

BRAZIL PROGRESS REPORT ON CETACEAN RESEARCH, JANUARY 1999 TO FEBRUARY 2000,
WITH STATISTICAL DATA FOR THE CALENDAR YEAR 1999

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GEMARS-Grupo de Estudos de Mamiferos Aquaticos do Rio Grande do Sul (Porto Alegre, RS). Museo Oceanografico "Prof. Eliezer C Rios" (MOFURO) / Fundacao Universidade Federal do Rio Grande (FURG), FUNDAMAR (810 São Sebastio, SP), CEEMAM-Centro de Estudos sobre Encalhes de Mamiferos Marinhos (Santos, Sp), Projeto Atlantis (IB/USP, São Paulo), Museu de Zoologia/USP (São Paulo), Instituto Oceanografico/USP (São Paulo), Museo Nacional/UFRJ (Rio de Janeiro, RJ), Projeto Baleias e Golfinhos de Arraial (Arraial do Cabo, RJ), Projeto Golfinhos/RJ, Projeto MAQUA/UERJ (Rio de Janeiro, RJ) and UENF-Universidade Estadual do Norte Fluminense, Departamento de Vida Silvestre/IBAMA., Centro Mamiferos Aquaticos/IBANA, Instiuto Baleia Jubarte (Abrolhos. BA), GEMMAR - PB - Grupo de Estudos de Mamiferos Marinhos da Parabia (Joao Pessoa, PB), GECC - Grupo de Estudo de Cetaceos do Ceara, (Fortaleza, CE), Soctiedade Civil Mamiraua (SCM).

1. Species and stocks studied

Common name	Scientific name	Area/stock(s)	Items referred to
Atlantic spotted dolphin	<i>Stenella frontalis</i>	South-Southeastern Brazil and Pernambuco	2.1; 2.1.2; 4.3; 8
Boto	<i>Inia geoffrensis</i>	Central Amazon	4.2; 7.1
Bottlenose dolphin	<i>Tursiops truncatus</i>	WSA, Patos lagoon estuary, Pernambuco; Southern Brazil, LNRS1; ASPSP2	2.1; 2.1.2; 3.1.1; 4.3; 6.2; 8; 11.2
Bryde's whale	<i>Balaenoptera edeni</i>	Southeastern Brazil	2.1; 2.1.1; 2.1.2
False killer whale	<i>Pseudorca crassidens</i>	Rio de Janeiro	4.3; 8
Franciscana	<i>Pontoporia blainvillei</i>	Northern Rio de Janeiro	4.2; 4.4; 7.1
Franciscana	<i>Pontoporia blainvillei</i>	South-Southeastern Brazil, LNRS	2.1; 4.2; 4.3; 5.0; 8; 9
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Rio de Janeiro and Ceará	4.3; 8
Humpback whale	<i>Megaptera novaeangliae</i>	WSA, Pernambuco; B and C (Areas I and II)	2.1.1; 2.1.2; 2.2; 3.1.1; 4.1; 4.3; 4.4; 6.2; 8; 9
Killer whale	<i>Orcinus orca</i>	Southeastern Brazil	2.1.2
Long-beaked common dolphin	<i>Delphinus capensis</i>	Southeastern Brazil, São Paulo state	2.1; 2.1.2
Melon-headed whale	<i>Peponocephala electra</i>	Alagoas	8
Mink whale	<i>Balaenoptera acutorostrata</i>	WSA, Northeastern Brazil, Bahia and Paraíba	2.1.1; 4.3; 8; 11.2
Rough-toothed dolphin	<i>Steno bredanensis</i>	Rio de Janeiro,	2.1; 2.1.2; 4.3; 7.1; 8

		Pernambuco and Ceará	
Short beaked common dolphin	<i>Delphinus delphis</i>	Southeastern Brazil	2, 1
Southern right whale	<i>Eubalaena australis</i>	WSA, Southern Brazil, LNRS1 and Santa Catarina	2, 1, 2; 3, 1, 1; 4, 1; 4, 3; 6, 2; 8
Sperm whale	<i>Physeter macrocephalus</i>	Rio de Janeiro Paraíba	4, 3; 8 8
Spinner dolphin	<i>Stenella longirostris</i>	Rio de Janeiro and Pernambuco	4, 3; 8
Striped dolphin	<i>Stenella coeruleoalba</i>	Rio de Janeiro	4, 3; 8
Tucuxi	<i>Sotalia fluviatilis</i>	Northern Rio de Janeiro, and Pernambuco, Paraíba, Rio Grande do Norte and Fortaleza	2, 1; 2, 1, 1; 3, 1, 1; 4, 2; 4, 3; 4, 4; 5; 7, 1; 8; 9; 10

¹LNRS = Northern Rio Grande do Sul, from Torres (29°19'S; 49°43'W) to "Parque Nacional da Lagoa do Peixe" (31°22'S; 51°02'W).

²ASPSP = Arquipélago de São Pedro e São Paulo (ASPSP) (00°55'N; 29°20'W).

2. Sightings data

2.1 Field work

2.1.1 SYSTEMATIC

Vessel Name	Vessel Type	Top Barrel	Period and Region	Species Seen	Researchers
Alkaide	Supply boat	Yes	May 1999, Campos Basin, Rio de Janeiro	<i>Stenella attenuata</i>	J.L.A. Pizzorno
Asso Ventuno	Supply boat	Yes	October 1999, Campos Basin, Rio de Janeiro	<i>Megaptera novaeangliae</i> , <i>Delphinus</i> sp.	J.L.A. Pizzorno and Y.G. Maia
Alte Graça Aranha	Light house ship	14m	September 1999, Northeastern	<i>Balaenoptera acutorostrata</i> <i>Megaptera novaeangliae</i> <i>Balaenoptera edeni</i> <i>Physeter macrocephalus</i> <i>Globicephala macrorhynchus</i> <i>Stenella attenuata</i> <i>Stenella clymene</i> <i>Stenella longirostris</i> <i>Tursiops truncatus</i> <i>Steno bredanensis</i> <i>Sotalia fluviatilis</i> <i>Mesoplodius</i> sp Unidentified dolphin, Unidentified whale	J. M da Rocha, S. Siciliano, A. Andriolo, P. Simoes-Lopes, A. Lucena, I. Moreno, M. Bassoi, D. Danilewicz, J.L. Pizzorno

During the last three austral summers (1997/98 to 1999/00) the Projeto Balcias/Brazilian Antarctic Program conducted ship surveys for biopsy and photo-identification of humpback whales as well as for cetacean distribution and relative density estimates in waters of the Antarctic Peninsula region (B and C/I and II).

The Projeto Baleias is financed by the Interministerial Commission for the Resources of the Sea (Secretaria da Comissão Interministerial para os Recursos do Mar - SECIRM/Marinha do Brasil) and the National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq).

A ship-based sighting survey cetaceans was conducted off the northeastern coast of Brazil from 6 to 26 September 1999. The objectives of the cruise were to verify distribution and abundance of cetacean as well to obtain the an abundance estimate for minke whales. This project is supported by Brazilian Environmental Protection Agency (IBAMA) and SECIRM. (Contact: A. Zerbini and J.M. da Rocha).

GECC has conducted regular systematic land-based sightings in Fortaleza, Northeastern coast to monitoring population of *Sotalia fluviatilis*, (Contact: C. Monteiro Filho)

Weekly 4-day cruises by the Instituto Baleia Jubarte during the winter season - July to November - in Abrolhos Bank region. Bahia. Brazil -17°30.00-18°20.00'S/38°30.00-39°15.00. Cruises for photo-identification, biopsy sampling and behavioral observations

Cruises surveys – 1999 season (from July to November)

Sighting effort (h)	Nautical miles navigated	Number of whales sighted	Number of calves	Number of whales/hour	Number of whales/nautical miles
410,73	1.801,3	705	116 + 31 Sb**	1,716	0,39

* including calves

** Sb – Subadult

Land based survey from the highest point of Santa Barbara Island at Abrolhos Archipelago. Focal groups and animal continuous sampling (Mann, 1999) of humpback whales and their interaction with whalewatching boats (item 9) were made using theodolite tracking. One hour scans, surveying 5 nautical miles around the observatory point, were made during mornings and afternoons. Composition, behavioral state and localization of all groups within this area were registered during the season.

Land based survey – 1999 season

Scans	Morning	Afternoon	Total
Number of scans	77	62	139
Whales sighted	843	614	1457
Groups sighted	342	265	607
Calves sighted	172	124	296
Group composition not determined	44	40	84
Groups with 1 adult	38	37	75
Groups of dyads	82	73	155
Groups of trios	30	18	48
Groups of 4 or more adults	20	13	33
Groups of mother and calf	98	73	171
Groups of mother, calf and one escort	56	45	101
Groups of mother, calf and two or more escorts	18	6	24

Focal humpback groups sampling

Group composition	Number of observations	Total time of observation
Mother and calf	26	56h47m35s

Mother, calf and escort	12	21h29m30s
Mother, calf and two or more escorts	2	3h01m12s
One adult	10	14h49m47s
Dyad	8	8h54m17s
Total	58	105h43m41s

2.1.2 OPPORTUNISTIC, PLATFORMS OF OPPORTUNITY

Research groups along south-southeastern Brazil collect sighting data from several platforms of opportunity and keep their records on a data set. Most of their observations were conducted in coastal waters. GEMARS team has also conducted opportunistic surveys off Fernando de Noronha Archipelago (03°51S) and São Pedro and São Paulo Rocks (00°55S).

2.2 Analysis/development of techniques

Estimates of relative density of whales in these areas, specially in the Gerlache Strait and South Shetland Islands have been compared for the three seasons. In the last summer (99/00, the total survey effort was approximately 1280 nautical miles, and 164 sightings were made (including out of effort sightings and unidentified species) of six cetacean species..

Standard photo-identification techniques are being conducted in Cananea (São Paulo) and Baía de Guanabara (Rio de Janeiro) applied to marine tucuxi (Santos, 1999). Density and abundance studies of marine tucuxi using distance sampling methodology (Buckland et al. 1993) are under way in Cananea estuary.

An opportunistic cruise carried out by the Instituto baleia Jubarte outside the study area from 28 August to 11 September 1999, resulted in the following cetacean sightings:

Species	N° of individuals / group composition	Latitude & Longitude
<i>Stenella</i> sp	About 120 / adults and calves	24° 52'S / 47° 21' W
<i>Balaenoptera</i> sp	01 unidentified	23° 44'S / 44° 58' W
<i>M. novaeangliae</i>	02 Female and calf	21° 12'S / 40° 31' W
<i>M. novaeangliae</i>	03 three adults	21° 12'S / 40° 31' W
<i>M. novaeangliae</i>	02 dyad	19° 47'S / 39° 39' W
<i>M. novaeangliae</i>	01 lone	19° 23'S / 39° 32' W
<i>M. novaeangliae</i>	04 three adults & one subadult	19° 08'S / 39° 29' W
<i>M. novaeangliae</i>	02 dyad	18° 59'S / 39° 26' W

During humpback whale photoidentification cruises and land based survey, Southern right whales have been sighted. In 1999 the following sightings were made: 1 adult and 4-mother-calf (cruise), and 1-mother-calf(land based).

3. Marking data

3.1 Field work

3.1.1 NATURAL MARKING DATA

Species	Feature	Area/Stock	N. of animals photographed	Catalogue (Y/N)	Catalogue total	Contact Person /Institute
Tucuxi	Dorsal	Baía de Guanabara, Rio	48	Y	67	A. de F. Azevedo, Projeto

		de Janeiro				Maqua/UERJ
Tucuxi	Dorsal fin and body marks	Cananéia estuary	12	N	43	M.C. de O. Santos, Projeto Atlantis/USP
Bottlenose dolphin	Dorsal fin	S. Pedro and S. Paulo Rocks	7	Y	7	G. Caon and P.H. Ott, GEMARS
		Patos Lagoon estuary	1998: 43	Y	43	L. Dalla Rosa/ Museu Oceanográfico - FURG
Southern right whale	Callosities	Southern Brazil	32	Y	40*	P.H. Ott, GEMARS
Humpback whale	Fluke	WSA	1999 is season being analysed	Y	Until 1998: 668	Instituto Baleia Jubarte
		B and C (area I and II)	1999/2000 season: 18	Y	130	Projeto Baleias, Museu Oceanográfico/FURG

* These include only biopsied right whales photo-identified during the genetic study carried in southern Brazil since 1998 (see 4.1).

3.1.2. ARTIFICIAL MARKING DATA

3.1.3 Telemetry data

4. Tissue/biological samples collected

4.1 Biopsy samples

Species	Areas	Calendar year 1999	Archived (Y/N)	Number analyzed	Total holdings	Contact person/institute
Southern right whale	Southern Brazil	32 skin samples and 11 blubber	Y	On going study	40 skin and 11 blubber	P. H. Ott, GEMARS
	WSA	1			1	P. H. Ott, GEMARS
Humpback whale	WSA	143		--	91	Instituto Baleia Jubarte
	B and C (Area I and II)	18	Y			Projeto Baleias, Museu Oceanográfico/FURG

4.2 Samples from directed catches or by catches

Species	Area/stock	Calendar year 1999	Archived (Y/N)	Tissue type(s)*	Contact person/institute
Tucuxi	Northern Rio de Janeiro	4	Y	Skin, blubber, liver, kidney, muscle, lung, blood, stomach contents, gonads, internal parasites, tooth and	A.P.M. Di Benedito and Renata Ramos, UENF

				complete skeleton	
Franciscana	Northern Rio de Janeiro	1	Y	Skin, blubber, liver, kidney, muscle, blood, stomach contents, gonads, teeth and complete skeleton	A.P.M. Di Benedetto and Renata Ramos, UENF
Franciscana	Northern Rio Grande	2	Y	Gonads, liver, kidney, blubber, muscle, stomach, teeth and skull.	P. H. Ott and D. Danilewicz, GEMARS
Striped dolphin	LNRS	1	Y	Gonads, liver, kidney, blubber, muscle, stomach, teeth and skull.	P. H. Ott and D. Danilewicz, GEMARS
Boto	Central Amazon	2	Y	Feces, skin	M. Marmontel, SCM

4.3 Samples from stranded animals

Total number of strandings correspond to season March 1999 to February 2000, or otherwise stated

Species	Area/stock	Mar 99-Feb.00	Archived (Y/N)	Tissue types (total)	Contact person/Institute
Antarctic minke whale	Bahia	1	Y	Skin	S. Siciliano, Museu Nacional/UFRJ
Atlantic spotted dolphin	Rio de Janeiro	1	Y	Skin, liver, kidney muscle, gonads, stomach, blubber	A. de F. Azevedo, Projeto Maqua/UERJ
	Central São Paulo	1	Y	Muscle and organs samples	E. Zampiroli/CEEMAM
	Alcatrazes Island Area	6	Y	Blubber, muscle, kidney, ovaries, bladder, pancreas	V. Ruopollo, Instituto de Veterinária/USP
	LNRS	2	Y	Complete skeleton, gonads, liver, kidney, blubber, muscle, stomach	P. H. Ott and D. Danilewicz, GEMARS
Bottlenose dolphin	LNRS	1	Y	Skull and teeth	P. H. Ott and D. Danilewicz, GEMARS
	Pernambuco	1	Y	Skull including teeth, postcranial skeleton	J. Vergara and C. Parente (CMA)
Burmeister's porpoise	LNRS	1	Y	Complete skeleton, muscle, stomach.	P. H. Ott and D. Danilewicz, GEMARS
Dwarf minke whale	Rio de Janeiro	1	Y	Skin, muscle, blubber, gonads	A. de F. Azevedo, Projeto Maqua/UERJ
Franciscana	Northern São Paulo	2	Y	muscle and organs samples	M.C. de O. Santos, Projeto Atlantis/USP
	LNRS	49	Y	Skull, teeth, gonads, liver, kidney, blubber, muscle,	P. H. Ott and D. Danilewicz, GEMARS

	Central São Paulo	12	Y	stomach Muscle and organs samples	E. Zampirolli/CEEMAM
Fraser's dolphin	Ceará	?	Y	Lung, heart, liver and gonads	C. Monteiro Neto, GECC
Humpback whale	W.S. Atlantic	1	Y	Skin	S. Siciliano, Museu Nacional/ UFRJ
	LNRS	1	Y	Muscle, blubber	P. H. Ott and D. Danilewicz, GEMARS
Rough-toothed-dolphin	Ceará	?	Y	Lung, heart, liver and gonads	C. Monteiro Neto, GECC
Southern right whale	WSA	1998 season: 1			P.H. Ott, GEMARS
Sperm whale	Rio de Janeiro	1	Y	Skin, blubber, muscle, teeth	S. Siciliano, Museu Nacional/UFRJ and A. de F. Azevedo, Projeto Maqua/UERJ
	CE	?		Lung, heart, liver, gonads	C. Monteiro Neto
Spinner dolphin	RJ	1	Y	Skin, liver, blubber, gonads, stomach and muscle.	A. de F. Azevedo, Projeto Maqua/UERJ
	Northeastern coast, Pernambuco	2	Y	Skull including teeth, postcranial skeleton	J. Vergara and C. Parente/Centro Mamíferos Aquáticos-IBAMA
Striped dolphin	RJ	1	Y	Skin, liver, kidney, gonads, blubber, stomach and muscle	A. de F. Azevedo, Projeto Maqua/UERJ
	LNRS	1	Y	Skull, teeth, gonads, liver, kidney, blubber, muscle, stomach	P. H. Ott and D. Danilewicz, GEMARS
Tucuxi	RJ	8	Y	Skin, liver, kidney, gonads, blubber, stomach and muscle	A. de F. Azevedo, Projeto Maqua/UERJ
	Cananéia estuary	4	Y	Muscle	M.C. de O. Santos, Projeto Atlantis/USP
	Central São Paulo	1	Y	Muscle	E. Zampirolli/CEEMAM
	Paraíba state	2	Y	Heart, genitals, liver	Alfredo Langguth e Alincide Lucena UFPB
	Ceará state	?	Y	Lung, heart, liver, gonads	Cassiano Monteiro-Neto
	Rio Grande do Norte	1999 Jan: 1	Y	Skull including teeth, Postcranial skeleton	J. Vergara and C. Parente/Centro Mamíferos Aquáticos-

	Pernambuco	2	Y	Skull including teeth, Postcranial skeleton	IBAMA J. Vergara and C. Parente/Centro Mamíferos Aquáticos- IBAMA
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* Atlantic spotted dolphin (*Stenella frontalis*); † Striped dolphins (*Stenella coeruleoalba*); ‡ Burmeister's porpoise (*Phocoena spinipinnis*); § Humpback whale (*Megaptera novaeangliae*).

4.4 Analyses/development of techniques

Skin samples are being analysed using Microsatellite techniques, by the Projeto Baleias/ Museu Oceanográfico. Organochlorine analyses of the blubber samples will soon be started.

Studies of heavy metals concentration on coastal dolphins have been underway in Rio de Janeiro since 1994 (Lailson-Brito, 1994).

Heavy metals: The tissues (muscle, liver and kidney) of franciscana sample were examined for the presence of heavy metals (HS, Cd, Zn, Cu, Pb, Cr, Al, Ni, and Fe) by Rebelo *et al.* (1999). The metals were determined by atomic absorption spectrometry.

Age determination: The age of tucuxi and franciscana samples are being estimated through the number of growth layers group ("GLG") present in the dentine and cement. The method of decalcified, thin stained sections of the teeth for optical microscope were used following standard techniques (Perrin & Myrick, 1980; Honh *et al.* 1989).

Feeding habits: The stomach contents analysis of tucuxi and franciscana samples are being carried out through direct comparisons between prey remains and fish and squid reference collections. The original prey dimensions are being back-calculated by regressions.

Epidemiology: The sera of franciscana sample was examined for the presence of dolphin morbillivirus (DVM) (Van Bressem *et al.*, in prep.). The sera was tested for the presence of DMV- specific antibodies on a coat of DMV antigen in an indirect enzyme-linked immunosorbent assay (jELISA), as described in Van Bressem *et al.* (1998).

5. Pollution studies

Samples of blubber, kidney and liver of all cetaceans species found have been collected for future contaminant studies. (Contact: P.H. Ott)

The heavy metals analysis of tucuxi and franciscana samples are still in progress. The metal, Hs and Se are being determined by ICP-MS. The dolphins tissues (muscle, blubber, liver, kidney and lung) and their prey tissues (muscle and liver) are being examined for further studies of biomagnification and bioaccumulation processes in the Northern coast of Rio de Janeiro.

Concentrations of cadmium, lead, mercury were researched in tissue of *Sotalia fluviatilis* stranded on Northeastern coast, Ceara (Itavo. 1999).

6. Statistics for large cetaceans

6.1 Direct catches (commercial, aboriginal and scientific permits) for the calendar year 1999)

6.2 Other non-natural mortality for the calendar year 1999 or the season 1999/2000

6.3 Earlier years' statistics

7. Statistics for small cetaceans

7.1 Incidental mortality for the calendar year 1999

Species	Area/stock	Reported	Est. total	Fishery type	Locality
Boto*	Central Amazon	?	?	?	?
Franciscana	Northern Rio de Janeiro	1	178 (1986-1999)	Gillnet	Atafona
Franciscana	Central São Paulo	10	24 (Aug. 1998 - May 2000)	Gillnet	Praia Grande
Rough-toothed dolphin	Ceará	2	-	Gillnet	Ceará
Franciscana	Northern Rio Grande do Sul	3	-	Gillnet	Tramandai/Imbé
Rough-toothed-dolphin	Ceará	7	150	Gillnet	Ceará
Striped dolphin	Northern Rio Grande do Sul	2	-		Tramandai/Imbé
Tucuxi	Northern Rio de Janeiro	4	141 (1986-1999)	Gillnet	Atafona
Tucuxi	Northern Espírito Santo	4	-	Gillnet	Regência
Tucuxi	Paraíba	2	-	Gillnet	Paraíba

* Contact: Miriam Marmontel, Sociedade Civil Mamirauá

8. Strandings

Four strandings of live cetaceans have been registered;

One *Peponcephala* stranded alive at Pontal do Peba, Alagoas. After three days attempting to revive the animal, it was decided to sacrifice it. The necropsy found an intense parasitic infection mainly auricular and in the stomach. The parasites were identified as *Stenurus* sp. and *anisakis* sp, respectively.

A *Megaptera novaengliae* calf was stranded alive at Praia de Boa Viagem, Pernambuco. The animal was immediately returned to the sea. This was considered a success because it did not return and there was no further incidence of strandings of this species.

Finally *Sotalia fluviatilis* pair was stranded alive Coroa do Aviação, Pernambuco. They were immediately returned to the sea safely. (Contacts: C. Parente and J. Vergara)

Information on strandings along Brazilian coast can be obtained at the following institutions/individuals:

GEMARS/Paulo Henrique Ott; FUNDAMAR/Shirley Pacheco de Souza; CEEMAM/Emerson Zampirolli; Instituto Oceanográfico. USP/Carolina P. Bertozzi; Projeto Atlantis, USP/Marcos Cesar de Oliveira Santos; Museu de Zoologia. USP/Mario M. Rollo Jr.; Museu Nacional, UFRJ/Salvatore Siciliano; Projeto Maquã, UERJ/Alexandre de F. Alevedo; Projeto Baleias e Golfinhos de Arraial/Jose Luis .A. Pizzorno and UENF/Ana Paula M. Di Benedetto and Renata M.A. Ramos, Instituto Baleia Jubatã/Marcia Engel, Centro Mamíferos Aquáticos/Jociery Vergara; GEMMAR-PB .A. Languth and A Lucena; GECC - C. Monteiro Neto and Cristine Silva.

9. Other studies and analyses

Other aspects of cetacean research conducted by GEMARS relevant to the Scientific Committee not covered in earlier sections include (the following studies:

- Body condition of franciscana dolphin - (Contact person: Glauco Caon / GEMARS)
- Population genetics of franciscana dolphin - The genetic variability and population structure of franciscana dolphins along the Brazilian coast are being studied using nuclear (microsatellites) and mitochondrial markers (Contact person: Paulo Ott GEMARS).

c) Life history of franciscana dolphin - (Contact person: Danid Danilewicz: / GEMARS)

d) Systematic survey on stranded Cetaceans in southern Brazil since 1991. Study area: From Torres (29°19'5; 49°43'W) to "Parque Nacional da Lago do Peixe" (31°22'5; 51°2'W). (Contact person: sec 8).

From land based Survey at Santa Barbara Island at Abrolhos Archipelago, interactions between humpbacks and vessels are being tracked using chronic digital theodolite.

Group composition	Speed boats	Trawlers	Sail boats	Catamaran	Total of interactions	Total time
Mother and calf	2	6	1	1	10	1h25m11s
Mother, calf and one scort	0	3	0	1	4	5h25m16s
One adult	0	0	0	2	2	2h20m22s
Dyad	0	2	0	0	2	3h30m41s
Total	2	11	1	4	18	22h41m20s

GECC:

A project is underway to test efficiency of pingers to warn dolphins of the presence of fishing nets and reduce accidental catches (Monteiro-Neto et al., 1999).

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