

## **SURVIVAL OF THE WORLD'S FOUR HORSESHOE CRAB SPECIES REQUIRES A GLOBAL PERSPECTIVE.**

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### **ABSTRACT**

The survival of the world's four horseshoe crab species is due in part to its being an ecological generalist, which has allowed it to successfully adapt to a multitude of environmental changes for over 445 million years. In contrast, man has walked the planet for fewer than 200,000 years and has only recently embraced the word "sustainable." We might well be served to borrow a lesson from a true master, who very early in its existence learned to harmonize with the world it depended on for survival. The word "sustainable" has become ubiquitous within the environmental movement, most often used to imply meeting the needs of the present without compromising the ability of future generations to meet their needs. However, upon closer examination, it is often a word in search of a vision or leadership.

It may be myopic to discuss the sustainability of a species known for its generalist approach towards life within the context of a specific location. The effects of management policies practiced within the Delaware Bay Estuary often ripple throughout the species' range from Maine to Mexico's Yucatan Peninsula and at times even impact the survival of the three Asian species. Can we truly be concerned about the sustainability of a species without taking a global perspective?

In the short term, local environmental concerns may favor or even mandate a science-driven regulatory/law enforcement approach. However, long term sustainability will ultimately depend on a global community of players. Who is this community? What is it willing to sacrifice to achieve sustainability? How do we engage its many facets? And, can we claim to be building community if our methodology will disenfranchise, marginalize, or villainize the very stakeholders needed for success?

This talk will explore the sustainability of the horseshoe crab species from a community-building perspective, with a review of conservation efforts around the world (or the lack thereof).

### **DISCUSSION**

#### **What is the value of life?**

Conceptually, most would agree that all life is precious. Unfortunately, not all life is considered equal. Whether through ignorance, indifference or intolerance, the majority of living beings on this planet do not reach our threshold of concern. Fortunately, a segment of the horseshoe crab population specifically the Delaware Bay population, and to a lesser degree the genetically diverse populations to the north and south of the bay has been elevated primarily out of concern for the survival of another, less environmentally adaptable species. Not that long ago there was a bounty on horseshoe crabs throughout New England, because the animals were viewed as predators in the shellfish industry.

For almost 100 years, they were harvested by the millions for fertilizer and feed stock in the mid-Atlantic region. Only 20 years ago they were bulldozed and buried by coastal communities around the Delaware Bay, seen as an impediment to the communities' ability to recreate on their beaches.

Although not on equal footing with many of the more charismatic terrestrial and marine species, many of which are valued for nothing more than their existence and the pleasure we gain in knowing they are among us, the horseshoe crab in contrast has gained entry into this elite club of management concern by offering something of value the others did not possess: its body. Its eggs provide fuel to shorebirds en route to their arctic breeding grounds, its flesh is consumed by hungry predators throughout all life stages, and its blood is the basis of a test critical to humanity's survival ...and the biomedical industry. Its body is used for bait in the conch and eel fisheries and also as sustenance to those who consume it throughout Southeast Asia. Like the hundreds of millions of chickens that are processed every year up and down the Delmarva Peninsula, the horseshoe crab's value has been reduced to a commodity. So are we really working to sustain a remarkable ecological generalist that has successfully adapted to a multitude of environmental changes for over 445 million years, or are we simply trying to preserve a food resource? The answer to this question is fundamental to the approach we take toward the long-term conservation of the horseshoe crab species. *For when we devalue a life to nothing more than a food resource for another species, it becomes much more difficult to engage a broader global community around its conservation.*

### **What is this global community?**

When I speak of community, I am not referring to the scientific community, the natural resource management community, the nonprofit community, the biomedical community, or the fishing community. I am referring to a broader global community of groups and individuals who, for one reason or another, are connected to the world's four horseshoe crab species. Whether that connection be nothing more than compassion for another living being, or as base as sustenance for a hungry family, this global community has a vested interest in the sustainability of this species. However, all too often, we are at odds with one another, separated by conflicting motives and/or conservation methodologies. I recently asked a colleague in India what he felt was the largest impediment to the conservation of his country's two horseshoe crab species. His answer? Ignorance. Can we claim to be building community if our motives and methodology disenfranchise, marginalize, or villainize the very stakeholders needed for success? Again the answers to this question will ultimately dictate our conservation approach.

Of course, in the short term, local environmental concerns may favor or even mandate a science-driven regulatory/law enforcement approach. However, long-term sustainability will ultimately depend on not only on a global resource management approach but also a global community. For it is the relationship we have with our natural resources and each other that forms the bedrock of conservation.

### **So why is this important?**

As we move out of the Delaware Bay to states farther North and South along our Atlantic coast, the interest in horseshoe crab conservation diminishes substantially.

By the time we reach the southern limits of our species' range, the Yucatan Peninsula, there is little more than limited academic interest. With spawning habitat squeezed by expanding luxury resorts and public indifference due primarily to the lack of conservation outreach, the horseshoe crab population faces an uncertain future. As we move beyond our shores, the world's three other horseshoe crab species face conservation challenges as diverse as the countries they inhabit.

There is a cause and effect of everything we think, say, and do. The effects of management policies practiced within the Delaware Bay often ripple throughout the species' range. We must be mindful of these effects and the impact they may have on less genetically diverse populations to the north and south. As some consider whether or not to place restrictions on the US lysate manufacturer (LAL), should we not consider the global impact such restrictions might have on the three other horseshoe crab species currently being harvested without restrictions for similar purposes in China, the Philippines, India, Malaysia and Indonesia? *Can we truly be concerned about the sustainability of a species without taking a global perspective?*

We are at the crossroads of a unique opportunity. The opportunity is one of leadership. Can we lead the global community in the practice of compassionate and ethical conservation? In much of the world where horseshoe crabs spawn, human considerations often overshadow environmental concerns. Can we demonstrate the capability to rise above our individual vested interests to serve a broader purpose and by so doing offer a path for others to follow? And most importantly, can we reach out and engage the public whom we serve? *A sustainable conservation vision needs to be accessible to all.*

The survival of the world's four horseshoe crab species will ultimately depend on the preservation of spawning habitat a challenging prospect in light of the ever-increasing human density along the same beaches horseshoe crabs rely on for propagation. We will not succeed without the active participation of a broader coalition of players and a global perspective.

### **How might this be accomplished?**

We all realize that without the expertise and dedication of our scientists and natural resource managers, it would be difficult to grasp the complexities of the resource, much less manage it. For this reason and rightfully so the scientific community working with our natural resource managers forms the core of any sound conservation policy. However, conservation is more than the implementation of science-driven policy and political advocacy; it is a moral responsibility that transcends both science and management. It can and should actively engage the public, for the world's four horseshoe crab species, with few exceptions, do not spawn within protected habitats. They come ashore where humans live, play, and work. Sometimes they are accepted, but more often they are exploited or even reviled.

Community building has always been the domain of the non-governmental organizations (NGOs); however, all too often, the community they serve does not extend much beyond their constituency.

In order to build a global community around the conservation of the world's four

horseshoe crab species, NGOs around the world will need to put aside their differences and work to heal, educate, and unify all groups and individuals that have a vested interest in the species' sustainability, particularly those whom they have worked against in the past. They will need to find solutions that extend beyond the political and regulatory process, solutions that reach to the heart of conservation, which is compassion for all living beings. Within the next few months ERDG will be modifying both its mission statement and internal operating guidelines to reflect our ongoing commitment to working in this manner. We encourage other like-minded NGOs to do the same.

It may take a generation or two, but it begins with us. I was talking to a friend the other day and he reminded me that when we were young, littering, although not socially acceptable, was commonplace. Today, several generations later, it is hardly seen. We have grown into an impatient society, which often compromises our methodologies and the longevity of our conservation programs for expediency. *Not all progress can be measured within a grant cycle or even a lifetime.*

**To deepen your perspective of the global challenges horseshoe crabs face, I would like to take you on a brief trip beyond our shores, where the three other horseshoe crab species struggle to make the threshold of concern.**

In Japan, horseshoe crabs are called kabutogani and have not been eaten or harvested for hundreds of years. In fact, they are revered. The Japanese have the only museum in the world dedicated to their species (*Tachepleus tridentatus*) and a national conservation organization called the Nihon Kabutogani wo Momorukai (Japanese Horseshoe Crab Conservation Association), of which ERDG is a member. However, due to centuries of land reclamation projects driven by economic growth, there is very little remaining spawning habitat. Sadly, the nation's spawning population hovers around 2,000 animals. Other than research, conservation consists of building public awareness and a breed-and-release program.

Taiwan has a similar story. The country's only remaining horseshoe crab (*Tachepleus tridentatus*) population is on the outlying islands of Penghu and Kinmen, where its numbers continue to decline as a result of industrial and urban development. A conservation group led by a remarkable scientist, Dr. Chan Po Chen, who in addition to his research and a breed-and-release program, is building public awareness, which hopefully will lead to the preservation of Taiwan's remaining habitat.

Hong Kong's horseshoe crab population (*Tachepleus tridentatus/ Carcinoscorpius rotundicauda*) is very small, but it is protected on the two islands where the animals are primarily found. A conservation group led by Dr. Paul Shin is working via a breed-and-release program to increase the horseshoe crab's numbers and build public awareness via a partnership with Hong Kong's Ocean Park Conservation Foundation. In spite of these efforts, horseshoe crabs are still a common sight in the marketplace and restaurants of Hong Kong.

Singapore is a small country with an even smaller horseshoe crab population (*Carcinoscorpius rotundicauda*). Fortunately, the mud flats and mangroves where they spawn are now protected.

The Nature Society Singapore has begun conducting population studies and building community awareness.

China, with a coastline of over 11,000 miles, is home to all three Asian species. They are harvested for bait, human consumption, ornaments, folk remedies, lysate (TAL) and other biomedical purposes. It is not known whether there are any harvesting regulations or conservation efforts in place.

In the Philippines, the horseshoe crab (*Tachepleus gigas*) population primarily inhabits the big Island of Mindanao, where social unrest between the Moro rebels and the government make conservation not only difficult but also dangerous. There is very little information on the size of the population and no interest in the preservation of spawning habitat or regulating harvest. The last time I was there, I met with a company that was gearing up to bleed horseshoe crabs for the lysate industry (TAL).

In Vietnam, Thailand, Cambodia, and Burma, horseshoe crabs (*Tachepleus gigas*/*Carcinoscorpius rotundicauda*) are harvested primarily for human consumption, ornaments, and folk remedies, with animals imported from Malaysia to augment their in-country harvest. All have diminishing populations with nothing being done to preserve spawning habitat or regulate harvesting.

India's State of Orrisa is home to that nation's horseshoe crab population (*Tachepleus gigas* and *Carcinoscorpius rotundicauda*), where the animals are primarily harvested for human consumption, ornaments, folk remedies, and a growing biomedical market. While large corporations exploit the natural resources along Orrisa's coastline and interior, there is growing social unrest between the state's Christian and Hindu factions. And if that were not enough, Maoist rebels are active throughout the state. Consequently, other than academic concern, nothing is currently being done to preserve spawning habitat or regulate harvesting.

In Malaysia and Indonesia, horseshoe crabs (*Tachepleus gigas* and *Carcinoscorpius rotundicauda*) are exported in large numbers to Thailand for human consumption. However, this is beginning to change as a result of a growing and more profitable demand for the animals by the biomedical industry. With the exception of calls for conservation by some in the academic community, nothing is currently being done to preserve spawning habitat or regulate harvesting.

**Parting quote by Albert Einstein:**

“A human being is part of the whole, which we call the “Universe”; a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest, a kind of optical delusion of his consciousness. This delusion is a prison for us, restricting us to our personal desires and affection for a few persons near us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its astonishing beauty.”