

## Carrot-and-stick approaches to biodiversity conservation: The case of sea turtles in Brazil

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# Applied Biodiversity Sciences Perspectives Series No. 2(3)

## May, 2012

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Suggested citation:

Pegas, F. (2012). Carrot-and-stick approaches to biodiversity conservation: The case of sea turtles in Brazil. *Applied Biodiversity Perspective Series*, 2(3) 1-9.

### **ABSTRACT**

Historically, conservation strategies have followed two distinct paradigms: top-down and bottom-up. Since 1982 the Brazilian Sea Turtle Conservation Program (TAMAR) collaborative effort to support sea turtle conservation has implemented a carrot-and-stick approach to control poaching in Brazil. In this paper I analyze TAMAR's conservation outcomes for residents from the villages of Praia do Forte and Imbassai that use turtles. Nine months of ethnographic research show that law enforcement has been essential to control poaching in both villages. Economic benefits from ecotourism are vital in Praia do Forte where TAMAR has operates a visitor center and research station since 1982. Overall, both communities now support the protection rather than the consumption of the species.

**Keywords:** Brazil, ecotourism, law enforcement, top-down, bottom-up

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## Introduction

Conservationists have different views on the most effective mechanisms to protect biodiversity. Historically, conservation strategies have fallen within two main paradigms: top-down and bottom-up. These approaches stand fundamentally different from each other in the way resources are managed to degrees of community participation and engagement in conservation. The differences between top-down and bottom-up strategies for conservation raise questions about whether these strategies can generate positive outcomes for conservation and people if implemented as a mixed-approach to conservation. The failure of many conservation initiatives that have adopted either paradigm has challenged the effectiveness of these approaches, calling for alternative ways to promote conservation. One alternative is to integrate both strategies.

This mixed approach uses socioeconomic incentives (e.g., education opportunities, economic benefits from ecotourism) as “carrots” and enforcement of environmental and species protection laws as “sticks” to achieve conservation goals. Both have been implemented by the Brazilian Sea Turtle Conservation Program (TAMAR), Brazil’s preeminent sea turtle conservation program, since 1982. Turtle nesting activities in Brazil have substantially increased indicating that turtle poaching has subsided substantially (Marcovaldi et al., 2007; Santos et al., 2000; Pegas & Stronza, 2010). In this article I examine how the implementation of both top-down (e.g., enforcement of sea turtle protection laws) and bottom-up approaches (e.g., economic incentives from ecotourism) adopted by TAMAR are related to local support for sea

turtle conservation in two fishing villages, Praia do Forte and Imbassaí, located in the state of Bahia.

## Methods

### ***Study Context***

This research was conducted in the villages of Praia do Forte and Imbassaí, located in the state of Bahia along the Coconut Coast ('Costa do Coqueiros'), Brazil's fastest growing coastal tourism destination (BSH, 2008, 2011). This area is prime feeding and nesting grounds for four species of sea turtles: critically endangered hawksbill (*Eretmochelys imbricata*) and Kemp's ridley (*Lepidochelys kempii*) turtles; endangered loggerhead (*Caretta caretta*) and green (*Chelonia mydas*) turtles; and vulnerable olive ridleys (*Lepidochelys olivacea*) (Marcovaldi & Marcovaldi, 1999), which has called attention to conservation efforts.

The Brazilian Sea Turtle Conservation Program, commonly known as "Projeto TAMAR," which is short for **T**Artaruga **M**ARinha, or sea turtle in Portuguese, was created in 1980 in response to intensive harvesting of nesting females and turtles eggs along the Brazilian coast. TAMAR is a collaborative effort between the Brazilian Government's Institute of Renewable Resources (IBAMA- ICMBio) and a non-profit organization, 'Fundação Pró-TAMAR' (Foundation Pró-TAMAR). TAMAR currently operates 23 research stations and ten visitor centers in nine states. It employs approximately 1,300 people nationwide with about 85% of them residents from the coastal communities where TAMAR works.

Praia do Forte is located 80 km north of Salvador and it is estimated that during the peak tourism season the population (excluding the potential 10,000 hotel guests) doubles to reach up to 4,000 residents (Prefeitura Municipal de Mata de São João, 2004) (see Figure 1).

Like Praia do Forte, the permanent population of Imbassai is of approximately 2,000 permanent residents. In both communities, residents make their living off tourism-related jobs, services industry and fishing, and both represent Bahia's prime coastal tourism areas. However, although these communities share their traditional roots in the traditional fishing industry and are only 11 km from each other, they have adopted distinct sea turtle conservation strategies.

The socioeconomic and legal strategies adopted by TAMAR have helped to shift behavior from consumption to collaboration across time and regions. In Praia do Forte, TAMAR opened a research station in 1982 and a visitor center a few years later. Socioeconomic benefits from ecotourism at TAMAR include employment opportunities to 130 employees. Sea turtles, once overexploited for their meat and eggs, are now iconic conservation symbols of the village. In Imbassai, TAMAR's influence is limited to enforcement of sea turtle protection laws.

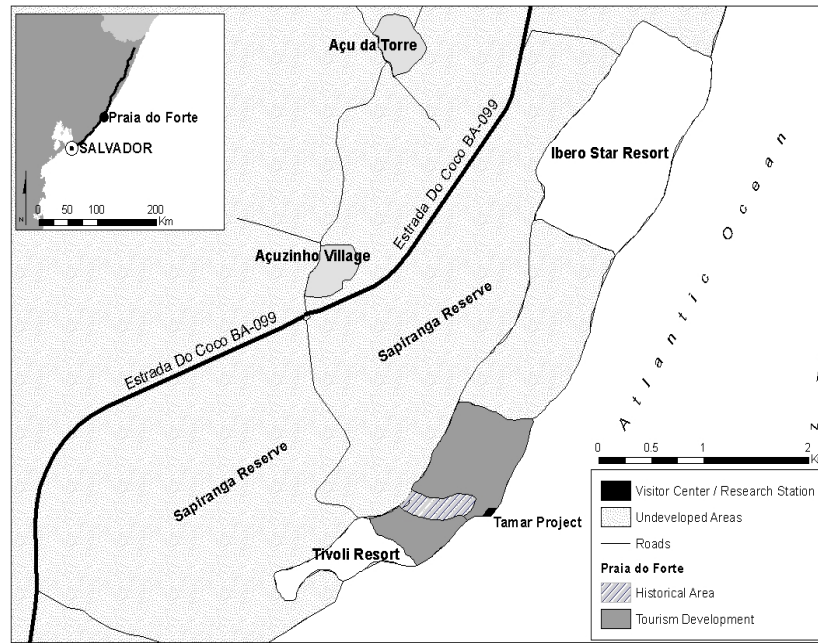


Figure 1. Location of the village of Praia do Forte and the Visitor Center and Research Station of the TAMAR Project.

### ***Survey data***

Qualitative and quantitative data were gathered through nine months of field-based research (between May 2006 and September 2008), using tools of participant observation, semi-structured interviews, and key informant interviews. Snowball and purposive sampling techniques (Bernard, 2000), were used in the first two phases and convenience sampling on the third phase. Overall, 127 local residents were interviewed in this study. Residents from Imbassaí responded to the same questionnaire used among the residents of Praia do Forte, which centered on the following research questions: Do values and uses about sea turtles differ between communities? Why, and what, do these findings mean for sea turtle conservation efforts now and in the longer term?

### **Results**

Research results revolved around five primary themes. First, perceptions about TAMAR were generally positive and cast the organization in light of opportunity for employment, alternative sources of income, and education opportunities to the local children and youth. Second, sea turtle consumption was undertaken for subsistence purposes and without strict enforcement of sea turtle protection laws to control harvesting in the area, sea turtles were, and still are, an easy catch. Third, sea turtle ecotourism and conservation efforts shaped local values and uses of the species. In both communities many of the socioeconomic changes that have taken place since the early 1980s were directly attributable to mass tourism development in the region. These changes create both challenges but opportunities for conservation. Fourth, respondents expressed fear about the negative impacts associated with the sporadic and

intense coastal tourism development in the region, which have been associated with drugs, insecurity, violence, cost of living, and prostitution. In other words, the quality of life was “at risk” due to the potential impacts from mass tourism. Fifth, enforcement of sea turtle protection laws by the research team of TAMAR was not only supported by respondents from both communities but also perceived as essential to control poaching activities. Finally, trust existed between communities and TAMAR. However, feelings of trust and reciprocity with the founders of TAMAR were only reported amongst residents of Praia do Forte. This outcome is attributed with the establishment of a long-term and positive relationship between the founders and the community since 1982.

## **Discussion**

The influence of sea turtle ecotourism and enforcement on the way locals value and use sea turtles varied among the residents of Imbassaí and Praia do Forte. Overall, lack of involvement in sea turtle conservation decision-making and loss of access to turtle meat and eggs occurred without leading to greater species exploitation as found by Belsky (1999) in Belize. As such, despite some claims that top-down approaches in conservation are unable to enhance the chances of achieving conservation goals (Aberkeli, 2001; Chhatre & Saberwal, 2005), results from this study show that TAMAR’s main goal to protect nesting females and their eggs from poaching through enforcement of laws has been successfully achieved without generating conflicts with local stakeholders.

Mixed responses regarding local perspectives about TAMAR and the implications of implemented carrot-and-stick strategies appears to be influenced by the way these strategies

were and continue to take place. Whilst in Praia do Forte, TAMAR is a strong economic and tourism pull-factor, in Imbassai its role is more of an environmental program that monitors for illegal activities and for turtle encounters. Also, sea turtles were an important source of food for fishing families in Praia do Forte but not so much in Imbassai particularly because of variations in turtle numbers. Local food-dependency influenced, in turn, the implications of losing access to this food source on local livelihood needs.

Respondents not only supported turtle conservation but did so without a station or visitor center of TAMAR in the village. This result demonstrates that the influence of TAMAR has expanded beyond the community's borders, in this case, from Praia do Forte to Imbassai. However, would the community of Imbassaí obey the laws if TAMAR's reputation was not a positive one? Probably not, therefore, it is not only enforcement that creates an incentive to control harvesting but a combination of factors that include enforcement as one of the components. In this case it seems that the combination of a good relationship with the founders of TAMAR since the concept of sea turtle conservation was implemented, the introduction of diverse and plentiful job opportunities by TAMAR, and the promotion of education programs create a way for residents to support sea turtle conservation.

## **Conclusion**

Results from nine months of ethnographic research in the villages of Praia do Forte and Imbassai show that enforcement of sea turtle protection laws is an essential conservation strategy to control poaching. In Praia do Forte, where harvesting was by far more intensive than in Imbassai, economic benefits from conservation, particularly ecotourism, complement nicely the use of enforcement as an incentive to gain and sustain support for the cause. On a larger



scale, the local coastal tourism industry has yet to reach a mature stage, which means that more demographic changes generated by seasonal and permanent residents as well as land use changes will pose even greater pressures on local livelihoods and the efforts currently in place to protect nesting females, their nests, and coastal habitat. Aside from these pressures it is unlikely that turtle poaching will go back to historical numbers. Support for turtle conservation seems to no longer be a mission but an achieved goal, and local support seems vital for the successful protection of these species in these villages and nationwide.

## **ACKNOWLEDGEMENTS**

I am grateful to the families of Praia do Forte for their generosity and for sharing their life stories about their beautiful community. I would like to thank TAMAR and its staff for their support and for providing a welcoming research environment throughout the study and for sharing their data on sea turtle conservation. Lastly, I would like to thank the support and mentoring provided by my doctoral advisor, Dr. Amanda Stronza. This study was partially funded by the National Science Foundation Cultural Anthropology Programme (PI – Dr. Amanda Stronza - # 0724347), the PADI Foundation, the Viillo and Gene Phillips Scholarships, and the Graduate Student Research Grant and The Centre for Socioeconomic Research and Education at Texas A&M University, USA.

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