee on Finance

FROM: William W. Paty

SUBJECT: House Bill (H.B.) No. 2878, House Draft 1 -- Making an Appropriation
for Shark Hunting

H.B. No. 2878 H.D.1 proposes to appropriate an unspecified amount of funds to be expended by the Department during Fiscal Year 1992-1993 to establish a shark hunting program. The Department concurs with the Bill with reservations since we feel shark control programs should be conducted only after cultural-religious concerns are addressed and public support assured and the need identified.

There are about 41 different types of sharks that inhabit the offshore, deep bottom, and inshore waters of Hawaii. The primary concern should be on sharks that come in contact with humans; the inshore sharks include sandbar, black tip, galapagos, hammerhead, gray reef, and tiger. Among these, the tiger, galapagos, and gray reef sharks are known to be dangerous to man. Hence, any control of inshore sharks for human safety should be directed to the three sharks.

The Department previously implemented three statewide shark control projects that reduced the probability of inshore shark encounters. While selective hunting may be appropriate, we question whether a statewide hunt on a regular basis could be justified unless qualified aquatic biologist familiar with sharks believes a statewide hunt is necessary.

While the Department recognizes the need to make our inshore waters safer, we cannot support the measure at this time, as it would, unless funded by other means, result in reducing current priorities as indicated in the Executive Biennium and/or Supplemental Budget(s).

MAUI HOTEL ASSOCIATION
1325 Lower Main
Wailuku, Maui, Hawaii 96793

February 25, 1992

The Honorable Joe Souki, Chairman
House Finance Committee
State Capitol, Room 907
235 Beretania
Honolulu, Hawaii 96813

Re: H.B. 2878 HD1 Making an Appropriation for Shark Hunting

Mr. Chairman and Members of the Committee:

The Maui Hotel Association supports H.B. 2878 HD1 which appropriates funds to establish a controlled shark hunting program.

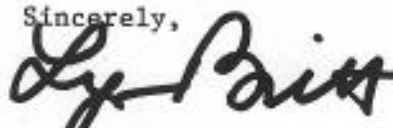
Maui residents and visitors were shocked at the shark attack and death of one of Maui's finest citizens late last year. There was considerable discussion on the need to have a controlled shark eradication program at least occasionally in Hawaii. Newspaper accounts reported an increase in the shark population over the past several years and no measures taken by the state to curb this growing population. In the past there were regular efforts in this area and we wonder why the practice has been discontinued.

After the November 1991 incident on Maui, the Maui Hotel Association wrote to DLNR Director William Paty asking that the state continue its efforts to find the 14-foot tiger shark that killed Ms. Morrell. Mr. Paty responded that a control program would be very expensive and the department did not have the funds to pursue.

Because Hawaii's #1 industry depends on the safety and security of our visitors, the state must take its responsibility seriously in this regard. Incidents such as the two recent attacks, one which resulted in death and the other, yet to be confirmed here on Oahu, both happened to residents. Had they happened to visitors, it would be making front page news in every newspaper in the U.S. and Japan. Whether the victims are residents or visitors, the issue of safety is the same and we urge the state to act responsibly and take action.

Thank you for the opportunity to support this important measure.

Sincerely,



Lynn Britton
President