

# Manifesto on Sirenian Conservation

## Justification and Motivation for Sirenian International, Inc.

*The mission of Sirenian International is to promote the long-term conservation of manatee and dugong populations around the world through research, education, and inter-cultural collaboration. We are a volunteer driven partnership of Participating and Supporting Members, governed by an International Board of Directors and Scientific Advisory Council.*

### I. Preamble

- 1.1. Unique:** Four species, the West Indian, West African, Amazonian manatees and the Indo-Pacific dugong, constitute the unique Order Sirenia. As remnants of an ancient and diverse group of marine mammals dating back approximately 50 million years, these four sirenians represent the only extant marine mammal herbivores.
- 1.2. Threatened:** Virtually all sirenian populations are fragmented, in decline, threatened, and/or endangered, primarily due to human impact. One modern species, Steller's seacow, and some manatee and dugong populations are already extinct. Other populations may be on the brink of extinction.
- 1.3. Limited Research:** Long-term sirenian research, education, and conservation projects exist in a few industrialized nations. However, most sirenian populations are found in the coastal waters of less-developed countries. Even the most dedicated professionals with a strong conservation ethic cannot combat limited resources in these settings to conduct the long-term research needed to understand and conserve long-lived species like Sirenians.
- 1.4. Cultural Heritage:** Sirenians have been part of the culture and mythology of humans for thousands of years. The taxonomic order is named after the Sirens (half-woman, half-bird creatures) of ancient Greek mythology. Over time, some authors confused Sirens with mermaids (mythical half-woman, half-fish creatures), which eventually led to naming of the scientific Order Sirenia. Indigenous cultures in Asia, Africa, Australia, and the Americas each have their own unique creation story about how manatees and dugongs "came to be." Many legends say that manatees and dugongs came from human ancestors who were transformed into sirenians by a curse or other misfortune of living near the water.
- 1.5. Hope:** The public, particularly in rich industrialized nations, is an untapped source of revenue for sirenian research, education, and conservation programs. While almost everyone recognizes the more popular marine mammals, like dolphins, whales, seals and sea lions, relatively few people know about manatees, dugongs, and the growing threats to their survival. Targeted outreach can turn public attention towards Sirenia and catalyze long-term conservation programs.

### 2. Why manatees and dugongs should be conserved

- 2.1. Ecology:** As the only marine mammal herbivore, manatees and dugongs are primary consumers of aquatic plants in riverine, estuarine, and marine plant ecosystems. Past loss and decline of these species has altered the ecological balance within these communities. Continued loss and decline will further change these ecosystems. As with any species, manatees and dugongs are coupled to other species through ecological connections. Protecting sirenians thus protects these ecosystems, even when the systems and connections are not fully understood.
- 2.2. Charismatic Flagship Species:** The decline or disappearance of vulnerable manatee and dugong populations serves as an indicator of changes in their habitat, which may be the result of natural phenomena or, more likely, the result of human activities, such as development, pollution, and direct take by watercraft, entrapment in water diversion structures, or entanglement in fishing gear. These changes also involve a loss to the human habitat, such as the deterioration of riverine, coastal, and marine habitats and their valuable animal and plant products. By protecting the charismatic flagship species of manatees and dugongs, we are also protecting our essential coastal zone.
- 2.3. Culture:** In addition to the ecological consequences of the decline of these giant aquatic herbivores, many people feel a sense of inner loss when such magnificent and mysterious animals are gone from the wild. Many of us believe that we are responsible for conserving biodiversity due to our human ability to

dominate the natural environment. Because we are at the apex of the consumption pyramid, we have a responsibility and obligation to all species, including our own descendants, to protect threatened and endangered species. Extinction is forever.

### 3. Problems faced by sirenians

- 3.1. **Habitat Loss and Degradation:** The accelerating loss of habitat has reached a critical stage as the human population continues to grow exponentially. In many rivers and coastal areas, manatee and dugong habitat represents only a small percentage of what existed in the past, and what remains could be wiped out in the near future through continued development. The global disappearance of seagrass beds, resulting from pollution and competition for space with humans, deprives many sirenians of their normal sustenance. Increased nutrient levels, due to runoff from residential, agricultural, and commercially developed land, may be a primary factor in toxic algal blooms, which have caused mass manatee mortality events in Florida.
- 3.2. **Hunting:** Manatees and dugongs have long been hunted for food and other products. Historically they have been taken for both subsistence use and commercial endeavors. In some areas, they continue to be illegally hunted for meat, leather, and medicine. In other areas, they are killed or harassed for sport.
- 3.3. **Competition for Space:** Incidental take has increased dramatically due to increased human population growth and competition for space between sirenians and humans. They are maimed and killed by watercraft and by entanglement in fishing gear. They are often trapped in culverts or canals where they starve to death unless discovered, rehabilitated, and returned to suitable habitat.
- 3.4. **Alteration of Environmental Factors:** Where manatee populations have acclimated to man-made warm-water effluents, they are increasingly vulnerable to death from cold stress when these effluents are interrupted in the winter.

### 4. The decline of sirenians

- 4.1. **Historically:** Dugongs, West African, Amazonian, and West Indian manatees have been hunted for subsistence for thousands of years. Bone middens (ancient slaughter sites) have been discovered by archeologists in Florida and Central America, indicating that West Indian manatees were an important food source to indigenous cultures.
- 4.2. **Recent Commercial Takes:** Large-scale commercial hunting during the last three centuries drastically reduced West Indian and Amazonian manatee population numbers. Europeans began exploiting manatees in the Caribbean area with early exploration and colonization. During the 1600s, European explorers, privateers, and buccaneers purchased manatee meat from indigenous people in Central America. In the 1700s and 1800s, manatees were harvested commercially for meat, which was used to feed workers on the South American frontier and in the West Indies. The Amazonian manatee was also heavily harvested for leather and other products until 1973.
- 4.3. **Over-Harvesting:** Steller's sea cow is a classic example of decline because of human impact. According to fossil records, the giant northern sea cow ranged from Southern California to Japan around the Pacific Rim for several million years. However, the species had been reduced (probably by pre-historic human hunting) to an isolated and remnant population of about 2,000 animals when it was first observed by Georg Wilhelm Steller in 1741. Immediately identified as an excellent source of protein for sailors, the species was hunted to extinction within 27 years after its "discovery" by modern man.
- 4.4. **Competition for Space:** Today, the greatest known threats to manatees and dugongs come from competition for space with human beings. As the human population continues to grow, more and more sirenian habitat is developed for residential, recreational, commercial, and military use. Human populations are growing the fastest in coastal areas -- in the same places that manatees and dugongs depend on for their survival. As herbivores, sirenians must stay in shallow coastal waters or rivers where vegetation is abundant. While illegal hunting is still an issue in some areas, development is a greater and more widespread issue. As coastal areas are developed for human use, dredging, wastewater discharge, and sediment run-off negatively impact manatee habitat. Seagrass beds are destroyed by increased sedimentation. Greater human use of waterways means increased entanglement with fishing gear and

increased collisions with boats and jet skis for manatees. Diversion of water means entrapment in culverts and canal gates for manatees.

## **5. Problems of sirenian conservation**

- 5.1. Education and Enforcement:** Manatees and dugongs are protected at the international, as well as the national level, in most countries where they are found. However, hunting still occurs in many locations where sirenians are valued for food, medicine, amulets, and other traditional uses. Illegal hunting occurs due to a lack of educational outreach and a lack of resources for enforcement. Even in countries with strong conservation ethics, there are occasional manatee poaching events. In other countries, poaching is much more serious. Illegal hunting of manatees appears to be common and even increasing in some areas of South America and West Africa. Illegal dugong hunting occurs in most countries throughout their range. The full impact of poaching on population dynamics is not fully understood and is dependent on many ecological and population variables. However, because sirenians are long-lived and slow reproducing, even small amounts of illegal hunting can have negative ramifications for some populations. Education has proven to be an effective means of curtailing poaching. In addition, providing proper enforcement of protective laws is critical to putting an end to illegal take.
- 5.2. Cultural:** Dugongs have very high cultural significance for aboriginal people. In certain places, they are legally hunted for subsistence. For example, the right to hunt is protected by Native Title legislation and the Torres Strait Treaty between Australia and Papua New Guinea. According to dugong scientists, the level of dugong hunting appears to be sustainable in areas such as the northern Great Barrier Reef and Torres Strait – although new data indicate that current limits may not be sustainable.
- 5.3. Research:** Despite over three decades of research in Florida and Australia, there is still only limited knowledge of the abundance, distribution, diversity, biology and behaviour of almost all other populations of sirenians. Research to increase our understanding of these factors is essential to the planning and implementation of effective conservation measures. However, there are insufficient resources to pursue necessary research.
- 5.4. Economy:** Coastal development projects often fail to recognize the importance of ecological integrity and fail to recognize that ecosystems themselves provide services that have economic value. Because most cost-benefit analyses undervalue indirect uses and don't value non-uses of ecological resources, development schemes of coastal areas are often at odds with protecting ecosystems and wildlife habitats. Consequently, development programs are carried out with little or no consideration for their impact on wildlife and wildlife habitat. Because of increasing habitat destruction, habitat fragmentation, and human use pressures, manatees and dugongs are increasingly impacted by human activities such as development and boat traffic.

## **6. How sirenians can be conserved**

- 6.1. Site-Specific Conservation Plans:** Conservation projects need to be developed at the local level. They should be led by a diverse array of key stakeholders, based on scientific knowledge, and explicitly integrate ecological research with conservation and management actions. In every country where manatees and dugongs live, there are people working at the grassroots level to better understand and protect them. In many cases, these are local people with very limited resources that are enthusiastically dedicated toward conservation. Local people are critical to developing site-specific management plans that are developed with the direct involvement of key local stakeholders. In addition, effective conservation measures cannot be developed without site-specific and population level ecological information. Conservation and management actions identified need to explicitly address ecological problems. All of the measures described below should be included in an overall conservation strategy for each local population to ensure its survival.
- 6.2. Population-Specific Research:** Relatively little research has been done on sirenian populations outside of Florida, Australia, and Brazil. Recovery plans developed for the Florida subspecies and Australian dugong populations may not be appropriate for other species and populations in developing nations where taxonomic, geographical, and environmental variables will differentially affect life history,

behaviour, and habitat use. These differences need to be taken into account to assure conservation and management plans are effective.

- 6.3. Genetic Diversity:** The abundance, distribution, and range of each population and the amount of genetic exchange between populations should be clarified. Protected habitat of sufficient size and productivity to support viable populations of manatees and dugongs must be preserved. Parks and reserves may not be adequate to allow for necessary genetic exchange. Adjacent areas and travel corridors must be identified and protected so that they are compatible with use by both humans and sirenians.
- 6.4. Legislation and Enforcement:** Local and international legislation, treaties, and agreements to promote long-term conservation of sirenian populations and their habitat do exist. However, many of these documents have no consequences, and there are no local resources for enforcement in many areas.
- 6.5. Compromise:** Conservation of sirenians must be reconciled with the needs (and wants?) of humans. As demonstrated in Florida, conflict may be inevitable as humans and sirenians compete for coastal habitat. Conflict can be minimized by appropriate management measures.
- 6.6. Education and Stakeholder Input:** Local people must feel that they are a part of the decision-making process involving manatee and dugong conservation issues. Information about the role of sirenians and ways to protect them should be part of conservation education at all ages and levels of the community, including the students, teachers, fishermen, recreational and tour boat operators, governmental and non-governmental agencies, politicians and other officials, industrialists, businessmen, and the public who are either stake-holders or decision-makers.
- 6.7. Stranding Networks, Zoos and Oceanariums:** Stranding networks, including local community involvement in capture, rehabilitation, and release of sick and injured animals, have been shown to endear manatees and dugongs to people, who then become advocates for both the animals and their habitat. Manatee and dugong hunters have been converted to tour guides and park rangers through education and personal involvement. Zoos and oceanariums can provide expert rehabilitation care, educational outreach programs, and increased advocacy within local communities. In some areas, captive propagation programmes might provide genetic reservoirs, which could, in appropriate circumstances, be used to reinforce wild populations.

## **7. Conclusions**

- 7.1. Sirenian International:** The mission of Sirenian International is to promote the long term conservation of manatee and dugong populations around the world through research, education and inter-cultural collaboration. Through our Participating Members, Supporting Members, Board of Directors, Scientific Advisory Council and direct actions, our work encompasses the 7 strategies highlighted above.

### **7.1.1**

Our Participating Members are actively involved in sirenian projects around the world. They are participants in research projects and stranding networks. They are staff at zoos and oceanariums. They are educators in public school systems, colleges, universities, nature centers and environmental education programs. They are staff or volunteers of non-profit conservation organizations. They share knowledge through educational outreach programs, effect changes by providing scientific data to decision makers concerned with conservation issues, and provide opportunities for students and local communities to participate in field and laboratory research. Sirenian International contributes to their work by facilitating communication through our Sirenian Listserv, Bibliography, Library, and Networking services. We support individual projects through our small grant program.

### **7.1.2**

SI directly participates in educational outreach through our web page, through public speaking engagements, by participating in educational programs at primary schools in the United States and through outreach at local festivals in the U.S. We support educational programming through our small grant

program.

#### **7.1.3**

SI promotes compromise by specifically encouraging collaboration in our mission. Our small grant program prioritizes projects based on their collaborative style. We are dedicated to the idea that effective conservation must be achieved in the spirit of compromise and bridging diverse views through stakeholder communication.

#### **7.1.4**

SI helps achieve site-based conservation planning, population specific research and genetic diversity by making it a high priority to support, through our small grant program, locally based projects that work towards these ends.

**7.2. Appeal:** We appeal to our supporting members and the general public for continued financial support, to teachers and students for continued educational outreach, to scientists and conservation managers for continued research and integrated conservation programmes, and to community-based advocacy groups for continued communication with local decision makers.

**7.3. Hope:** Species need not be lost provided action is taken to conserve them. Experience has shown that seemingly desperate situations can be reversed, if protection is given to species and their ecosystems.

**7.4. Sirenian International as a Model:** Sirenian International believes that conservation is much more than just understanding an ecological problem. Conservation success can only be achieved when inter-cultural collaboration and inclusiveness reach beyond academia, to include local communities, governmental agencies, non-governmental agencies, and other conservation groups. Although our focus is on manatees and dugongs, we strive to be a model for all conservation endeavors. Our goal is to be leaders in the conservation movement by providing innovative solutions to complex problems and by modeling how collaboration and cooperation can achieve the most effective solutions to environmental problems.