

# **France. Progress report on cetacean research, January 2008 to December 2008, with statistical data for the calendar year 2008.**

COMPILED BY VINCENT RIDOUX <sup>1,2</sup>, ALEXANDRA GROSS <sup>2</sup> AND OLIVIER VAN CANNEYT <sup>2</sup>

*1- LIENSs, Littoral ENvironnement et Sociétés, UMR6250, Université de La Rochelle, F-17071 La Rochelle.*  
*and*

*2- CRMM, Centre de Recherche sur les Mammifères Marins, Université de La Rochelle, F-17071 La Rochelle.*

This report summarises information obtained from:

Name of agency/institute	Abbreviation (used in rest of report)	Contact e-mail address
Association Evasion Tropicale ( <i>Etude, Recensement, Protection, Tortues marines &amp; Cétacés</i> ), Guadeloupe	AET	<a href="mailto:evastropic@wanadoo.fr">evastropic@wanadoo.fr</a>
Association BREACH (Recherche, Connaissance et Protection des Mammifères Marins), Corse, Golfe du Lion, Guadeloupe	BREACH	<a href="mailto:etienne.girou@breach-asso.org">etienne.girou@breach-asso.org</a>
Centre d'Etudes Biologiques de Chizé, CNRS, Chizé	CEBC	<a href="mailto:guinet@cebc.cnrs.fr">guinet@cebc.cnrs.fr</a> <a href="mailto:cecotte@cebc.cnrs.fr">cecotte@cebc.cnrs.fr</a> <a href="mailto:samaran@cebc.cnrs.fr">samaran@cebc.cnrs.fr</a>
Centre de Recherche sur les Cétacés, Marineland, Antibes	CRC	<a href="mailto:crc@marineland.fr">crc@marineland.fr</a>
Centre de Recherche sur les Mammifères Marins, Université de La Rochelle, La Rochelle	CRMM/ULR	<a href="mailto:olivier.van-canneyt@univ-lr.fr">olivier.van-canneyt@univ-lr.fr</a>
Centre de la Mer Côte Basque/ Muséum National d'Histoire Naturelle	MNHN/CMCB	<a href="mailto:contact@ermma.fr">contact@ermma.fr</a> <a href="mailto:ikercastege@yahoo.fr">ikercastege@yahoo.fr</a>
Ecole Pratique des Hautes Etudes, Université de Montpellier, Montpellier	EPHE	<a href="mailto:pierre-christian.beaubrun@cefe.cnrs.fr">pierre-christian.beaubrun@cefe.cnrs.fr</a> <a href="mailto:gastruc@yahoo.fr">gastruc@yahoo.fr</a>
écoOcéan Institut, Montpellier	écoOcéan Institut	<a href="mailto:lea.david@wanadoo.fr">lea.david@wanadoo.fr</a> <a href="mailto:nathalie.di-meglio@wanadoo.fr">nathalie.di-meglio@wanadoo.fr</a> <a href="mailto:ecoocean@wanadoo.fr">ecoocean@wanadoo.fr</a>
Groupe d'Etude des Cétacés du Cotentin et des mammifères marins de la mer de la Manche, Cherbourg	GECC	<a href="mailto:gecc@wanadoo.fr">gecc@wanadoo.fr</a>
Groupe d'Etude des Cétacés de Méditerranée, Marseille	GECEM	<a href="mailto:frank.dhermain@wanadoo.fr">frank.dhermain@wanadoo.fr</a>
Groupe d'Etude de la Faune Marine Atlantique, Cap-Breton	GEFMA	<a href="mailto:alexandre.dewez@free.fr">alexandre.dewez@free.fr</a>
Groupement d'Intérêt Scientifique sur le Mammifères Marins en Méditerranée et leur environnement, Hyères	GIS3M	<a href="mailto:gis3m@yahoo.fr">gis3m@yahoo.fr</a>
Groupe local d'observation et d'identification des cétacés, La Réunion	GLOBICE	<a href="mailto:globice@globice.org">globice@globice.org</a>
Groupe de Recherche sur les Cétacés, Antibes	GREC	<a href="mailto:assgrec@wanadoo.fr">assgrec@wanadoo.fr</a> <a href="mailto:a_o.gannier@club-internet.fr">a_o.gannier@club-internet.fr</a>
Groupe Mammalogique Normand, Caen	GMN	<a href="mailto:groupemammalogiquenormand@orange.fr">groupemammalogiquenormand@orange.fr</a>
Institut Français pour l'Exploitation de la Mer, Brest	Ifremer	<a href="mailto:yvon.morizur@ifremer.fr">yvon.morizur@ifremer.fr</a>
Laboratoire d'Etude des Mammifères Marins, Océanopolis, Brest	LEMM	<a href="mailto:sami.hassani@oceanopolis.com">sami.hassani@oceanopolis.com</a>
Littoral, Environnement et Sociétés, CNRS Université de La Rochelle, La Rochelle	LIENSs/ULR	<a href="mailto:vincent.ridoux@univ-lr.fr">vincent.ridoux@univ-lr.fr</a>
Muséum National d'Histoire Naturelle, Paris	MNHN, Paris	<a href="mailto:jbc@mnhn.fr">jbc@mnhn.fr</a>
Observatoire des Mammifères Marins (Direction de l'Agriculture et de la Forêt/Office National de la Chasse et de la Faune Sauvage/ Collectivité Départementale de Mayotte/Université de la Rochelle)	OMM	<a href="mailto:jeremy.kiszka@wanadoo.fr">jeremy.kiszka@wanadoo.fr</a> <a href="mailto:claire.pusineri@oncfs.gouv.fr">claire.pusineri@oncfs.gouv.fr</a> <a href="mailto:wickel_julien@yahoo.fr">wickel_julien@yahoo.fr</a>
Observatoire pour la Conservation et l'Etude des Animaux et Milieu Marins	OCEAMM	<a href="mailto:oceamm@orange.fr">oceamm@orange.fr</a>
Opération Cétacés Nouvelle Calédonie, Nouméa	OCNC	<a href="mailto:op.cetaces@lagoon.nc">op.cetaces@lagoon.nc</a>
Parc naturel marin d'Iroise, Agence des Aires Marines Protégées	PNMI	<a href="mailto:philippe.le-niliot@aires-marines.fr">philippe.le-niliot@aires-marines.fr</a>
Souffleurs d'Ecume	SDE	<a href="mailto:pmayol@souffleursdecume.com">pmayol@souffleursdecume.com</a> <a href="mailto:fredcap@wanadoo.fr">fredcap@wanadoo.fr</a>
Société pour l'Etude, la Protection et l'Aménagement de la Nature en Martinique, Martinique	SEPANMAR	<a href="mailto:sepanmar@ool.fr">sepanmar@ool.fr</a> <a href="mailto:reseau_cetaces972@hotmail.com">reseau_cetaces972@hotmail.com</a> <a href="mailto:stephane.jeremie@wanadoo.fr">stephane.jeremie@wanadoo.fr</a>
University of Auckland, Auckland, New-Zealand	UoA	<a href="mailto:m.oremus@auckland.ac.nz">m.oremus@auckland.ac.nz</a>
University of Louisiana at Lafayette, Lafayette, LA, U.S.A.	ULL	<a href="mailto:viricel@louisiana.edu">viricel@louisiana.edu</a>
Université Paris Sud, Neurobiologie de l'Apprentissage, de la Mémoire et de la Communication	UPS	<a href="mailto:olivier.adam@u-psud.fr">olivier.adam@u-psud.fr</a>
Université de Toulon	UTL	<a href="mailto:glotin@univ-tln.fr">glotin@univ-tln.fr</a>

## 1. SPECIES AND STOCKS STUDIED

IWC common name	IWC recommended scientific name	Area/stock(s)	Items referred to
Cetaceans	<i>Cetacea</i>	Northeast Atlantic, Mediterranean, Caribbean, French Guiana, South West Indian, New Caledonia, French Polynesia, Southern Ocean	2.1;2.2;4.3;8;9
Humpback whale	<i>Megaptera novaeangliae</i>	Caribbean, Mayotte et Réunion/stock C, New Caledonia/stock E2, French Polynesia/stock F	2.1;2.2;3.1;3.2;4.1;4.3;9
Blue whale	<i>Balaenoptera musculus</i>	Southern ocean	9
Fin whale	<i>Balaenoptera physalus</i>	Northeast Atlantic, Mediterranean	2.1;2.2;3.1;4.1;4.3;5;6.3;8;9
Balaenoptera sp	Balaenoptera sp.	Caribbean	2.1
Common minke whale	<i>Balaenoptera acutorostrata</i>	Northeast Atlantic, New Caledonia, Caribbean, Mediterranean	2.1;4.3;8
Sperm whale	<i>Physeter macrocephalus</i>	Northeast Atlantic, Mediterranean, Caribbean, Réunion	2.1;2.2;3.1;3.2;4.1;4.3;4.4;5;8;9
Pygmy sperm whale	<i>Kogia breviceps</i>	Northeast Atlantic, Caribbean, Mayotte, New Caledonia	2.1;3.1;4.3
Dwarf sperm whale	<i>Kogia sima</i>	Caribbean, Mayotte	2.1;3.1;4.3;8;9
Beaked whale	<i>Mesoplodon spp.</i>	Northeast Atlantic, Caribbean, Mayotte	2.1;2.2;3.1
Blainville's beaked w.	<i>Mesoplodon densirostris</i>	Mayotte	2.1;4.3;8
Gervais's beaked whale	<i>Mesoplodon europaeus</i>	Caribbean	2.1;4.3
Sowerby's beaked whale	<i>Mesoplodon bidens</i>	Northeast Atlantic	4.3;8
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Northeast Atlantic, Mediterranean, Caribbean	2.1;2.2;4.3;8
Delphinids	<i>Delphinidae</i>	Caribbean, Mediterranean, Mayotte, Réunion	2.1;2.2;3.1;3.2;4.1;4.2;4.4;5;7.3;8;9
Killer whale	<i>Orcinus orca</i>	Caribbean, Southern Ocean	2.1;3.1;5
False killer whale	<i>Pseudorca crassidens</i>	Caribbean	2.1;3.1
Pygmy killer whale	<i>Feresa attenuate</i>	Caribbean, New Caledonia, Réunion	2.1;3.1;4.3
Long-finned pilot whale	<i>Globicephala melas</i>	Northeast Atlantic, Mediterranean	2.1;2.2;3.1;4.1;4.3;4.4;5;7.3;8;9
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Caribbean, Réunion, New Caledonia	2.1;4.3;8;9
Melon-headed whale	<i>Peponocephala electra</i>	Caribbean, Mayotte, Réunion	2.1; 3.1;3.2,4.3;8;9
Risso's dolphin	<i>Grampus griseus</i>	Northeast Atlantic, Mediterranean, Caribbean, Mayotte	2.1;2.2;3.1;4.3;4.4;5;8;9
Common bottlenose dolphin	<i>Tursiops truncates</i>	Northeast Atlantic, English Channel, Mediterranean, Caribbean, Réunion	2.1;2.2;3.1;4.3;5;7.3;8
Indo-Pacific bottlenose dolphin	<i>Tursiops aduncus</i>	Mayotte, Réunion, New Caledonia, Pacific Ocean	2.1;2.2;3.1;3.2;4.1;4.4;9
Rough-toothed dolphin	<i>Steno bredanensis</i>	Caribbean, New Caledonia	2.1;2.2;3.1;9
Indo-Pacific humpback dolphin	<i>Sousa chinensis</i>	Mayotte	2.1
Guiana dolphin	<i>Sotalia guianensis</i>	Guiana	2.1;2.2
White-sided dolphin	<i>Lagenorhynchus acutus</i>	Northeast Atlantic	N/A
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	Northeast Atlantic	2.1
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Caribbean, Mayotte, Réunion	2.1;3.1;4.3
Short-beaked common dolphin	<i>Delphinus delphis</i>	Northeast Atlantic, Mediterranean	2.1;2.2;4.2;4.3;4.4;7.3;8.9
Striped dolphin	<i>Stenella coeruleoalba</i>	Northeast Atlantic, Mediterranean, Caribbean, Réunion	2.1;2.2;3.1;4.2;4.3;5;7.3;8;9
Pantropical spotted dolphin	<i>Stenella attenuate</i>	Caribbean, Mayotte, Réunion	2.1;2.2;3.1;8
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Caribbean	2.1;4.3
Spinner dolphin	<i>Stenella longirostris</i>	Caribbean, Mayotte, Réunion, New Caledonia, Pacific Ocean	2.1;2.2;3.1;3.2;4.1;4.3;4.4;8;9
Clymene dolphin	<i>Stenella clymene</i>	Caribbean	N/A
Harbour porpoise	<i>Phocoena phocoena</i>	Northeast Atlantic	2.1;2.2;4.2;4.3;4.4;5;7.3;8;9

## 2. SIGHTINGS DATA

### 2.1 Field work

#### 2.1.1 Systematic

*North-east Atlantic* – Summer and winter cetacean distributions (mostly harbour porpoise and white beaked dolphin) are surveyed in the eastern English Channel and southern bight of the North Sea (OCEAMM).

GECC carries out a year-round cetaceans survey along the coasts of Normandy.

Systematic summer and winter surveys of coastal bottlenose dolphins were carried out along the coast of western Brittany (LEMM). Aerial surveys were carried out using line transect protocol to estimate abundance and seasonal patterns of small cetaceans in west Brittany (LEMM) in partnership with the Iroise marine natural park (*Parc Naturel Marin de l'Iroise*, PNMI).

Cetacean distributions were surveyed over the shelf of the Bay of Biscay (May) and English Channel (January) by CRMM/ULR and LIENSs/ULR in order to determine relative abundances, preferential habitats and relationships with distribution of small pelagic fish as determined by simultaneous acoustic survey carried out by *Ifremer/ Instituto Español de Oceanografía* (IEO) research vessel *Thalassa*. This survey followed a standardized protocol in use since 2003 in the Bay of Biscay (PELGAS survey) and since 2007 in the English Channel (IBTS survey). In 2008, CRMM/ULR and the *Centro Oceanográfico de Vigo* (IEO) co-operated to collect data on cetacean distribution by using the same protocol in April and September pelagic fish survey in the south of the Bay of Biscay (PELACUS survey). Data on top predators from PELGAS, PELACUS, and IBTS surveys are stored in a single database managed by CRMM-ULR.

Cetaceans at sea are recorded by MNHN/CMCB under standardized line transect conditions in the Bay of Biscay year round since 1976 from vessels of *Douanes Françaises* and *Affaires Maritimes* (Custom and Coast Guard vessels).

*Mediterranean* - Systematic spring and summer surveys of coastal common bottlenose dolphins and striped dolphins were carried out off the coasts of Provence, northwest Mediterranean (GECEM).

A survey was conducted in September (1013 km 91 sightings) in the NW Mediterranean Sea to collect biopsies and associated photo-id of fin, sperm and pilot whales (GIS3M, CRC, WWF, écoOcéan Institut). The survey followed a line transect protocol, collecting both visual and acoustic data, which was interrupted for biopsy and photographic sampling.

Fin whales and common bottlenose dolphins were surveyed around Corsica, NW Mediterranean, in July 2008, (BREACH and GECEM) and around *Golfe du Lion*, NW Mediterranean, in April 2008, August 2008 and October 2008 by using transect lines and photo-ID (BREACH and EPHE) to determine abundance and distribution.

Both boat-based and aerial surveys have been conducted off the French Mediterranean coasts from early January to December 2008 (écoOcéan Institut). They were dedicated to studying cetacean distribution in relation to environmental variables, and also to map maritime traffic (commercial and leisure vessels) in cetacean habitats.

Sperm whales were surveyed in the Ligurian and Tyrrhenian Seas, NW Mediterranean, from March-November 2008 and Cuvier's beaked whales in July-August 2008, with a focus on behaviour and acoustics (GREC).

*Caribbean and Guiana* - Sperm whales, humpback whales and other cetaceans were surveyed (sightings/acoustics) along the leeward coast of Guadeloupe year-round from a research sailing boat. Data were also collected off Dominica in April 2008 and land based surveys were conducted during the humpback whale season, December to May (AET). From March 2008 to June 2008, a cetacean abundance and distribution study was conducted off Guadeloupe using transect lines and acoustics (BREACH).

Delphinids, beaked whales and dwarf sperm whales were surveyed around Martinique in October 2008 (SEPANMAR). Surveys in both leeward and windward territorial waters were performed by using a sailing boat and focused on nocturnal habitat use by delphinids and slope waters for beaked whales. Photo-ID was performed for short-finned pilot whales and pantropical spotted dolphins over the leeward continental slope.

Aerial surveys were conducted by CRMM/ULR using line-transect methods to estimate distribution and abundance of cetacean species in Guadeloupe, Martinique, Saint-Martin and Saint Barthélemy waters in February 2008 (EEZ: 123 000 km<sup>2</sup>) and French Guiana waters in October 2008 (EEZ: 138 000 km<sup>2</sup>).

*South-west Indian* - Both boat-based and aerial surveys were conducted around Mayotte throughout the year by OMM. Targeted species were mostly delphinids, but other toothed whales were also recorded (Kogiidae, Ziphiidae). Aerial surveys were conducted over the lagoon of Mayotte in May 2008 with a focus on the dugong (*Dugong dugon*) and small cetaceans.

Boat based surveys have been conducted year round by GLOBICE, to look at species diversity and distribution around Reunion Island: for the first time the northern and eastern part of the island were covered. A dedicated sperm whale survey was conducted in Reunion-Mauritius area, based on visual and acoustic monitoring.

*New Caledonia* - Boat based surveys were conducted from February 22<sup>nd</sup> to December 11<sup>th</sup> 2008 (N = 100 days), in the eastern, western and southern lagoons of New Caledonia (OCNC). Targeted species were humpback whales (sub-stock E2), Indo-Pacific bottlenose dolphins and spinner dolphins. These areas were surveyed using small motor boat and sailing catamaran.

*Polynesia* - Humpback whales were surveyed in French Polynesia from September-November 2008 (songs recorded).

*Southern ocean* - All cetaceans were surveyed in the summer along the routes of the supply vessel *Marion-Dufresnes* between Réunion Island and the French research stations of the Southern Indian Ocean: Crozet, Kerguelen and Amsterdam (CEBC).

Target species	Date	Area	No. of sightings	Contact person /institute and references
Cetaceans	Summer / winter	East English Channel / Southern North Sea	In progress	S. Pézeril (OCEAMM)
Common bottlenose dolphin	Year round	Normandy	80	F. Gally (GECC)
Common bottlenose dolphin	Year round	Normandy	In progress	GMN
Cetaceans	January	English Channel	6 <sup>s</sup>	O.Van Canneyt (CRMM/ULR)
Cetaceans	April-May	Bay of Biscay	176 <sup>s</sup>	O.Van Canneyt (CRMM/ULR)
Cetaceans	September-October	Bay of Biscay	51 <sup>s</sup>	O.Van Canneyt (CRMM/ULR)
Cetaceans	Year round	Bay of Biscay	In progress	G. Hémerly and I. Castège (MNHN/CMCB)
Cetaceans	Year round	west Brittany	104	LEMM / PNMI
Cuvier's beaked whale	July	Western Mediterranean	17	A.Gannier (GREC)
Odontocetes	March-November	NW Mediterranean	127	A.Gannier (GREC)
Sperm and long-finned pilot whales	September	NW Mediterranean	22	S. Laran (GIS3M, CRC)
Fin whales	May to October	NW Mediterranean	In progress	N. Di-Méglio (GIS3M, WWF, écoOcéan Institut)
Cetaceans	Year round	NW Mediterranean	In progress	L. David (écoOcéan Institut)
Fin whales	April 2008	Golfe du Lion/ NW Mediterranean	3	C.Azzinari (BREACH)
Cetaceans	July 2008	Corsica/ NW Mediterranean	3	C.Azzinari (BREACH)
Cetaceans	August to October 2008	Golfe du Lion/ NW Mediterranean	11 <sup>e</sup>	C.Azzinari (BREACH)
Cetaceans	March-June 2008	Guadeloupe/ Caribbean	34 <sup>Δ</sup>	N. Gandilhon, (BREACH)
Cetaceans	Year round	Guadeloupe/ Caribbean	357 <sup>s</sup>	C. & R. Rinaldi (AET)
Cetaceans	October	Martinique	29 <sup>@</sup>	S. Jérémie (SEPANMAR)
Cetaceans	February	French West Indies	70 <sup>i</sup>	O.Van Canneyt (CRMM/ULR)
Cetaceans	October	French Guiana	164 <sup>§</sup>	O.Van Canneyt (CRMM/ULR)
Delphinids	January to December 2008	Mayotte/ SW Indian	104 <sup>#</sup>	J. Kiszka (OMM)
Delphinids	May 2008	Mayotte/ SW Indian	13 <sup>*</sup>	C. Pusineri (OMM)
Humpback whale	August to November 2007	Mayotte/ SW Indian	16	J. Wickel (OMM)
Cetaceans	Year round 2008	Réunion/ SW Indian	262	V. Dulau (GLOBICE)

Humpback whale	June to November	Réunion/ SW Indian	166	V.Dulau (GLOBICE)
Indo-Pacific bottlenose dolphin	Year round 2008	Réunion/ SW Indian	49	V.Dulau (GLOBICE)
Indo-Pacific bottlenose dolphin	January to December 2008	New Caledonia, Pacific Ocean	59	M.Oremus (OCNC)
Spinner dolphin	January to December 2008	New Caledonia, Pacific Ocean	13	M.Oremus (OCNC)
Humpback whale	July to September 2008	New Caledonia, Pacific Ocean	115 at sea and 265 from land	C. Garrigue (OCNC)
Cetaceans	Austral summer	Southern Indian Ocean	In progress	C. Guinet (CEBC)
Cetaceans	Year round	Crozet and Kerguelen Islands	In progress	C. Guinet (CEBC)

§ constituted of 5 common minke w., 4 fin w., 4 unidentified w., 2 sperm w., 2 unidentified beaked w., 29 long-finned pilot w., 4, Risso's d., 1 false killer w., 101 short-beaked common d., 37 common bottlenose d., 31 striped d. and 13 unidentified d.

∞ constituted of 7 fin w., 3 common bottlenose d. and 1 striped d.

Δ constituted of 14 humpback w., 5 sperm w., 1 dwarf sperm w., 1 Gervais' beaked w., 3 unid. Beaked w., 1 pygmy killer w., 1 false killer w., 1 common bottlenose d., 1 steno, 3 pan-tropical spotted d., 2 unid delphinids, 1 unid cetacean.

§ constituted of (encounters) : 3 humpback w., 277 sperm w., 1 *Balaenoptera* sp. w., 1 Cuvier's b. w., 3 Gervais's b. w., 1 non Id beaked w., 3 pygmy killer w., 6 Fraser's d., 3 common bottlenose d., 51 pan-tropical spotted d., 4 short-finned pilot w., 3 false killer w., 1 rough toothed d.,

i constituted of 12 humpback w., 4 common minke w., 1 unidentified w., 16 sperm w., 2 *Kogia* sp., 2 Cuvier's b. w., 2 unidentified b. w., 2 killer w., 2 false killer w., 5 short-finned pilot w., 4 common bottlenose d., 4 Fraser's d., 10 unidentified d., 2 unidentified medium cetacean

g constituted of 2 fin w., 1 unidentified w., 3 sperm w., 3 Cuvier's b. w., 4 unidentified b. w., 8 short-finned pilot w., 1 Risso's d., 83 common bottlenose d., 31 Guiana d., 26 unidentified d., 2 unidentified medium cetacean.

# constituted of 1 short-finned pilot w., 3 dwarf sperm w., 2 Blainville's beaked w., 2 Indo-pacific humpback d., 19 pantropical spotted d., 42 spinner d., 24 Indo-Pacific bottlenose d., 4 humpback w., 3 melon-headed w., 1 sperm w.

\* constituted of 10 spinner/pan-tropical spotted d., 3 Indo-Pacific bottlenose d.

### 2.1.2 Opportunistic, platforms of opportunity

*North-east Atlantic* - A ferry from Brest (France) to Cork (Ireland) is used as a platform of opportunity to survey cetaceans across Celtic Sea (LEMM). The same methodology is also applied along two ferry routes across the English Channel, from Saint-Malo and Caen to Portsmouth (GMN).

*Mediterranean* - The *Pelagos* sanctuary, NW Mediterranean, and ACCOBAMS will jointly deliver a label to whale-watching operators that will allow cetacean observers to use these vessels as platforms of opportunity under coordination by SDE.

Weekly surveys were conducted from June to October on whale-watching cruises off Provence, northwest Mediterranean.

*Caribbean and Guiana* - Cetacean sightings were collected from a whale-watch motor boat off leeward coast of Guadeloupe (AET). Data from St Barthélemy and St Martin were also collected by St Barthélemy Natural Reserve, *St Barth Cétacés* as well as the Natural Reserve of St Martin, and compiled by AET.

An observatory has been created to collect cetacean documented sightings around Guadeloupe (BREACH): over 120 sightings were documented in one year (May 2008 to May 2009).

In Martinique, a fishermen network has provided encounter data (simple sighting) from small motor boats, mostly reporting the presence of sperm whales, short-finned pilot whales and Atlantic spotted dolphins (SEPANMAR).

Primary species	Area	Data type/method	Collected by	Platform	Location of archive	Contact person/institute and refs
Cetaceans	East English Channel Southern North Sea	Opportunistic sightings	Public, scientists, OCEAMM	Boat based, seawatching, sea users	OCEAMM	S. Pézeril (OCEAMM)
Cetaceans	English Channel	opportunistic sightings	public, customs, scientists	Boat based, land	GECC	F. Gally (GECC)
Cetaceans	Normandy	opportunistic sightings	GMN	Land, whale watching vessel, ferry	GMN	GMN
Cetaceans	Celtic Sea	Sightings	LEMM	Ferry	LEMM	S. Hassani (LEMM)
Common bottlenose dolphin	Provence coastline, NW Mediterranean	opportunistic sightings	Data from fishermen, ferries and National Park wardens	Boat based	GECEM	F. Dhermain (GECEM)
Cetaceans <sup>Δ</sup>	Provence	Sightings	Scientists	Whale-watching boats	SDE	P. Mayol (SDE)
Cetaceans <sup>§</sup>	Guadeloupe	Sightings	AET	Whale watching boat	AET	C. & R. Rinaldi (AET)
Humpback whales and other cetaceans <sup>£</sup>	St Barthélémy St Martin Guadeloupe	Opportunistic sightings	St Martin and St Barthélémy natural reserves staff / St Barth cétaés / AET	Sea users	AET / Natural Reserves of St Barthélémy and St Martin	C. & R. Rinaldi (AET) and contributors*
Cetaceans <sup>♣</sup>	Guadeloupe	opportunistic sightings	Fishermen, BREACH members, Divers, coasts-guards	Boat based	BREACH	N.Gandilhon et E.Girou (BREACH)
Cetaceans	Martinique	Opportunistic sightings	Fishermen	Fishing boats Ferries	SEPANMAR	S. Jérémie (SEPANMAR)
Cetaceans	New Caledonia	Opportunistic sightings	Public, scientist	Various types of platform	OCNC	C. Garrigue (OCNC)

<sup>Δ</sup> include sightings of fin w., sperm w., long-finned pilot w., Risso's d., striped d.

<sup>§</sup> constituted of (encounters) 8 humpback w., 119 sperm w., 1 pigmy sperm w., 1 unid kogia sp., 3 Gervais's b.w., 3 unid beaked w., 1 false killer w., 6 short-finned pilot w., 6 common bottlenose d., 9 Fraser's d., 121 pan-tropical spotted d., striped d., 1 melon headed w., 1 atlantic spotted d., 2 pigmy killer w., 2 rough-toothed d., 3 unid delphinids.

<sup>£</sup> included killer w.

\*contributors: St Barth Cétaés, Réserve Naturelle St Martin, Réserve Naturelle St Barthélémy, sea users

<sup>♣</sup> included humpback w., rough-toothed d., common bottlenose d.

## 2.2 Analyses/development of techniques

Distribution patterns and relative abundance of small cetaceans were analysed in the Bay of Biscay from past aerial and boat-based surveys (LIENSs/ULR; Kiszka *et al.*, 2008; Certain *et al.*, 2008).

Habitat modelling of sperm whale, long-finned pilot whale, Risso's dolphin were computed from summer surveys (1998 to 2005) in the NW Mediterranean sea (CRC and GREC; Praca, 2008, Praca *et al.*, 2009) and striped dolphin's distribution in coastal habitats using generalised additive modelling techniques (CRC and ULR).

Habitat modelling from platform of opportunity data in the western Mediterranean was conducted by CEBC. Distribution patterns, relative abundance, habitat preferences and risk assessment areas for collision and disturbance for cetaceans are currently analysed in the NW Mediterranean (écoOcéan Institut).

Distribution, relative abundance and preferred habitat of fin whales and common bottlenose dolphins are currently analysed in *Golfe du Lion* and identification and acoustics methods are implemented (BREACH).

Distribution, habitat preference and long-term displacement of bottlenose dolphins are currently studied in NW Mediterranean jointly by GECEM (France), Aquarium di Genova, Tethys, Cetus, Ambiente Mare (Italy).

Distribution, habitat, relative abundance and social structure of delphinids are currently analysed around Mayotte (OMM). Some insights of habitat partitioning among delphinids have been investigated (Gross *et al.*, in press). Species diversity and distribution data collected from 2004 to 2007 off Reunion were analysed (GLOBICE; Dulau-Drouot *et al.*, in press).

Target species	Date	Area	Methods/effort	Parameters/ factors measured	Contact person/institute; refs
Harbour porpoise	Year round 2004-2008	Strait of Dover	Land based surveys (> 5000 hours observation effort)	Local occurrence	S. Pézeril (OCEAMM)
Delphinids <sup>s</sup>	Spring and autumn	Bay of Biscay	boat based surveys and spatial analysis	Relative abundance and habitat preference	O. Van Canneyt (CRMM/ULR)
Sperm w., long-finned pilot w., Risso's d.	September	NW Mediterranean	Line transect	Distribution, biopsies and photo-ID	S. Laran (CRC, GIS3M)
Cetaceans	1991-2008	NW Mediterranean	Aerial and boat based surveys	Distribution, relative abundance, habitat preference, risk assessment areas	L. David (écoOcéan Institut, GIS3M)
Fin whale	Year round	West Mediterranean	Line transect survey	Distribution, relative abundance	C. Cotté (CEBC)
Sperm whale	June, July, October	Western Mediterranean	Creak counting in acoustic records	Feeding/IPI	A. Gannier (GREC)
Cetaceans <sup>i</sup>	February	Caribbean	Aerial survey / 50 hours of observation effort / and spatial analysis	Relative abundance and habitat preference	O. Van Canneyt (CRMM/ULR)
Cetaceans <sup>g</sup>	October	French Guiana	Aerial survey / 50 hours of observation effort/ and spatial analysis	Relative abundance and habitat preference	O. Van Canneyt (CRMM/ULR)
Sperm whales, delphinids	August, September	Martinique/ Caribbean	Creak counting, surveys and photo-ID	Feeding/IPI Abundance, site fidelity	S. Jérémie (SEPANMAR)
Cetaceans*	Year round	Guadeloupe and Caribbean	Surveys and photo-ID	Local abundance, distribution, site fidelity group composition	C. & R. Rinaldi/AET
Cetaceans	Year round	west Brittany	Aerial survey	Distribution, abundance	S. Hassani (LEMM) P. Le Nilot (PNMI)
Common bottlenose dolphin		west Brittany	Photo-ID, behaviour	Size group, home range	S. Hassani (LEMM)
Delphinids	May 2008	Mayotte/SW Indian	Aerial survey / 19 hours of observation effort	Distribution / group composition / relative abundance	C. Pusineri (OMM)
Fin Whale, Common bottlenose dolphins	2005- 2008	Golfe du Lion/NW Mediterranean	Line transect survey and photo-ID	Local abundance, Distribution / individuals recognition	C. Azzinari/ N. Gandilhon (BREACH/DIREN) and P.Beaubrun (EPHE)
Fin Whale, Common bottlenose dolphins	2007- 2008	Corsica/NW Mediterranean	Line transect survey and photo-ID	Local abundance, distribution / individuals recognition	C.Azzinari /N.Gandilhon (BREACH) and F.Dhermain (GECM)
Cetaceans	2007-2008	Guadeloupe/ Caribbean	Line transect and acoustic surveys	Relative abundance and distribution	N. Gandilhon & E. Girou (BREACH)
Cetaceans	May 2008 – May 2009	Guadeloupe/ Caribbean	Opportunistic sightings and ID monitoring	Individuals recognition / Distribution completion	N.Gandilhon (BREACH)
Cetaceans	December 2008 – in progress	Guadeloupe/ Caribbean	Acoustics monitoring	Distribution, biodiversity	N.Gandilhon (BREACH)
Cetaceans	December 2008 – in progress	Guadeloupe/ Caribbean	Species monitoring	Dynamics and biology	N. Gandilhon (BREACH)
Humpback whale	August to November 2007	Mayotte/SW Indian	Aerial survey / 15 hours of observation effort	Distribution / group composition / relative abundance	J. Wickel (OMM)
Delphinids <sup>#</sup>	January to December 2008	Mayotte/SW Indian	Boat-based surveys / 266 hours	Distribution / group structure / behaviour	J. Kiszka (OMM)



Indo-Pacific bottlenose dolphin	Year round 2008	Réunion/SW Indian	Photo-ID	Local abundance/group structure/site fidelity	V. Dulau-Drouot (GLOBICE)
Humpback whales	June to November 2008	Réunion/SW Indian	photo-ID	Local distribution and movement/ residency time/group composition	V. Dulau-Drouot (GLOBICE)
Humpback whales	1999-2008	Oceania and East Australia	Photo-ID comparison	Rates of exchange	C. Garrigue (OCNC)
Humpback whales	1999-2008	New Caledonia Pacific Ocean	Boat based surveys	Relative abundance and spatial analysis	C. Garrigue (OCNC)
Delphinids <sup>#</sup>	January to December 2008	New Caledonia Pacific Ocean	Boat-based surveys, photo-ID comparison and genetic analysis	Distribution / local abundance/genetic structure	M.Oremus (OCNC)
Humpback whales	2005-2007	New Caledonia Pacific Ocean	Theodolite surveys	Impact of whale watching activities	A.Schaffar (OCNC)
Cuvier's beaked whale	July 2008	Mediterranean	Acoustic behaviour	Click rate	A. Gannier (GREC)
Delphinids	Sept-Dec 08	Mediterranean	Acoustic classification	Whistles contours	A. Gannier (GREC)

§ includes short-beaked common d. and common bottlenose d.

\* includes sperm w., humpback w., beaked w., all delphinids

# includes Indo-Pacific bottlenose d., spinner d., pan-tropical d.

i includes humpback w., sperm w., large and small delphinids

g includes common bottlenose d., Guiana d.

### 3. MARKING DATA

#### 3.1 Field work

##### 3.1.1 Natural marking data

Species	Feature	Area/stock	No. photo-id'd	Catalogue (Y/N)	Catalogue total	Contact person/institute; refs
Common bottlenose dolphin	Dorsal Fin	Normandy/NE Atlantic	-	Y	280	François Gally (GECC)
Common bottlenose dolphin	Dorsal fin	Channel/NE Atlantic	In progress	Y	In progress	GMN
Common bottlenose dolphin	Dorsal fin	west Brittany	16	Y	30	S. Hassani (LEMM)
Long-finned pilot whale	Dorsal fin	Bay of Biscay/NE Atlantic	In progress	Y	107	O. Van Canneyt (CRMM/ULR)
Risso's dolphin	Dorsal fin and body	NW Mediterranean	11	N	In progress	GIS3M
Risso's dolphin	Dorsal fin and body	Western Mediterranean	In progress	Y	In progress	A. Gannier (GREC)
Sperm whale	Fluke	Western Mediterranean	10	Y	176	A. Gannier (GREC)
Common bottlenose dolphin	Dorsal fin	Corsica/NW Mediterranean	2245 selected pictures	Y	206	F. Dhermain (GECM)
Common bottlenose dolphin	Dorsal fin	Provence/ NW Mediterranean	295 selected pictures	Y	43	F. Dhermain (GECM)
Fin whale	Dorsal fins / sides	NW Mediterranean	In progress	Y	In progress	L. David (écoOcéan Institut)
Risso's dolphin	Dorsal fins / sides	NW Mediterranean	In progress	Y	In progress	L. David (écoOcéan Institut)
Common bottlenose dolphin	Dorsal fin	Corsica/ NW Mediterranean	In progress	N	In progress	(BREACH and GECM)
Sperm whale	Fluke/sides	NW Mediterranean	3	Y	13	S. Laran (CRC)

Long-finned pilot whale	Dorsal fin	NW Mediterranean	In progress (c. 20)	N	In progress	S. Laran (GIS3M/CRC)
Fin whale	Sides	NW Mediterranean	≥40 selected pictures	Y	9	C.Azzinari (BREACH)
Common bottlenose dolphin	Dorsal fin	<i>Golfe du Lion/</i> NW Mediterranean	≥360 selected pictures	Y	≥23	C.Azzinari (BREACH)
Common bottlenose dolphin	Dorsal fin	Guadeloupe / Caribbean	≥ 224 selected pictures	Y	20	N. Gandilhon (BREACH - thesis)
Humpback whales	Ventral flukes and dorsal fin	Guadeloupe	≥ 220 selected pictures	Y	In progress	N. Gandilhon (BREACH - thesis)
Sperm whale	Ventral fluke	Guadeloupe	≥ 42 selected pictures	In progress	In progress	N. Gandilhon (BREACH - thesis)
Rough tooth dolphins	Dorsal fin and shape pods	Guadeloupe	≥ 224 selected pictures	Y	21	N. Gandilhon (BREACH)
Beaked whales §	Dorsal fins / sides	Guadeloupe	In progress	Y	6	N. Gandilhon (BREACH /thesis program)
Humpback whale	Ventral fluke	Guadeloupe, St Barthélémy and Caribbean	4	Y	45 individuals	C. & R. Rinaldi (AET)*
Sperm whale	Ventral fluke	Guadeloupe & Caribbean	271	Y	220 individuals	C. & R. Rinaldi (AET)
Common bottlenose dolphin	Dorsal fin	St Martin/Caribbean	In progress	Y	In progress	Reserve St Martin (AET)**
Beaked whales and delphinids§	Dorsal fins / sides	Guadeloupe and Caribbean	223	Y	378	C. & R. Rinaldi (AET) and contributors
Sperm whale	Fluke	Martinique/Caribbean	In progress	Y	>25	SEPANMAR / GREC
Delphinids #	Dorsal fin	Mayotte/SW Indian	In progress	Y	In progress	J. Kiszka et C. Pusineri (OMM)
Indo-Pacific bottlenose dolphin	Dorsal fin	Réunion/SW Indian	In progress	Y	76	V. Dulau-Drouot (GLOBICE)
Humpback whale	Fluke and dorsal fin	Réunion/SW Indian	In progress	Y	110	V. Dulau-Drouot (GLOBICE)
Humpback whale	Fluke	New Caledonia/sub-stock E2	45	Y	549	C. Garrigue (OCNC)
Indo-Pacific bottlenose dolphin	Dorsal fin	New Caledonia Pacific Ocean	In progress	Y	304	M.Oremus (OCNC)
Spinner dolphin	Dorsal fin	New Caledonia Pacific Ocean	In progress	Y	83	M.Oremus (OCNC)
Sperm whale	Fluke and dorsal fin	Crozet & Kerguelen/ Southern Ocean	-	Y	80	C. Guinet (CEBC)
Killer whale	Dorsal fin	Crozet & Kerguelen/ Southern Ocean	-	Y	195	C. Guinet/CEBC

\* contributors: St Barth Cétacés

\*\* contributors: St Martin Natural Reserve

§ include beaked whales, killer w., pygmy killer w., short-finned pilot w., melon-headed d., common bottlenose d., pan-tropical spotted d., Fraser's d., false killer w., striped d., spinner d., rough-toothed d. orcas, *Kogia* sp.

# include melon-headed w., spinner d., Indo-Pacific bottlenose d.

### 3.1.2. Artificial marking data

None deployed.

### 3.1.3 Telemetry data

Species	Tag type	No. successfully deployed	Maximum time transmitting	Contact person/institute; refs
Humpback whales	Argos satellite tag	12	52 days	C.Garrigue (OCNC)

A total of 12 satellite tags were deployed on humpback whales in New Caledonia in order to identify breeding areas and migration routes. The project is a collaboration between OCNC in New Caledonia, the U.S. National Marine Mammal Laboratory (A. Zerbini and P. Clapham), and *Instituto Aqualie* (Y. Geyer, Rio de Janeiro). The work was primarily funded by Greenpeace International as part of a scientific collaboration.

### 3.2 Analyses/development of techniques

AET carries out specific studies on sperm whales off Guadeloupe including analysis of surface behaviours, blow sequences, inter-individual associations and fidelity, maternal care, impacts of human activities. Sperm whale abundance estimates are being carried out around Guadeloupe archipelago (AET) by using capture-mark-recapture methodologies (CMR) from photo-identification data. A similar work is under way on delphinids and humpback whales in the same area, off St Barthélemy, St Martin and the neighbouring islands. AET also participates to the NAMSC catalogue to match flukes of sperm whales and, similarly, to the North Atlantic Humpback Whales catalogue. A regional catalogue for both these species and for small cetaceans is in progress with data collected from Guadeloupe and neighbouring islands.

Photo-identification data analysis of Indo-Pacific bottlenose dolphin is in progress. Inter-individual associations, site fidelity and abundance are under study for Indo-Pacific bottlenose dolphins, melon-headed whales and spinner dolphins in Mayotte (OMM). Residency, site fidelity, association and movement patterns are being studied for Indo-Pacific bottlenose dolphins in Réunion from photo-identification data (GLOBICE). Movement and residency time of humpback whales around Réunion were investigated by GLOBICE using photo-identification (78 whale flukes identified). Inter-annual comparisons of humpback whale photo-ID are undertaken to assess site fidelity over years.

Residency pattern, local population structure and abundance of Indo-Pacific bottlenose dolphins and spinner dolphins in the lagoon of New Caledonia are currently investigated using capture-recapture methods based on photo-ID and genetic data. Photographs and genetic samples (biopsy and stranding) were collected opportunistically since 1996 but systematic surveys were initiated in 2008.

Further demographic investigations based on humpback whale photo-identification have been conducted by OCNC including migration events in the South Pacific. Humpback whale flukes collected in Eastern Australia (EA, Hervey Bay and Byron Bay, N = 650) and in Oceania (N = 130) in 2005 were compared with the catalogues of Oceania and of EA (1999-2004) previously created. This process resulted in new matches between EA and both New Zealand and New Caledonia (in progress).

## 4. TISSUE/BIOLOGICAL SAMPLES COLLECTED

### 4.1 Biopsy samples (summary only)

Species	Area/stock	Calendar year/season - no. collected	Archived (Y/N)	No. analysed	Total holdings	Contact person/institute
Sperm whale	NW Mediterranean	2008/ summer - 3	Y	In progress	9	S. Laran (CRC)
Long-finned pilot whale	NW Mediterranean	2008/ summer - 2	Y	In progress	4	S. Laran (CRC)
Fin whale	North western Mediterranean	2006/2008	Y	>25	>25	L. David (écoOcéan Institut, WWF)
Delphinids	Mayotte/SW Indian	2008/year round - 42	Y	104	227	J.Kiszka (OMM)
Humpback whale	Breeding Stock E2	2008 / winter - 76	Y	612	926	C. Garrigue (OCNC)
Indo-Pacific bottlenose dolphin	New Caledonia Pacific Ocean	2008/year round - 53	Y	53	69	M.Oremus (OCNC)
Spinner dolphin	New Caledonia Pacific Ocean	2008/year round -26	Y	26	34	M.Oremus (OCNC)

#### 4.2 Samples from directed catches (commercial, aboriginal and scientific permits) or by-catches

Samples from by-caught small cetaceans collected onboard fishing boats were collected in the course of by-catch monitoring programmes in pelagic trawl and gill- or trammel net fisheries (CRMM/ULR).

Species	Area/stock	Tissue type(s)	No. Collected	Archived (Y/N)	No. analysed	Contact person/institute
Short-beaked common dolphin	Bay of Biscay and Channel/Northeast Atlantic	Various*	6	Y	In progress	O.Van Canneyt (CRMM/ULR)
Harbour porpoise	Bay of Biscay and Channel/Northeast Atlantic	Various*	10	Y	In progress	O.Van Canneyt (CRMM/ULR)
Striped dolphin	Mediterranean	Various*	1	Y	In progress	O.Van Canneyt (CRMM/ULR)

\* typically: skin, blubber, teeth, stomach, muscle, kidney, liver, gonads

#### 4.3 Samples from stranded animals

Species	Area/stock	Tissue type	No. Collected	Archived (Y/N)	No. analysed	Contact person/institute
Cetaceans <sup>§</sup>	Bay of Biscay and Channel/Northeast Atlantic	Various*	129 <sup>§</sup>	Y	In progress	O.Van Canneyt (CRMM/ULR)
Harbour porpoise	Channel/ Northeast Atlantic	Various*	2	Y	In progress	GMN
Cetaceans	Mediterranean	Various*	150 <sup>\$\$</sup>	Y	In progress	F.Dhermain & F. Dupraz (GECM)
Cetaceans <sup>§</sup>	Guadeloupe/Caribbean	Various*	3 <sup>§</sup>	Y	In progress	C.&R.Rinaldi (AET) <sup>§</sup>
Cetaceans <sup>μ</sup>	Martinique/Caribbean	Various*	10 <sup>μ</sup>	N	In progress	S.Jérémie (SEPANMAR)
Humpback whale	Réunion	Bone, blubber	4	N	-	C. Jammes (GLOBICE)
Cetaceans <sup>#</sup>	New Caledonia Pacific Ocean	Various**	4	Y		C.Garrigue (OCNC)

\* typically: teeth or baleen plates, skin, blubber, muscle, reproductive organs, stomach contents, kidney, liver.

\*\* typically: muscle, teeth, stomach contents, skin, liver, kidney.

§ includes 1 fin w., 1 sperm w., 1 pygmy s. w., 4 Cuvier's b. w., 3 Sowerby's b. w., 2 Blainville's b. w. 3 long-finned pilot w., 2 short-finned pilot w., 1 melon-headed d., 1 Risso's d., 69 short-beaked common d., 3 common bottlenose d., 17 striped d., 21 harbour p.

\$\$ includes mostly striped d. and common bottlenose d., 1 Cuvier's b.w., 1 sperm w. and 1 minke w.

§ includes 1 melon head w., 1 spinner d., 1 common bottlenose d.; Guadeloupe Strandings Network

μ includes 1 Gervais's beaked w., 1 pygmy killer w., 1 Fraser's d., 1 Atlantic spotted d.

# includes 2 pygmy sperm whales, 2 dwarf sperm whales

#### 4.4 Analyses/development of techniques

Biological parameters (age, reproductive status, diet, ...) and ecological tracers (heavy metals, stable isotopes of N and C) analyses based on samples collected from stranded or by-caught animals are carried out to examine small cetacean population structure and ecology in the Bay of Biscay (LIENSs/ULR et CRMM/ULR) (Dabin *et al.*, 2008; Meynier *et al.*, 2008; Pusineri *et al.*, 2008; J. Spitz PhD, thesis on going). Tissue samples of common dolphin and harbour porpoise were provided for studies on population structure (Viricel *et al.*, 2008).

Trophic relationship of sperm whale, long-finned pilot whale, Risso's dolphin and their prey were inferred from stable isotope analysis (CRC, in collaboration with the University of Liege, Laboratory of Oceanology; Praca, 2008).

In Mayotte (OMM), trophic interactions between delphinids are investigated in collaboration with (LIENSs/ULR) by analysing stable isotopes (N and C) in biopsy samples. The same samples are also used for social structure analyses in Indo-Pacific bottlenose dolphins (J. Kiszka, PhD thesis).

Preliminary analyses on the genetic diversity of Indo-Pacific bottlenose dolphins and spinner dolphins in New Caledonia have been conducted at the University of Auckland by using markers of mitochondrial and nuclear DNA (OCNC, M. Oremus). The analyses will help to assess conservation status, local population structure and evolutionary history of the species.

### 5. POLLUTION STUDIES

The EU project BIO CET (2001-3), which focused on the causes and effects of pollution by organic contaminants in small cetaceans of the European Atlantic, stimulated further analyses well beyond formal completion of the project (Pierce *et al.*, 2008; LIENSs/ULR, P. Mendez-Fernandez, PhD Thesis).

Pollutants, trace metals and POP were analysed in biopsy of sperm whale, long-finned pilot whale and Risso's dolphin in collaboration with the University of Liege (CRC; Praca, 2008).

Analyses of organic pollutants (PCB, DDT, DDE, PBDE, HBCD, HAP) are in progress for fin whales biopsied in NW Mediterranean (écoOcéan Institut in partnership with WWF and LPTC, UMR 5255, University of

Bordeaux). Additional large Odontocete biopsies collected in 2008 will be analysed in collaboration with the University of Bordeaux (GIS3M, CRC).

Analyses of organic pollutants (PCB, DDT, DDE, PBDE, HBCD, HAP) and heavy metals are in progress for striped and bottlenose dolphin stranded in French Mediterranean (GECM in partnership with Pharmacology Faculty of Marseille).

Analyses of persistent organic pollutants (POPs) in killer whales from Crozet Archipelago were conducted and revealed that for the 11 individuals analysed toxic equivalent were below immunotoxicity and endocrine disruption threshold, but PCB concentrations exceeded some effect levels suggesting that organic contaminants cannot be ruled out as an additional threat to this declining population (Noel *et al.*, submitted).

## 6. STATISTICS FOR LARGE CETACEANS

### 6.1 Corrections to earlier years' statistics for large whales

None.

### 6.2 Direct catches of large whales (commercial, aboriginal and scientific permits) for the calendar year 2008

None.

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
N/A	N/A	N/A	0	0	0	0

### 6.3 Anthropogenic mortality of large whales for the calendar year 2008

#### 6.3.1 Observed or reported ship strikes of large whales (including non-fatal events)

Whale species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
Fin whale	U	1	23/05/08	Eastern English Channel	U	U	D	French Navy	O.Van Canneyt (CRMM/ULR)
Comments:									

#### 6.3.2 Fishery bycatch of large whales

None reported.

Whale species	Sex	No	Date	Location	Fate	Targeted fish species	Gear	How observed?	Source or contact
None reported	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Comments:									

## 7. STATISTICS FOR SMALL CETACEANS

### 7.1 Corrections to earlier years' statistics for small cetaceans

None.

### 7.2 Direct catches of small cetaceans for the calendar year 2008

None.

Species	Type of catch	Area/stock	Males	Females	Total landed	Struck and lost
N/A	N/A	N/A	0	0	0	0

### 7.3 Anthropogenic mortality of small cetaceans for the calendar year 2008

#### 7.3.1 Observed or reported ship strikes of small cetaceans (including non fatal events)

None reported.

Species	Sex	No.	Date	Location	Vessel type	Speed	Fate	How observed	Contact person/ institute and refs
N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

#### 7.3.2 Fishery bycatch of small cetaceans

Species	Sex	No.	Date	Location	Fate	Targeted fish species	Gear	How observed	Source or contact
Common dolphin	N/A	19	February, April, May, August	Bay of Biscay, English Channel	D	Seabass, bream,	PTM	V	O.Van Canneyt (CRMM/ULR)
Common dolphin	N/A	1	June	Celtic Sea	D	Monkfish	GTR	V	O.Van Canneyt (CRMM/ULR)
Common dolphin	N/A	2	January, April	Bay of Biscay	D	Sole, Pollack	GTR, GNS	V	O.Van Canneyt (CRMM/ULR)
Striped dolphin	N/A	3	January, April, September	Mediterranean	D	Anchovy	OTM	V	O.Van Canneyt (CRMM/ULR)
Striped dolphin	N/A	1	May	Bay of Biscay	D	Sole	GTR	V	O.Van Canneyt (CRMM/ULR)
Bottlenose dolphin	N/A	1	September	Mediterranean	D	Anchovy	OTM	V	O.Van Canneyt (CRMM/ULR)
Long-finned pilot whale	N/A	4	august	Bay of Biscay	D	Tuna	PTM	V	O.Van Canneyt (CRMM/ULR)
Harbour porpoise	N/A	7	January to December	Bay of Biscay	D	Pollack, Meagre, Sole, Monkfish	GNS,GTR	V	O.Van Canneyt (CRMM/ULR)
Harbour porpoise	N/A	3	June	Celtic sea	D	Monkfish, hake	GTR, GNS	V	O.Van Canneyt (CRMM/ULR)

Comments: only data from observer programme are given; stranded animals with unequivocal by-catch marks are not included; see table under section 8 for stranding data.

An observation program under the EU regulation 812/2004 started in July 2006 in France. Target fisheries include pelagic gears in Atlantic and Mediterranean waters and set nets in the Bay of Biscay.

An observation program (FilManCet) under the EU regulation 812/2004 started in November 2008 in France (English Channel) and will be targeting set net fisheries for the next 2 years.

When observing set netters primarily operating in the Bay of Biscay, some trips with observers extended into the Celtic sea or area VII. These areas were not scheduled in the sampling scheme; hence by-catch observed there cannot be raised to fleets. Extrapolation was achieved for areas and fleet segments planned for observation according to regulation (see Table below).

Regulation Fleet Segments	Observation effort	Cetacean estimated numbers				
	Days at sea with observers	Harbour porpoise	Common bottlenose dolphin	Long-finned pilot whale	Striped dolphin	Common dolphin
Pelagic trawls-single vessels (OTM) – boats length >= 15 meters ; ICESs areas VI, VII & VIII,	5	-	-	-	-	-
Pelagic trawls-single vessels (OTM) – boats length < 15 meters ; ICESs areas VI, VII & VIII	0	-	-	-		
Pelagic trawls-pair vessels (PTM) – all vessel lengths ; zones VI, VII & VIII	434	-	0	(90)	0	300
Pelagic trawls-single vessels (or pairs) – Méditerranéan Sea	173	-	35	-	70	
Set nets, mesh > 80mm – vessels length < 15 meters, area VIII	265	100	-	-	50	100
Set nets, mesh > 80mm – vessels length >= 15 meters, area VIII	217	250	-	-		0
<b>TOTAL</b>	<b>1094</b>	<b>350</b>	<b>35</b>	<b>(90)</b>	<b>120</b>	<b>400</b>

Brackets denote poor statistical significance due extrapolation from a single event.

Three large pelagic vessels were not included in the sampling plan as they land their catches in the Netherlands and are similar to vessels of the Dutch fleet; therefore by-catch rates from the Dutch fleet for 2007 should be raised to these 3 boats when data available.

It appears that the estimate of common dolphin by-catch in pelagic gears for 2008 is higher than for 2007, which in contrast was lower than estimated in the Petracet project (year 2005-2006). Most common dolphins were caught in the sea-bass fisheries.

Harbour porpoise were caught in ICES area VIII (Bay of Biscay) with set nets. By-catch rates seemed to be higher in area VIIIa than in area VIIIb. Several fisheries were concerned and by-catch might occur irrespective of target species and mesh size. This second estimate of by-catch for this gear and area is lower than the estimate of 2007. The annual report is made available at <http://www.ifremer.fr/docelec/doc/2008/rapport-4506.pdf>.

The fishing industry in northern Brittany (Area VIIe) contracted a scientific observer located in Paimpol to observe vessels from this harbour. This observation program is not directly under the EU regulation. Observation effort started in July 2007. In 2008, a total of 120 days at sea were observed in several seasonal fisheries; no cetacean by-catch was reported there. This information suggests that by-catch rate of harbour porpoise may vary according to areas across the English Channel.

Following the European project NECESSITY (completed in 2007), which dealt with the impact of pelagic trawls on cetacean populations (mainly common dolphins), mitigation experiments on common dolphin in the pelagic trawl fisheries were conducted by the fishing industry in 2008 with the acoustic deterrent CETASAVER, specially designed for use in trawls. After two years of experiments at sea, 130 tows with deterrent and 130 tows without showed a decrease of 70 % in by-catch (Morizur et al, 2008). The system is commercialized by iXSEA company.

The Iroise marine natural park in collaboration with Ifremer and LEMM have deployed three different models of acoustic deterrents (V02, Aquamark, DDD) in the gillnet fishery off west Brittany, for one year. By-catch rates observed on gillnets with and without deterrents were not significantly different.

Of 150 cetaceans found stranded along the French Mediterranean coast in 2008, 17 striped dolphins and 2 common bottlenose dolphins showed unequivocal by-catch marks (F. Dhermain/GECM).

## 8. STRANDINGS

The French stranding network is nationally coordinated by CRMM/ULR under an agreement with the Ministry in charge of the Environment. Local voluntary observers, generally under local supervision by various institutions or NGOs (AET, EPHE, GECM, GECC, GEFMA, GLOBICE, GMN, LEMM, OCEAMM, OCNC, SEPANMAR), have been trained to process stranded cetaceans (and pinnipeds) under a common standardized protocol. An annual synthesis of all strandings reported in France is produced by CRMM/ULR (Van Canneyt *et al.*, 2008).

In remote sectors of the coastline, notably in overseas territories where geographical constraints can be pregnant, the standard stranding reporting scheme may not be totally applicable and therefore reports are made more opportunistically; nonetheless periodic compilations are made and tissue samples collected (AET, CEBC, GLOBICE, OCNC, OMM, SEPANMAR).

Statistics of stranding for the coast of France in 2007 indicate a total number of 406 cetaceans reported (CRMM/ULR and all National Stranding Scheme field correspondents).

Stranded cetaceans found in overseas territories are available from AET, GLOBICE, OCNC, OMM and SEPANMAR.

Species	No. strandings	No. post mortems	Contact person(s)/ Institute(s)	Contact email address(es)
Cetaceans 2008/ French Atlantic	579 <sup>§</sup>	208	O. Van Canneyt (CRMM/ULR)	<a href="mailto:olivier.van-canneyt@univ-lr.fr">olivier.van-canneyt@univ-lr.fr</a>
Cetaceans 2008/ French Mediterranean	150 <sup>£</sup>	74	F. Dhermain (GECM)	<a href="mailto:frank.dhermain@wanadoo.fr">frank.dhermain@wanadoo.fr</a>
Cetaceans / Guadeloupe	3 <sup>#</sup>	-	C.&R. Rinaldi (AET)	<a href="mailto:evastropic@wanadoo.fr">evastropic@wanadoo.fr</a>
Cetaceans / Martinique	3 <sup>*</sup>	-	S. Jérémie (SEPANMAR and collaborators)	<a href="mailto:reseau_cetaces972@hotmail.com">reseau_cetaces972@hotmail.com</a>
Cetaceans/ Réunion	3	0	C. Jammes (GLOBICE)	<a href="mailto:globice@globice.org">globice@globice.org</a>
Cetaceans / New Caledonia	4	0	C. Garrigue (OCNC)	<a href="mailto:op.cetaces@lagoon.nc">op.cetaces@lagoon.nc</a>

§ include 17 unidentified small cetaceans, 4 fin w., 2 common minke w., 1 sperm w., 1 pygmy sperm w., 7 Cuvier's beaked w., 5 Sowerby's beaked w., 2 Blainville's b. w. 44 unid delphinids, 24 long-finned pilot w., 2 short-finned pilot w., 1 melon-headed d., 8 Risso's d., 20 common bottlenose d., 285 short-beaked common d., 42 striped d., 114 harbour p.

£ include 113 striped d., 10 common bottlenose d., 1 sperm w., 2 Cuviers's beaked w., 1 minke, 22 unid small delphinids

# include 1 melon headed w., 1 common bottlenose d., 1 spinner d.

\* include 1 sperm w., 1 dwarf sperm w., 1 spinner d.

## 9. OTHER STUDIES AND ANALYSES

### *Acoustics*

UTL has developed a patented method for real time tracking of whales by using passive acoustics with confidence ellipses of c.30 m (Glotin, et al., 2007) in the aim of studying behaviour in deep water without interfering with their environment: automatic labeling of the signal and extraction of features such as the speed, click energy and Inter-Click-Interval (<http://glotin.univ-tln.fr/PIMC/DEMO>).

GREC developed a computer aided and statistical method to classify whistles from different delphinid species. CRC and GIS3M placed an autonomous hydrophone on a buoy located 50km offshore from Nice, to record occurrence of acoustic signals fin, sperm and long-finned pilot whales, as well as Risso's and striped dolphins. This work is conducted in collaboration with *l'Océanografic* (Valencia, Spain), UTL, Oceanwide Science Institute and the *Boussole* program from CNRS.

SEPANMAR investigates cetacean distribution in relation to man-induced disturbances in the marine and coastal habitats by using acoustic monitoring approaches. Possible long term changes in humpback whale songs in response to ship traffic and reproductive events will be monitored. Feeding grounds range of pantropical spotted dolphins and sperm whales is studied to assess local impact of fisheries. Acoustic analyses are underway on humpback, sperm, dwarf sperm and melon-headed whales (SEPANMAR), in particular aiming at determining nyctemeral prey capture pattern in sperm whales.

In Madagascar (Ste Marie Island), UPS started a project whose 3 objectives were: humpback whale interactions (male/male, female/male, calf/female), humpback whale vocal repertoire, humpback whale recognition, identification and tracking, in collaboration with H. Glotin (UTL), P. White (University of Southampton) and *Megaptera* ([www.megaptera.org](http://www.megaptera.org)).

Acoustic analyses of humpback whale songs are carried out at University of Queensland in collaboration with OCNC (E. Garland PhD, supervised by M. Noad).

CEBC investigates seasonal occurrence, distribution and movements of large mysticetes, notably blue whale subspecies, in the Indian and Southern Oceans by analysing long term low frequency acoustic recordings.

### *Genetics*

Population structure of the short-beaked common dolphin in the Northeast Atlantic (Portugal to Scotland) was investigated by using mtDNA sequences and microsatellite markers (Mirimin *et al.*; Necessity final report). Genetic analysis (using microsatellites and mtDNA sequences) of a mass-stranded short-beaked common dolphin pod provided insights on group composition and social organization in this species in the north-eastern Atlantic (Viricel *et al.*, 2008). Current knowledge on population status of short-beaked common dolphins in the Northeast Atlantic was reviewed in a Report to ASCOBANS/HELCOM (Murphy *et al.*, 2008).

In NW Mediterranean, genetic analyses are conducted on biopsied sperm and long-finned pilot whale (CRC with NOAA Fisheries Service, La Jolla and CIRCE Spain). First analyses have been made on fin whale biopsies from



the Mediterranean and Atlantic seas regarding assessment of sex ratio and of polymorphism (écoOcéan Institut, in partnership with WWF and CIRAD).

OCNC carries out genetic studies on humpback whales in collaboration with the University of Auckland, NZ, and Oregon State University, USA, which include genetic diversity (mtDNA and nuclear markers), relatedness within sub-stock and between sub-stocks (genotyping of 17 loci) (Steel *et al.*, 2008, Albertson-Gibb, 2008). Preliminary analyses on the population structure of rough-toothed dolphins from the Society Archipelago, French Polynesia, were carried out based on genetic markers and photo-identification data (University of Auckland; Oremus, 2008). Genetic samples of short-finned pilot whales collected opportunistically in French Polynesia and New Caledonia (stranding and biopsy samples) were included in an analysis of the world-wide mtDNA phylogeography and diversity of this species (OCNC, University of Auckland; Oremus, 2008).

### *Ecology*

The ecology of small cetaceans in the Bay of Biscay is being investigated by using multiple approaches, both direct and indirect (LIENSs/ULR, CRMM/ULR, Ifremer). Distribution is studied yearly during a one month survey cruise (PELGAS: Ifremer small pelagic fish survey) during which cetacean sightings are collected along with several environmental data such as fish biomass, phytoplankton concentration and oceanographic characteristics. Stranding data provides information on diet (stomach content), trophic levels (stable isotopes) and subpopulation structure or movement pattern (stable isotopes, heavy metals and contaminants).

The impact of oceano-climatic changes on marine ecosystems and in particular on common dolphin abundance was investigated (MNHN/CMCB).

The spatial distribution of the striped dolphin in coastal waters of NW Mediterranean was studied in parallel to isotope analyses (Meissner, on going MSc, Univ Aberdeen, CRC, ULR, GREC, EcoOcean Institut). In the Ligurian Sea, seasonal densities of main cetacean species were estimated to quantify their biomass and their prey consumption (CRC).

The identification of cetacean priority habitats in the French EEZ of the Caribbean and off Guiana is underway for the designation of marine protected areas within pelagic waters under French jurisdiction in this region (CRMM/ULR, with AET and SEPANMAR). Evaluation of sperm whale feeding success and prey species inventory are underway off Guadeloupe (AET).

Focal follows dedicated to investigating habitat use and social organisation were conducted on spinner, pantropical spotted, Indo-Pacific bottlenose dolphins and melon-headed whales in Mayotte (OMM, ULR; Gross *et al.*, *in press*).

### *Conservation, management and education*

GECC manages a regional observer network and organises educative programs for sea users. A movie on cetaceans and ferries as platforms of opportunity, produced by Brittany Ferries and LEMM, was displayed onboard the ferries along with public conferences. A new exhibition on cetaceans was created by MNHN, Paris, in partnership with LEMM, of which an itinerant version will circulate in European institutions. Educational workshops for schools are proposed by LEMM. LEMM is involved in the management council of *Parc Naturel Marin d'Iroise* (west Brittany).

The detectability of large whales from high speed ferries and from other ferries has been investigated in the aim of reducing strike risk (EPHE and SDE). This work was conducted within the limits of the Pelagos sanctuary, northeastern Mediterranean, under a collaboration agreement with one of the main ferry companies operating from France mainland to Corsica. Another approach consists in training mariners and officers at *Ecole Nationale de la Marine Marchande* (National Shipping School). Finally, the project REPCET is designed as to develop a tool that will inform in real time all vessels steaming in the Pelagos sanctuary of the location of large whales reported by mariners themselves, so that they can adapt their route and speed accordingly. SDE produced a review about potential impacts of global change and greenhouse gas emissions on Mediterranean marine ecosystems and cetaceans. écoOcéan Institut produces educational programmes and tools for schools, professionals, lay public and ill children to introduce them to marine biodiversity, cetacean species and ecology, threats to cetaceans and their habitats and solutions proposed for the management of Marine Protected Area (PELAGOS sanctuary) as well as solutions that everybody can implement in his everyday life.

AET is involved in the French Caribbean whale sanctuary process, the Marine Mammal Action Plan (MMAP) UNEP CAR SPAW, the East Caribbean Cetacean Network (ECCN) and the CARIBwhale regional association. It also carries out studies on impacts of boats on whales to set up regulations in the purpose of the sanctuary (revising the code of conduct for whale watching) and performs educational programs for schools and public. AET has also been carrying out studies on marine traffic since 2005. BREACH is involved in the French Caribbean whale sanctuary process and recently in the project of *Parc Naturel Marin de Côte Vermeille* (NW

Mediterranean) working group, as well as in educational programs about Cetacean. In Martinique, SEPANMAR produces educational programmes toward professionals, schools and lay public concerning marine coastal biodiversity, water quality monitoring, ship strikes, acoustic disturbance, and more generally any management issue relevant to cetacean conservation.

GLOBICE runs educative programs for schools, local population, and sea users in Réunion. OMM is in charge of assessing the conservation status of marine mammals in Mayotte in order to contribute to improving current regulation.

OCNC (Schaffar and Garrigue) analysed data of a 3-year land-based research project investigating the potential effects of whale watching boats on the behaviour of humpback whales wintering in the southern lagoon of New Caledonia. Land based surveys were also conducted from July 13<sup>th</sup> – September 7<sup>th</sup> 2008 (N = 50 days) in order to collect theodolite data on interactions between humpback whales and boats and assess changes in the level of exposure of humpback whales to whale watching activities in the southern lagoon of New Caledonia, following the signature of a code of conduct by whale-watch tour operators. Compliance to the code of conduct was also investigated. OCNC, in collaboration with IFAW and SPREP, organised a workshop for whale and dolphin watching in the Pacific Islands. This workshop led to the creation of Pacific Islands regional guidelines for whale and dolphin watching.

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