

**RUFFORD MAURICE LAING FOUNDATION
RUFFORD SMALL GRANT FOR NATURE CONSERVATION
(RSG)**

ANNUAL REPORT

RESEARCH PROJECT

Potential effect of whale-watching tours and other recreational activities on dolphins at Drake Bay, Costa Rica: A case for the spotted dolphin *Stenella attenuata* (Cetacea: Delphinidae)

REF: 176/07/04

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PERIOD COVERED IN THIS REPORT:

December 2004 to April 2005

October, 2005

ACTIVITIES' ADVANCE DESCRIPTION

My specific objectives include:

- (1) Quantify the number of boats using these waters for dolphin watching
- (2) Propose a limit number of vessels that can do dolphin watching simultaneously.
- (3) Propose to community leaders from Drake Bay and close communities to protect the dolphins as a long-time valuable resource in tourism by following recently approved regulations (still in legal process during the first surveyed season) in the dolphin watching tourism.

Since my objectives 1 and 2 require enough measurements in order to estimate averages, I need to complete my second season in 2006 to quantify them accurately.

With respect to objective 3, we have been working directly with 5 different boat drivers (captains), from the area in our surveys.

On March 26th, we had our first community workshop for general public from Drake Bay's community. This was an informative meeting, in which 2 cetacean projects were explained to the assistants. In total, 17 people came: 8 captains, 4 local tourist guides, 2 national tourists, 2 students and 1 housewife. All of them left contact information in order to get informed about future workshops.

The second meeting was done on June 25th, in coordination with the meeting of AGUINADRA, the Naturalist Drake Bay Guides Association. We talked about potential marine themes (cetaceans, coral reefs, fishes) from which they want to learn more about. There were 28 tourist guides in that meeting.

Three more workshops are to be done on October, November and December of the present year. We tried to fit them within the surveys-period, but people from the community prefer to hold them in other months, due to the high tourist activity given from January to April. We expect to arrange more workshops for 2006, depending on the community availability.

Tables 1 and 2, with figure 1, show partial quantitative results about the data that has been taken daily each month, between December 2004 and April 2005. The effective surveyed time was of 17%, when comparing effort time (10127 min. =168.8 hours) vs. time in which spotted dolphins were sighted (1699 min. =28.3 hours). In addition, other cetacean species have been observed, besides the spotted dolphin: humpback whale, Fraser dolphin, bottlenose dolphin and false killer whales.

Only two sightings of spotted dolphins were in presence of more than one boat. Nevertheless, other 3 cetaceans' species were observed in presence of more than one boat. In order to improve the research during the second season, I'll increase the possibilities of encounters of dolphins interaction with the research boat and tourist vessels by having a person in the tourist boat which have regular schedules for tours on dry season (Table 1).

Table 1. Invested time (minutes) during the first season's surveys and number of spotted dolphins' (S.a) sightings in presence of one or more boats.

	Minutes of survey	S.a sighting minutes	S.a sighting	S.a sighting in presence of more than one boat
Average per day of survey	506	85	5	0
Total of complete survey season	10127	1699	90	2

Table 2. Average of physical and chemical measurements taken each surveyed day during 5 months.

Biological station	Bajo Diablo	Paraíso	Punta Sierpe	San Pedrillo	General totality
Visibility (m)	16.0	15.2	8.1	13.9	13.3
Salinity (UPS0)	30.4	30.6	28.4	30.7	30.0
Temperature (°C)	29.1	27.8	29.3	29.2	28.9
Dissolved Oxygen (mg/l)	7.3	7.4	7.5	7.4	7.4

January and February are dry months characterized by an increase in water productivity. The abundance and behavioral patterns of *Stenella attenuata* (May-Collado 2001, May-Collado & Forcada 2001, May-Collado & Morales-Ramírez 2004), and of other delphinid species, such as *Tursiops truncatus* (Acevedo-Gutiérrez & Burkhart 1998; Cubero-Pardo 1998; Acevedo-Gutiérrez 1999) and *Pseudorca crassidens* (Damian Martinez, 2005 pers. comm.), appear to vary seasonally in the Costa Rican Pacific waters, reaching a peak in abundance and bias towards foraging activities during these dry months. This could explain the higher behavioral percentage on feeding activity, showed in figure 1.

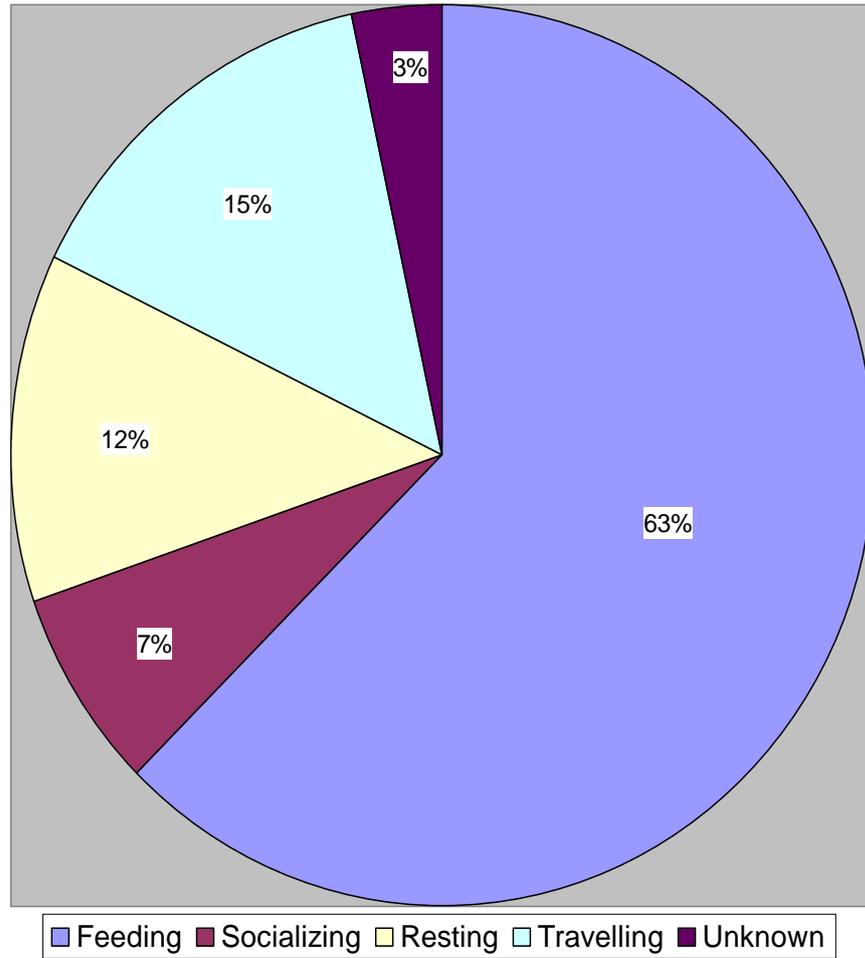


Fig. 1. Time percentage of behavioural categories during the whole season. The percentage was estimated based on the total time of sightings (See Table 1).

ACCOUNT OF RELEVANT EXPENDITURE

FIELD WORK

Transport	Total/ season (£)
San Jose-Bahia Drake (700km by land, roundtrip)	450
Boat taxi Sierpe-Drake Bay (roundtrip, 2 people)	150
Lodging (2 people)	450
Meals (2 people)	400
Boat rental	2000
Supplies	
(Batteries for DAT recorder, GPS, Range finder)	60
Materials for 2 community workshops	
(Snacks, papers, visual printings)	15
Total 2004-2005	3525

EQUIPMENT

Other collaborators entities have lend their equipment and services, significantly reducing the costs of this project, they are:

- CIMAR/Universidad de Costa Rica (\$1000 equipment: for physical parameters)
- Cascadia Research Collective (\$1500 equipment: hydrophone and DAT recorder)
- RAVEN© software (\$400 software, donated)

SCIENTIFIC OUTPUTS

-Acoustic recordings of different cetaceans' species encountered during the research. We have recorded 4 species during the first season. At least 300 minutes of digital recording.

-First identification catalogue of spotted dolphin in the South Pacific of Costa Rica, it will be the second in Costa Rican Pacific coast. At least 114 individuals identified; 13% based in dorsal fins' marks and 87% by combination of marks and corporal spotted pattern. The analysis process is not yet completed, so future recaptures are expected.

- Once the second season of field work is completed, the results of this study will be processed and then published as a Master's Thesis in the University of Costa Rica and later submitted to a scientific journal for review.

CONSERVATION AND MANAGEMENT OUTPUTS

On July of 2005, a new regulation for whale/dolphin-watching activities was approved in Costa Rica. This decree gives the people involved in this activity 6 months to adapt to the new rules (i.e. until January of 2006). In Costa Rica, state entities, such as the Costa Rican Institute of Tourism (ICT) and the Department of Environment and Energy (MINAE) lack of a registry tour operators (at national or local level), related to dolphin-watching.

The information obtained from the project will be used to create a database about the perception of dolphin-watching activities, from boat drivers and tour operators' managers. This database will be available for state entities, such as the Costa Rican Institute of Tourism (ICT) and the Department of Environment and Energy (MINAE). Valuable suggestions could be made to these governments' entities about local people perception and dolphins' behaviour, for future management plans. Information about dolphin's sensitivity and the new regulation for dolphin-watching will be disseminated through community workshops during the project execution in Drake Bay.

This study is the first to directly measure the potential effect of these activities in Costa Rica; other studies have been primarily based on interviews. It will be interesting to compare tour operators' behaviour before the regulation was approved (first season of the project, already completed) and 6 months after been approved (second season of the project). My study will contribute to protect and manage our cetaceans by generating reliable data that can be use to regulate dolphin-watching activities in my country and create consciousness in Drake Bay's inhabitants so they can use this resource well for their own benefit.

POTENTIAL PROBLEMS

- **Extra material expenses** (not included in the original budget): Batteries, electronic cables, digital record tapes, compact discs (in order to digitalize acoustic tapes).
- **Weather:** The weather is not always the best to go out to the field, sometimes we need to go back to land when the wind or rain don't le us work with good visibility or security

Comments: There have been few rainy days, but some strong winds in our surveys. We have data sheet in which we write weather data each day of survey, so we'll be aware of the biases regarding to sightings probabilities. In case of bad weather, the trip would need to be re-arranged or the stay in Drake Bay to be expanded. Either of these would mean higher expenses in lodging and meals.

References

- Acevedo-Gutiérrez, A. & S. Burkhart. 1998. Seasonal distribution of bottlenose (*Tursiops truncatus*) and pan-tropical spotted (*Stenella attenuata*) dolphins (Cetacea: Delphinidae) in Golfo Dulce, Costa Rica. *Revista de Biología Tropical* 6 (Supl. 46):91-101.
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