

Project Title: *Brazil's Marine Mammals*

Principal Investigator (s): *Prof Dr Marcos César de Oliveira Santos*

Position/Affiliations: *Coordinator of Projeto Atlantis/Member of Instituto de Biologia da Conservação*

Research Site(s): *Cananéia county, São Paulo state, Southeastern Brazil (25°03'S; 47°55'W).*

Local Management Status of the Research Site(s): *Federal and State protected Areas, near to be included as a RAMSAR site, includes state parks in surrounding areas. Huge estuary inserted in the Atlantic Rainforest.*

Scientific names of primary species being studied: *Marine tucuxi dolphin (Sotalia fluviatilis) – main target of all studies.*

Key Research Objectives:

- *Investigate aspects on local dolphin population use of area and social organization*
- *Evaluate human-induced impacts to local marine mammals*
- *Estimate annual abundance estimates of local dolphin population*
- *Gather information on marine tucuxi natural history*
- *Include the local community in the scope of this project in a long-term investment*
- *Establish environmental education campaigns to local community*

Data Collection and Results

- a) **Give a concise account of the data you have collected during the past field season.** *Data were collected from boats and from land. Land-based observations are crucial, as two local beaches are unique for marine tucuxi dolphin observations. A few individuals of the local population approach those beaches for feeding and foraging purposes. This phenomenon was only described for the local area along the whole species distribution. Evidences show that it involves cultural transmission between different dolphin generations. These observations are extremely important to gather data on calving intervals, growth patterns, breeding seasons, prey items, behaviour and social interactions. Both beaches have been exposed to human-induced impacts such as inappropriate boat and swimmers approach. Data are necessary to show the authorities the importance of protecting both areas. We collected data on use of area from land, without applying the photo-identification technique with teams 1 to 3. By the use of two digital cameras bought after team 3, we conducted such observations in teams 4 and 5. It is deemed important to identify dolphins using both beaches at the same time. Thus, observations collected with teams 4 and 5 were more concise. For the first time in the last nine years conducting such efforts we could evaluate the use of both beaches at the same time using the photo-id technique. Environmental data, such as water temperature and salinity, as well as the tidal state, were also collected in all occasions. Boat-based observations were conducted in all teams, with emphasis to teams 2 and 3 because of better weather conditions. A total of **4,464** photos were taken from boat, and **3,705** photos were taken from land. Thus, a total of **8,168** dorsal fin photographs were taken*

during the five first teams. The identification of dolphin IDs is a medium-term process, and we are still doing it. In the next EW teams, we plan to digitalize our catalogue and, if possible, do all the individual identification in the field. We did seven beach surveys for stranded marine mammals (team 1:2; team 2:1; team 3:2; team 4:0; team 5:2). A total of 5 dead dolphins were found: four La Plata dolphins and one marine tucuxi dolphin. No pinnipeds were found. La Plata dolphin, an endemic species from South America, had been threatened by incidental captures along its whole distribution. Bioacoustic studies were performed in teams 1 and 5. Investigations were based on sound emissions in foraging and feeding activities, as well as in tourism boats approaching to observe dolphins. In one occasion, with team 5, we conducted a night survey on tucuxi's sound emissions for the first time. We are probably going to improve this data collection in further expeditions. Besides all field activities, we also conducted lab activities. Cetacean skull cleaning was conducted with teams 1, 2, 4 and 5. This activity is necessary to keep all collected skulls ready to be used by researchers engaged on geographic variation and/or cetacean growth studies. We also analysed dorsal fin photos' quality with teams 4 and 5. Team 5 helped to organize 66 albums of 36 exposition photos in a chronological order. With those photos in order, their analyses will be easier.

- b) **What progress have you made towards achieving your original objectives?** As it was the first year of this project, a few things which were planned were not achieved. For instance: boat-based observations for abundance estimates. A few students must be trained to conduct such surveys in other boats at the same time the PI is doing in one boat. This is why the focus in this first year was those two quoted beaches, as tourism has been growing in an uncontrolled manner. In both beaches, tourists have a unique chance to observe local dolphins so close, and a management plan will be extremely urgent soon. Thus, land-based observations were truly improved, mainly in the two last teams. Bioacoustic studies also were not achieved as previously planned. We had a problem with the equipment in two expeditions and in one of them, our team leader did not have the possibility to attend the expedition. Photo-quality analysis was improved as we had the opportunity of having "more eyes" to do that. Tourism impact observations must be improved also.

c) **Please provide a summary of your results (even if they are preliminary).**

Number of photographs taken from land: 3,705

Number of photographs taken from boat: 4,464

Total number of tucuxi dorsal fin photographs taken: 8,168

Total amount of time spent in dolphin sound emission recordings: 17h 04 minutes

Tourism impact data: 11 different days – need to be improved

Total number of cleaned skulls: 27

Total number of analysed photos (quality): 864

Total number of photo albums organized for photo-ID analyses: 66 from 98.

Land-based: We could follow the use of one of both beaches in a daily basis in July and August 2004. In February 2005 we followed them in a daily basis along 8 different days. We noticed that two females lost their yearlings in January 2005. We did not find both dead calves, but we are concerned that those females lost their calves at the same time, and in summer time – when boat traffic provoked by tourists usually increase. Also, the use of both beaches by tourists dramatically increases in summer time.

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?

- **Local (in the area of the research site):** *For team members: they had such a unique important opportunity to take part in a research crew devoted to study and protect marine mammals and their environment in Brazil. For the research base employees: they were involved in a process they never imagined in their lives - to receive non-Brazilian citizens engaged in local ecosystem research and conservation. They noticed that "their place" had more importance as previously thought. A few local community members were benefited as they served most or all teams with their efforts. They could make their own money with their skills, offering services or handcrafts in expeditions (e.g. vessel owner, taxi drivers, oyster farm employee, shop owners and handcraft street workers). Two distinct groups could share their local culture with teams 4 and 5. A folklore music group and a capoeira martial art and maculele dancers group. Volunteers and also team members could learn more about local culture. Local performers could feel the relevance of keeping their tradition alive. Federal and state agents also could feel how far Projeto Atlantis could go when making a partnership with the EWI. Our project is more respected by them all, and soon our gathered results will benefit their duties. To the local environment, this first year of the partnership represented a new era on data collection with a broader period and a bigger team of investigators. This bunch of data will surely be extremely important to be used in ecological and biological studies, to be gathered with previous data, and also with the next expedition's data to help completing the big picture of the local environment conservation. Soon, it will be deemed necessary to establish regulations to protect both beaches tucuxi dolphins have been using, as well as trying to regulate limits to speed boats close to both beaches.*
- **National:** *Maybe this research has served two different purposes on a national scale. First, the gathering of important data on a flagship species in a Federal Environmental Protected Area for future management purposes. Second, the enrolment of graduate and undergraduate students in one or more expeditions. This kind of experience is rare when we deal with marine mammal science in third world countries.*
- **International:** *Through the conduct of a long-term study, more and more reliable information on this species have been known based on recent publications of this research team. Thus, the continuum of these studies may help to fill the gap left by the "data deficient" species categories still listed around the world.*

(For example, do your findings, or do you expect your findings will contribute to management strategies or biodiversity conservation action plans at any of these levels?)

b) How do your findings contribute to issues of sustainability? *An important aspect to be considered is that tourism in that specific area is extremely important for the local economy. Management plans are deemed necessary in a near future. Dolphins have been attracting lots of people year round. They help supporting the local economy and,*

for sure, the next findings may help in planning a sustainable way to drive tourism in that place. Thus, only with a medium-term project involving scientific research, community enrolment and meetings with the authorities we may help in establishing local sustainability.

Dissemination of Results

a) Have you provided details of results from your research to or within:

- Scientific papers (indicate status; e.g., peer reviewed or in progress/press)

- Please provide full references

Two scientific notes were sent for publication. One about the association of a tucuxi dolphin and a remora fish was submitted to the Journal of the Marine Biological Association (UK). The other on a franciscana dolphin predation by a killer whale was submitted to the Latin American Journal of Aquatic Mammals. Two abstracts will be sent in June to the next conference on the Biology of Marine Mammals, to be held by the Society for Marine Mammalogy in San Diego, California (December 2005). PI has been organizing the data bank collected during the first season.

- Management plans and reports (in progress or completed)

- By who, for whom, and used by which agencies

Still did not have enough time to do that. Finishing the first year and getting used to the "timing".

- Presentations (given or planned)

- Who was the audience? How many people attended?

We intend to send two abstracts to the next Conference on the Biology of Marine Mammals to be held by the Society for Marine Mammalogy in San Diego, California (December 2005). Generally around 1,500 – 1,900 people attend for the conference. The audience is formed by long-term researchers (biologists, vets, oceanographers, etc), undergraduate and graduate students, and members of Non-Governmental Organizations from all over the world. PI was present in their events of 1995 (Orlando, FLA), 1999 (Maui, Hawaii), 2001 (Vancouver, Canada) and 2003 (Greensboro, North Carolina). In California I'll receive the Robon Best Award in the last day ceremony. I was awarded in the last South American Marine Mammal meeting (Ecuador, Sept., 2004) with the best presentation overall.

- Popular articles or films (in progress or completed)

A full page article was published in one of the main Brazilian newspapers known as Folha de SP in February 2005. Video recording is planned for the next semester focusing the research, conservation issues, local culture and Earthwatch enrolment.

- Books, chapters, illustrations

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We would appreciate copies of any relevant materials you can make available to us.