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SOCIO-ECONOMIC ASSESSMENT OF MARINE MAMMAL UTILIZATION IN THE WIDER CARIBBEAN REGION: CAPTIVITY, VIEWING AND HUNTING

Socio-Economic Assessment of Marine Mammal Utilization in the Wider Caribbean Region: Captivity, Viewing and Hunting

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Introduction

This briefing paper provides an overview of the socio-economic issues affecting marine mammals (whales, dolphins and manatees) in the Wider Caribbean Region (WCR) including captive and interactive programs; whale, dolphin and manatee watching; and hunting. These issues are relevant to the WCR because they directly affect marine mammal protection efforts; can have an impact on entire ecosystems; and influence local economic and social development.

The economic and political pressures that exist in the WCR for the maintenance and expansion of fishing, logging, tourism and coastal development activities have the potential to impact negatively on marine mammals and their habitats. The challenge of uniting marine mammal conservation with the diverse societal, institutional, historical, philosophical, psychological and ethical needs of the peoples of the WCR is confounded by the lack of precise information about the current utilization and commercialization of marine mammals. The development of the region and its present and future generations depend on conservation, but where there are socio-economic pressures on resource use, the economic potential of utilizing marine mammals can seem attractive. To adequately assess the socio-economic and conservation impacts of these activities involving marine mammals, the current paucity of information must be supplemented by island-specific data regarding the costs and benefits of these programs and activities.

State of knowledge

Captive marine mammal programs

Marine mammals are maintained in captivity (including both tanks and sea-pens) for the purpose of display to the public who pay to view them. Opportunities for direct physical contact with whales, dolphins and even manatees, including touching, feeding and swimming with both wild and captive animals, are increasing in range and intensity in the WCR. Of the twelve Parties to the SPAW Protocol, seven hold marine mammals in captive facilities *(see Annex 1)*. Other Parties are considering proposals for such programs.

Welfare considerations. In recent years, the ethics of capturing and maintaining marine mammals in captivity have increasingly come into question by the scientific community. Scientific evidence indicates that cetaceans in captivity experience mental and physical stress, which is revealed in aggression between themselves and towards humans, and a lower survival rate and higher infant mortality than in the wild.(1) Methods used to transport cetaceans can be cruel and many individuals have died as a result of injury and stress in attempts to supply captive facilities around the world.(2)

* WDCS, the Whale and Dolphin Conservation Society

Sea pen facilities can also be poorly suited for the maintenance of dolphins. Water temperature and quality cannot be controlled in pens where dolphins may live in stagnant, contaminated or shallow water with excessive exposure to the sun, resulting in sometimes dangerously high water temperatures. Sea pens located on Caribbean islands are at additional risk from storms and hurricanes. Dolphins have been inadvertently released (and not recovered) during hurricanes in the Bahamas, Bermuda and Honduras, for example, and several dolphins died in 2003 at a facility in La Paz, Baja California Sur, Mexico, after a severe storm contaminated the pen's water with sewage outfall.(3)

Conservation implications. In the absence of viable captive breeding programs, whales and dolphins continue to be taken from wild populations to supply the demand created by captive facilities and to compensate for their deaths in captivity. In the WCR, dolphins continue to be captured locally and traded internationally, and the numbers held in captive facilities in the region are increasing. However, there is a paucity of data available on local, often small, populations in the Caribbean that are targeted for capture.(4)

In addition to the inhumane and occasionally lethal nature of cetacean capture methods, the removal of animals (particularly when captures target a specific sex or age group) may also have a major impact on the viability of the wild population from which they are removed and, potentially, the species as a whole.(5) Swimming with dolphins programs are especially problematic in this regard because female dolphins are often selected for capture. Studies of wildlife populations have demonstrated that removal of females can have serious long-term consequences for the populations from which they are taken.(6)

It should be noted that the impact of a capture itself can extend beyond the animals targeted, as it involves harassment of a group, or groups, of animals.(7) Finally, the assessment of source populations is generally lacking, and live capture often adds to the pressure on stocks already at risk from hunting, bycatch in fisheries, habitat degradation and other factors.(8)

Educational and scientific value. In addressing the promotion of marine mammal public display as a tool for education, research has demonstrated that the benefits cited are largely anecdotal and not supported by systematic sociological analysis.(9) In addition, captive interactive programs may significantly distort the public's understanding of the marine environment. Educational messages may take second place to entertainment in whale and dolphin performances, where the 'jumping', 'splashing' and up-close encounters with the animals may diminish educational benefit. The promotion of physical interaction with captive marine mammals may also encourage visitors to carry out such activities with their wild counterparts, thus impacting negatively on wild populations.(10) Furthermore, there is an absence of research or other scientific contribution stemming from the captive display of marine mammals in the WCR. The absence of robust data makes it difficult to assess the real educational or scientific value of such programs.

Environmental risk. Studies have shown that dolphin sea pens can damage nearby coral reefs. Dolphins produce a great deal of waste – if tidal flow is inadequate at the sea pen location, this waste can accumulate around and through reefs, causing abnormal levels of

algal growth, which suffocates and kills corals.(11) Furthermore, in the case of facilities located in hurricane-prone areas, there is potential for genetic 'contamination' of local dolphin stocks by non-native escaped dolphins.(12) Dolphins, as top-level predators, play an important and beneficial role in the health of fish populations, the value of which we are only beginning to understand. The removal of only a few animals from small populations in the Wider Caribbean, is likely to have an impact on the reproduction, gene pool and maintenance of the species in the area.(13)

Human health risk. It is not uncommon for people to become injured from swimming with captive dolphins.(14) Reports include incidences of broken bones, internal injuries, and serious wounds requiring hospitalization.(15) These programs also present a risk of disease transmission between humans and marine mammals.(16)

Economic value. Although tourism is a primary industry in the WCR, it is unclear how much of the income generated by tourists reaches the people and economy of the country in which a captive facility is located, as opposed to the private owners, cruise ships and overseas travel agents that facilitate visits to these programs. Some programs do employ local peoples, but to what degree is uncertain and varies from facility to facility. The question must also be raised in relation to the accessibility of these programs to local people, given the sometimes-expensive fees charged for participation. Some interactive programs cost as much as $150 USD per individual to either swim with or touch a dolphin.(17) There is a clear and overwhelming absence of data indicating the costs and benefits of these programs, including the numbers (and trends) of tourists visiting these facilities and programs; the numbers of locals employed; related economic benefits accruing to local communities, such as taxi drivers and craft vendors; and levels of taxation or subsidization by the governments involved.

Whale, dolphin and manatee watching

Whale watching is still a fairly new phenomenon in the WCR, beginning in the early to mid -1980s with the development of dolphin watching and swimming tours in the Bahamas and humpback whale watching off the Dominican Republic. When well managed, whale watching has the potential to attract foreign tourists and exchange as well as to encourage the development of an extensive suite of benefits and services.(18) The overall potential today remains largely to be realized.

Economic value. In many places, whale watching provides valuable, sometimes crucial, income to a community, with the creation of new jobs and businesses. In general, wildlife viewers often contribute economically during off-seasons and consistently spend more in local areas than other visitor groups.(19) In 1998, an estimated 88,900 people went whale watching in the Wider Caribbean. Total revenues were more than $10 million USD. By the mid-1990s, whale watching was attracting visitors in the Turks & Caicos Islands, the US and British Virgin Islands, Puerto Rico, Martinique, Grenada, and Saint Vincent and the Grenadines. During the late 1990s, whale watch tours also started up in Antigua, Saint Lucia, Nevis, St. Barthélemy, and Guadeloupe.(20) Between 1998 and 2000, Saint Lucia had one of the fastest whale watch growth rates in the world (685%).(21) Other countries are reported to have developed whale watching since then. In

1999, the most valuable whale watch industry in the Caribbean in terms of total expenditures was in the Dominican Republic ($5.2 million USD) followed by the Bahamas ($2.97 million USD).(22) In Samaná, Dominican Republic, there are new businesses and infrastructure directly attributable to the increase in visitors during the whale watch season. Whale watching is also having a tangible impact on local economies in such places as Roseau, in Dominica, Rincon, Puerto Rico, and north Bimini, in the Bahamas.(23)

Educational and scientific value. Caribbean whale watching operations include some of the world's most outstanding educational opportunities, including the Marine Mammal Survey Wild Dolphin Project in the Bahamas, and whale-listening tours in the British Virgin Islands. These operations all feature naturalist guides — the key to an educational whale watching tour. Whale and dolphin watching operations provide a platform for research and data collection, including photo identification and other population studies. Whale research has developed in tandem with commercial whale watching in many parts of the world.(24). In some communities, whale watching has made significant contributions to education about the marine environment, including raising awareness to support establishment of marine protected areas.(25)

Conservation considerations. Tourism activities such as dolphin watching are often referred to as 'ecotourism.' This term refers to *low impact tourism which contributes to the maintenance of species and habitats either directly through a contribution to conservation and/or indirectly by providing revenue to the local community sufficient for local people to value and therefore protect their wildlife heritage areas as a source of income*"(26). 'Ecotourism' is a growing pursuit in many countries in the Wider Caribbean and marine mammal viewing is a growing component of more traditional 'ecotourism' type activities, including diving, hiking and snorkeling. A number of countries offer attractions involving manatees. As with whale and dolphin watching, viewing activities may be beneficial to manatees if properly planned and managed and may represent an alternative source of income to hunters and fishermen, while generally improving the local economy.(27) Small-scale eco-tourism is already taking place in countries such as Belize and Trinidad and Tobago. In Florida, the yearly income from thousands of tourists interested in seeing manatees has generated great public support for manatee conservation.

Marine mammal tourism, like tourism of all kinds, can have a downside. Intensive, persistent and unregulated vessel traffic that focuses on animals while they are resting, feeding, nursing their young, or socializing can disrupt those activities, and have a long-term impact on the populations they target. Entrepreneurs may rush to take advantage of newly discovered marine mammal watching opportunities, with little or no monitoring of the effects of these activities.(28) In addition, tourism activities focusing on whales and dolphins often involve invasive activities (such as swimming with the animals) that may cause disturbance. Many of these operators are based outside the Caribbean, and organize tours within the Region to interact with these animals. It is not always clear how programs based in other countries benefit the local economy or regional conservation efforts within the WCR.

Hunting

The legacy of commercial whaling has provided an experiment in conservation biology on a grand scale.(29) Populations of baleen whales and the sperm whale have been systematically hunted to near extinction during the past two hundred years. In spite of decades of protection, some populations have yet to show signs of recovery and exploitation may have eliminated an important part of the marine ecosystem.(30) Recent disclosures of misreporting or under-reporting of commercial whaling data have reinforced the belief that a profit-driven whaling industry cannot be adequately managed to prevent stock depletion.(31)

In the WCR, only a few countries currently conduct some form of 'whaling' operation where cetaceans are killed for their meat for consumption. Saint Vincent is granted an 'Aboriginal Subsistence Whaling'quota by the International Whaling Commission (IWC) that will allow the natives of Bequia island to take up to five humpbacks a year excluding mothers with calves.(32) Fishermen in Saint Vincent also hunts small cetaceans, mainly black fish (pilot whales). However, an unknown number of orca were taken in 2001.(33) Fishermen in Saint Lucia similarly maintains a hunt for pilot and other whales and dolphins, including pygmy and false killer whales, bottlenose dolphins, Atlantic spotted dolphins, Fraser's dolphins and common dolphins.(34) Little data is available regarding numbers of animals taken in any of the cetacean fisheries.

Manatees are present in nineteen countries of the Wider Caribbean, but most populations are estimated at below one hundred individuals. Heavily hunted in the past, they have played an important role in the folklore and traditions of native peoples of the region. Currently, manatees are hunted throughout the Caribbean through direct and incidental take (for instance, accidental entanglement in fishing nets in Belize). Illegal hunting represents the greatest threat to manatees in Colombia. There and elsewhere, manatees are killed for their meat by coastal and riverine fishermen.(35) The killing of even a few manatees every year may represent the difference between growth or decline of the very small manatee populations in the Region.

Economic value. Although only a few countries in the WCR actively hunt or consume marine mammals, more countries in the Region are asserting their political and sovereign right to reserve this activity for the future. Several countries have become more overtly supportive of marine mammal hunting since joining the IWC.(36) In recent publications and workshops, scientists identified a number of 'incompatible activities' to whale watching, one of which was hunting (whaling).(37) There are several factors which may contribute to this incompatibility, including reductions in the number of whales available for watching, disturbance to those animals, differing revenues resulting from the two activities, and negative attitudes of whale watchers, other tourists, and host communities.

Conservation implications. Because the status of most marine mammal populations in the Caribbean is unknown, the impact of direct hunting on marine mammal populations in the WCR is uncertain.

Human health risk. Mercury and other persistent heavy metals and toxins exist in the environment from both natural and man-made sources. Due to their position at the top of

the food chain, toothed whales and dolphins tend to accumulate higher pollutant loads.(38) Although few recent studies exist, toothed cetaceans in the WCR can be expected to carry high contaminant burdens that should be of concern in regards to human consumption of whale and dolphin products.(39)

Recommendations

Because all of the reviewed activities have the potential to negatively impact marine mammal populations in the WCR, this paper recommends the following:

Captive marine mammal programs

The socio-economic costs and benefits of captive marine mammal programs are unknown. A paucity of survey data exists which examines the real educational or economic benefit of these programs. From a scientific, educational or management perspective, it is critical to develop criteria which would qualify the value of such programs to the recovery of a threatened or endangered species, such as reintroduction of a breeding population into the wild, rehabilitation of stranded marine mammals, or the application of scientific knowledge obtained through these interactive programs.

Recommendation 1. Develop and support research procedures for assessing the impact of live captures on marine mammals in the WCR, including long-term population and focal studies.

Recommendation 2. Support studies that identify the costs and benefits of captive marine mammal programs to the countries in which they are situated, including economic, conservation, educational and environmental value and impacts.

Recommendation 3. Develop health and welfare standards, guidelines and local legislation for marine mammals in captivity.

Whale and other marine mammal watching

Whale and other marine mammal watching programs are growing throughout the WCR. Possessing positive economic potential, these activities can adversely affect marine mammals and their ecosystems if measures are not taken to guide the development of these programs.

Recommendation 1. Support the development of national and regional guidelines and regulations for safe, educational and sustainable marine mammal viewing.(40)

Recommendation 2. Support research into the status of marine mammals targeted by operators (e.g. bottlenose dolphins) for interactions in the wild, and other cumulative threats.

Recommendation 3. For the effective management of marine mammal tourism, the scientific community, tourist industry and natural resources agencies should jointly delineate policies, and define management strategies for visitors and granting of concessions to commercial enterprises.

Marine mammal hunting

Directed take has been documented in only a few countries in recent times.(41) These hunts include whaling, dolphin fisheries and manatee hunting. Information on these hunts is scant, especially in dealing with the exploitation of small species of marine mammals. Many of the hunts are now incidental or opportunistic.

Recommendation 1. Encourage and support existing, or the development of new, local legislative and enforcement efforts for marine mammal protection.
Recommendation 2. Support research that evaluates and compares the economic, educational and social value of whale watching and hunting to local communities.
Recommendation 3. Examine contaminant levels in marine mammals caught for human consumption in the WCR.
Recommendation 4. Conduct stock assessments for marine mammal populations targeted for hunting.

Notes and References

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ANNEX 1

Inventory of known captive dolphin facilities in the Wider Caribbean Region

Country	Name of facility and location	Species and reported source of cetaceans held	Details of owners/management	Activities
Anguilla, British West Indies.	Dolphin Fantaseas	Bottlenose dolphins, including individuals imported from Cuba	Dolphin Discovery, Mexico	Swimming with dolphins
Antigua and Barbuda	Dolphin Fantaseas, Marina Bay (NB: the facility is currently closed and nine dolphins from this facility are being held at Dolphin Discovery's facility in Tortola)	Bottlenose dolphins, including individuals imported from Cuba	Dolphin Discovery, Mexico	Swimming with dolphins
Bahamas	Dolphin Encounters, Blue Lagoon Island, Nassau	Bottlenose dolphins		Touching, feeding and swimming with dolphins
	Dolphin Experience, UNEXSO, Freeport, Grand Bahama Island	Bottlenose dolphins	UNEXSO, USA and Bahamas	Shows, touching and swimming with dolphins, assistant trainer programme, open ocean programme
Colombia	Acuario y Museo del Mar El Rodadero Magdalena, Santa Marta	Bottlenose dolphins		
	Oceanario, Islas del Rosario			
Cuba	National Aquarium of Cuba (Acuario Nacional), Havana	Bottlenose dolphins from Cuba	Cuban Agency of Environment, Ministry of Sciences, Technology and Environment	Display and occasional shows, dolphin-assisted therapy.
	Varadero Dolphinarium, Varadero	Bottlenose dolphins from Cuba	RUMBOS, S.A Tourism and Entertainment Corporation	Swimming with dolphins and shows, dolphin-assisted therapy.
	Rancho Cangrejo Dolphinarium,	Bottlenose dolphins from		Swimming with dolphins and

	Varadero	Cuba		shows
	Baconao Aquarium and Laguna, Santiago de Cuba	Bottlenose dolphins from Cuba	CUBANACAN, S.A Tourism Corporation	Swimming with dolphins and shows
	Cayo Naranjo Aquarium, Guardalavaca	Bottlenose dolphins from Cuba	GAVIOTA, S.A Tourism group	Swimming with dolphins and shows, dolphin-assisted therapy.
	Cienfuegos Dolphinarium, Rancho Luna	Bottlenose dolphins from Cuba	CUBANACAN, S.A Tourism Corporation	Swimming with dolphins and shows
Curacao, Netherlands Antilles	Dolphin Academy, Curacao Seaquarium, Willemstad	Bottlenose dolphins, imported from Honduras		Touching and swimming with dolphins and shows, dolphin trainer programme, dolphin assisted-therapy.
Dominican Republic	Manati Park, Bavarao	Bottlenose dolphins from Cuba and the Dominican Republic. Imports also reported from Honduras and Puerto Rico.		Swimming with dolphins and shows
	Ocean World, Puerto Plata	Bottlenose dolphins imported from Cuba and Honduras	Deep Down Discovery	Swimming with dolphins
Honduras	Roatan Institute for Marine Sciences, Anthony's Key Resort	Bottlenose dolphins from Honduras		Shows, wading, swimming, snorkelling and diving with dolphins, trainer-for-a-day programme.
Jamaica	Dolphin Cove, Ocho Rios	Bottlenose dolphins imported from Mexico		Touching and swimming with dolphins
	Dolphin Lagoon, Half Moon Club, Montego Bay	Bottlenose dolphins imported from Cuba		Swimming with dolphins
Mexico	There are at least 20 captive dolphin facilities in Mexico	Bottlenose dolphins from Mexico and imported from Cuba, belugas imported from Russia	Companies include: Dolphin Discovery, Wet 'n' Wild, Via Delphi Enterprise, CONVIMAR	Shows and swimming with dolphins

Tortola, British Virgin Islands	Dolphin Discovery, Prospect Reef Resort	Bottlenose dolphins imported from Mexico (including nine individuals formerly held at Dolphin Discovery's facility in Antigua).	Dolphin Discovery, Mexico	Touching, swimming, snorkelling and diving with dolphins, shows.
USA	There are over 30 captive dolphin facilities in the USA, including several in Florida.	Cetaceans displayed include: bottlenose dolphins, belugas, orcas, false killer whales, Pacific white-sided dolphins	Companies include: Sea World, Six Flags	Touching, feeding and swimming with dolphins, shows.
Venezuela	Acuario J.V. Seijas de Valencia	Bottlenose dolphins		Shows
	Parque Acuario Waterland (Mundo Marino), Margarita	Bottlenose dolphins		Shows and travelling circuses
	Parque Zoológico El Pinar, Caracas			
	Diver Land, Margarita			

Sources of information: Government, media and anecdotal reports.

There are also facilities proposed in: the Bahamas, Belize, the Cayman Islands, St. Kitts, St. Lucia and St. Maarten.