Réseau National Echouages
(National Stranding Network)

MARINE MAMMAL STRANDING GUIDE

Monitoring of marine megafauna

Who is this guide for?

This guide is primarily intended for correspondents of the National Stranding Network (*Réseau National Échouages*, RNE). It describes the procedures to be followed for the scientific exploitation of strandings of marine mammals along the French coasts.

This guide is also intended to inform managers, communities and coastal authorities on the steps to take after the discovery of a stranded marine mammal, whether live or dead.

Stranded marine mammals must undergo a scientific examination, which requires training and authorization under the protected species regulations.

This guide is supplemented by a series of technical sheets intended for RNE correspondents that are provided during training. These sheets detail particular procedures to be followed and the protocols for data collection and sampling.
They are indicated in sections of this guide by the pictogram:

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Summary

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Context

“The discovery of a cetacean stranded on the coast has always aroused, in those who witness it, a feeling of astonishment sometimes mixed, when it is a large species, with an admiring fear of these «monsters» that populate the oceans.”

Dr Raymond Duguy, 1983

What is a stranding?

A marine mammal stranding is defined as an animal (cetacean, pinniped or sirenian) lying on the shore, dead or alive but unable to return to its natural habitat. Although it is normal to observe seals on land (for rest, reproduction, moult), a live individual is considered to be stranded if it cannot take to the open sea on its own (because it is too weak, injured, ill, etc.). There are also other cases discussed in this guide that may fall into the category of animals in distress whose survival depends on human intervention.

On French coasts, multiple strandings mainly involve small cetaceans (dolphins and harbour porpoises) and the principal cause of death along the Atlantic coast is usually linked to interactions with fishing activities.

In the Mediterranean, episodes of multiple strandings of striped dolphins are often due to epidemics (morbillivirus).

Are there different types of strandings?

INDIVIDUAL STRANDING

This type of stranding, also known as an isolated stranding, involves a single individual stranded independently of other individuals of its species or group. These strandings occur throughout the year. The causes are diverse and can be natural or anthropogenic. Individual stranding deaths constitute the background noise or the chronic level of strandings.

MULTIPLE STRANDING

These stranding events are characterized by the discovery of a large number of dead individuals, possibly belonging to several species, stranded over a short period of time (a few days to a few weeks) within a limited geographic area. The cause of death is generally the same for the individuals involved: natural (epidemic), environmental (algal toxin) or anthropogenic (incidental bycatch). These events make up stranding peaks that exceed the usual stranding numbers. They can also be called unusual or extreme mortality events.

MASS STRANDING

This is the simultaneous stranding of several live cetaceans, two or more excluding cow-calf pairs, belonging to the same species and the same social unit. Seals and baleen whales do not strand en masse. Mass strandings involve mainly gregarious odontocetes, cetaceans with strong social cohesion.

There have been cases where mass strandings have involved over a hundred individuals.
Mass strandings are rarer on our shores. One of the major events in France involved the live stranding of a group of 96 pilot whales on the Île d'Yeu (Vendée) in 1963.

Are there other situations that resemble a stranding?

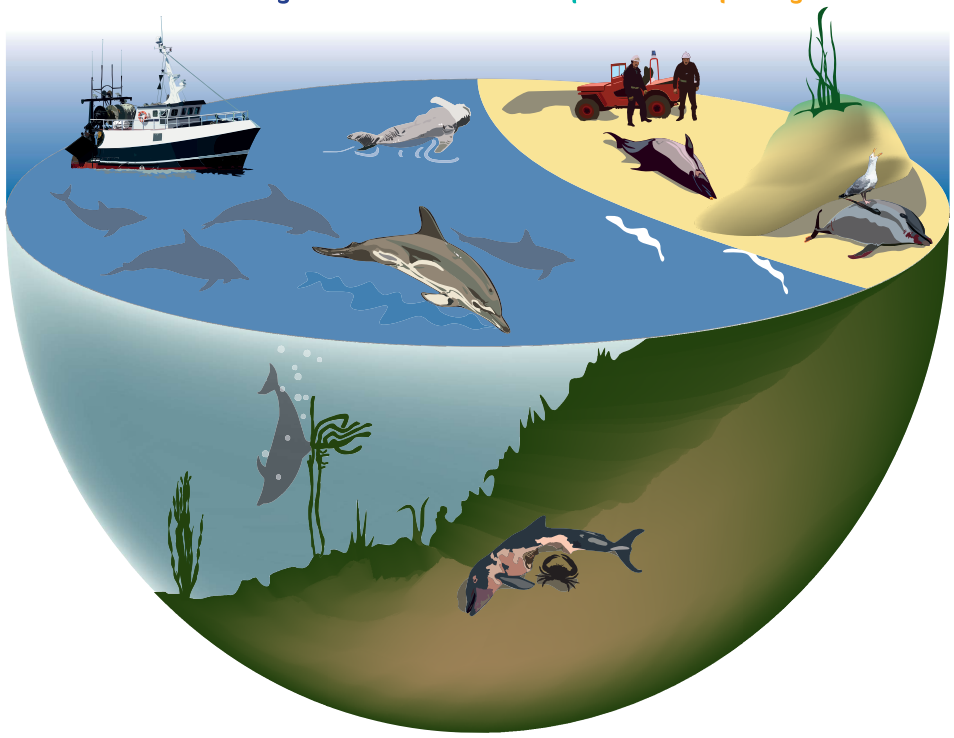
In other cases, an animal is considered to be in distress when human intervention can effectively resolve the situation and save the animal. These instances most often involve animals getting trapped in coastal developments (aquaculture, port, naval or industrial infrastructures) or entanglement in man-made installations or debris (fishing gear including netting, rope, line, or plastic materials such as strapping or tarpaulin).

The steps to follow in these situations are covered in this guide. These events must be reported and recorded in the same way as strandings in order to keep track of the trends.

Are there more strandings in winter due to wind?

Within the scientific community, studies based on marine mammal strandings have long been the subject of criticism for lack of knowledge on this subject. In scientific jargon, it is said that sampling is not controlled because strandings are unpredictable events that depend on several non-biological factors.
The data collection strategy for strandings is effectively based on reporting and not systematic beach prospecting. The latter exists effectively for seabirds along parts of the coast at certain times of the year, but it would be far too cumbersome to cover 5,000 km of coast throughout the year over the long term.
To demonstrate that strandings are indeed a reflection of a biological signal, another definition - presented in the form of an equation - reveals a combination of two components. The first component is biological, comprising the abundance and mortality of animals.
The second is non-biological, comprising the drift of the carcasses towards the shore and their reporting. These variables effectively constitute a bias that can be estimated and corrected for.
«Corrected» stranding numbers therefore reflect variations and trends in the biological component and the sampling is therefore well controlled. However, for most species, it remains difficult to estimate the part due to abundance and that due to mortality. More strandings occur in certain winters along the Atlantic coast, but this is either because there are more animals off our coast during that season, or because the mortality is higher, or a combination both.

Strandings = Abundance x Mortality x Drift x Reporting



The two **biological variables** are:
- the abundance of animals off our coasts,
- the mortality due to natural or anthropogenic causes.

The two **non-biological variables** are:
- carcass drift under the influence of wind, currents and the buoyancy of the carcass,
- the probability of strandings being reported.

left: isolated stranding of a striped dolphin in Charente-Maritime
top right: multiple stranding in the Landes
bottom right: mass stranding of short-finned pilot whales in the Antilles

What are the causes of strandings?

Why do they strand? Do they commit suicide? Is it pollution? ...

Suicide, of course not! Pollution contributes to strandings, but on our coasts most of the time it is not that either.

Many things could cause a stranding, before describing them we need to distinguish between live animals and dead ones.

What proportion of strandings involve live animals?

Only 5% of stranded cetaceans are found alive on our coasts. These live strandings mainly result from natural causes: a calf separated from its mother, senescence, disease, an accident related to topography and tide, etc.

Live seals found in difficulty represent around 50% of pinniped strandings. Over 90% of these cases involve young of the year either prematurely separated from their mother or unable to feed properly after weaning.

What are the causes of death revealed by strandings?

Carcasses of stranded seals and cetaceans are found in highly variable states of decomposition. In most cases the animals died at sea and drifted ashore, sometimes several days or even weeks prior to their discovery.

The causes of death are also diverse, we distinguish between natural, anthropogenic and environmental (dependent on the previous ones) causes.

NATURAL CAUSES

Natural causes include the vulnerability of certain categories (individuals that are young or old, and pregnant females); viral, bacterial or parasitic diseases; predation and inter- or intra-specific competition, etc..

ANTHROPOGENIC CAUSES

One of the main anthropogenic causes of small cetacean strandings on our coasts is undoubtedly incidental bycatch. Other causes include resource availability (collapses in stocks of prey species); ship strikes (large cetaceans in areas where maritime traffic is high); noise pollution (low frequency military sonar and industrial prospecting); plastic ingestion (<1% of cases for all species); acute chemical pollution: oil spills (mainly affecting seals); chronic chemical pollution (contributing factor to the development of diseases); etc.

ENVIRONMENTAL CAUSES

These include global climate change (difficult to verify); variations in oceanographic conditions (e.g. El Niño in the Pacific); major weather events (e.g. seal strandings associated with the 2013-14 winter storm series in the Atlantic); algal toxins; and, although less is known about them, geomagnetic disturbances and underwater earthquakes may play a role in strandings - particularly in mass strandings; etc.

stranded sperm whale in Corsica with propeller marks indicating death by collision with a vessel

What have we learned about the causes of death by monitoring strandings?

EPIDEMICS

The major epizootics that were detected have been due to the morbillivirus. Since 1990, this virus has repeatedly affected the population of striped dolphins in the western Mediterranean. A similar virus was responsible for the death of more than 50,000 seals in 1988 and 2002 in northern Europe.

The monitoring of strandings has also made it possible to highlight emerging diseases and zoonoses (diseases transmissible to humans) such as brucellosis.

FISHING

This human activity generates a major interaction with marine mammals and is notably linked to the peaks of multiple strandings of common dolphins (several hundred individuals).

These recurring peaks appeared at the end of the 1980s on the Atlantic coast. During these episodes, most of the animals examined (75%) showed obvious signs of incidental bycatch.

Observer programs aboard fishing vessels have revealed that pelagic trawl fishing targeting bass is one of the main causes of these acute deaths.

ENVIRONMENTAL CHANGES

The most striking example in recent years has been the increase in the abundance of harbour porpoises in French waters. The monitoring of strandings has contributed greatly to highlighting the change in the distribution of the species in European waters - a change that is most likely linked to changes in the availability of resources that would have caused them to move. Today we find that a large number of harbour porpoises stranded on our coasts died as a result of incidental bycatch.

The different causes of strandings

Natural causes:
vulnerable categories;
diseases; predation; etc.

Anthropogenic causes:
incidental bycatch;
overexploitation of fishery resources;
collisions; chemical, physical
or sound pollution; etc.

Environmental causes:
algal toxins;
climatic and oceanographic phenomena;
geomagnetic disturbances; etc.

Marine protected areas and strandings, what do they contribute to the protection of marine mammals?

By revealing the existence of certain anthropogenic pressures, the monitoring of strandings has led to management or mitigation measures being taken, such as in the case of incidental bycatch, collisions and underwater noise. Marine protected areas (MPAs) are also a major tool in the protection of habitats and marine species where direct and indirect impacts on these species can be limited by appropriate management measures.

MARINE PROTECTED AREAS

Among the different categories of MPAs in France, sanctuaries, marine natural parks and Natura 2000 sites at sea have specific actions with regard to marine mammals and their stranding. Two sanctuaries are dedicated to the protection of marine mammals: Pelagos in the Mediterranean and AGOA in the Antilles. Marine natural parks (*parcs naturels marins*, PNM) also play a major role in monitoring and preventing the pressures exerted on populations of marine mammals, such as the fight against the poaching of the last dugongs in Mayotte or the study of interactions between fishing and populations of marine mammals in the Iroise. The managers and workers of these MPAs are also often major contributors to stranding monitoring as part of their role.

INCIDENTAL BYCATCH

In Europe, multiple strandings of dolphins have revealed an abnormally high number of deaths resulting from incidental bycatch. Mitigation measures (repellents, hatches, etc.) have been tested and, as a result, European regulations have been established to limit cases of incidental bycatch, particularly in certain rigged net and pelagic trawl fisheries. On the north eastern coast of America, the stranding of common bottlenose dolphins identified in real time has a direct impact on reducing or even stopping dogfish fishing, which is known to be responsible for the incidental bycatch on this delphinid.

COLLISIONS

MPAs have implemented measures to raise awareness and prevent collisions, particularly in the western Mediterranean where 16 to 22% of stranded individuals are found to have died as a result of collisions. Across the Atlantic, vessel strikes are a direct threat to the last population of North Atlantic right whales, which comprises less than 500 individuals. This source of mortality, revealed by strandings, has led authorities to take measures to reduce the risk of collisions, including the modification of shipping routes and the reduction of the speed of large vessels.

UNDERWATER NOISE

Mitigation measures have been implemented increasingly often on military or seismic prospecting (industrial or scientific) vessels after massive strandings of beaked whales in particular (Greece, Bahamas, Canaries, etc.) revealed the direct impact of these human activities. The mapping and limitation of noise pollution are now integrated into the majority of MPA management plans.

left: a 19 m fin whale on the bulbous bow of a cargo ship in the port of Marseille

right: common dolphins bycaught by pelagic trawling

Observatory and citizen sciences

Can citizen science contribute to monitoring marine mammals?

The monitoring of marine mammal strandings is the principle environmental method of monitoring their populations in France and it is largely based on the concept of citizen science. This monitoring is mainly done by volunteers, or correspondents, of the National Stranding Network (RNE).

THE OBSERVATORY CONCEPT

Environmental monitoring centres, or observatories, are becoming more abundant in order to provide society with long-term monitoring of the state of biodiversity conservation. The activities of the RNE fall explicitly within this perspective.

The data provided by strandings have several decisive advantages. The major strengths of the RNE are essentially the large spatial and temporal extent of these data and the standardization of data collection. This for a relatively modest cost for such a long-term collection of data.
From these data, it is possible to produce indicators of relative abundance, distribution, health status and to assess the areas and causes of mortality of marine mammals. This is often a real challenge for long-lived, mobile top predators living in inaccessible habitats.

THE CONCEPT OF CITIZEN SCIENCE

The concept of citizen science, involving citizens in the acquisition of scientific knowledge, has only existed for a few decades. Citizen science programs offer everyone the opportunity to get involved and scientists are increasingly using this type of program, particularly in the context of large-scale data collection.

The RNE is probably one of the oldest and most structured citizen science programs for marine species in France. Established in the 1970s, it covers the entire coast (metropolitan France and overseas territories). It is made up of over 400 correspondents, the vast majority of whom are volunteers. This network is managed by a scientific coordinator and relies on local intermediaries.

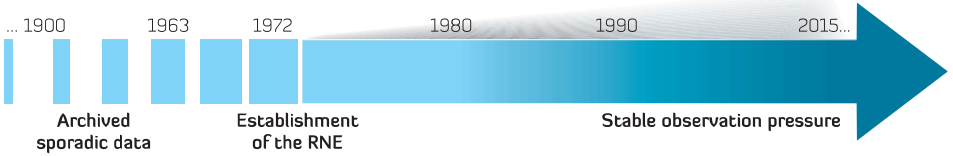
Can we obtain standardized scientific data on the scale of the French coasts?

To achieve scientific objectives while limiting cost, the monitoring of strandings over a large area and period of time can only be based on a network of volunteers. The scientific coordinator cannot singlehandedly see to the data collection across all the French coasts throughout the entire year.

The coordinator therefore determines the scientific orientation and programs, and the RNE correspondents are trained by specific establishments in the application of standard protocols, thus ensuring a high scientific value for the data collected.

training of RNE correspondents in the Antilles

The National Stranding Network



How did the idea for creating such a network come about in France?

Its creation originated from the stranding of nearly a hundred long-finned pilot whales on Île d'Yeu in December 1963.

This event aroused the interest of Dr Raymond Duguy (Natural History Museum of La Rochelle) and led him to create an observatory for marine mammals in France based on the census of strandings. In the 1970s and 1980s, from Dunkirk to Bonifacio, passionate volunteers gradually joined this national network of stranding monitoring, the objective of which was initially a naturalist vocation..

GOALS

The objectives of the National Stranding Network (RNE) have evolved over the decades. Today, it monitors the abundance, distribution and pressures (causes of mortality and health conditions) within populations of marine mammals, with conservation as the main objective. The RNE also permits the acquisition of biological material for study (biology, ecology, population structure).

The RNE has more than 400 correspondents spread across the entire French coast (metropolitan and overseas territories) and we consider the observation pressure to have been homogeneous since the early 1990s.

ITS ORGANIZATION

This network has historically been coordinated from La Rochelle, initially by the Museum of Natural History and today by the *Observatoire PELAGIS* (former Research Centre on Marine Mammals).

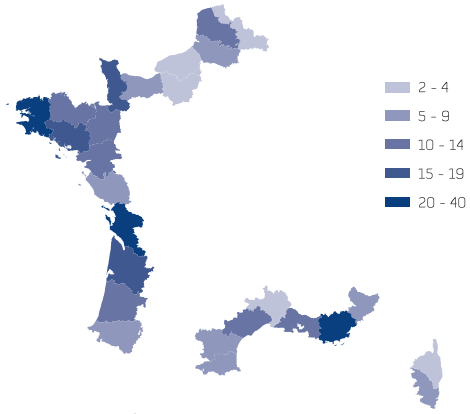
Correspondents of the RNE have access to a legal framework (authorization called a green card, this authorization is issued by the scientific coordinator and by a delegation from the Ministries of the environment and agriculture), a scientific framework (training and standard protocols), and feedback (annual summary, annual seminar, newsletter and website).

TO SUMMARIZE,
THE RNE IS A TRIPTYCH COMPOSED OF:

1 - the collection of data in the field by local correspondents and intermediaries,

2 - scientific coordination provided by *Observatoire PELAGIS* under the supervision of the Ministry responsible for the environment,

3 - governance provided by a monitoring committee (*comité de suivi*, CS) made up of around twenty members including correspondents of the RNE - reflecting the geographic and organizational diversity, as well as representatives from the scientific coordinators and supervisors. The main roles of this committee are the evaluation and validation of protocols, requests to use samples and new requests for authorization to intervene.



number of RNE correspondents by department in 2015

HOW IT WORKS

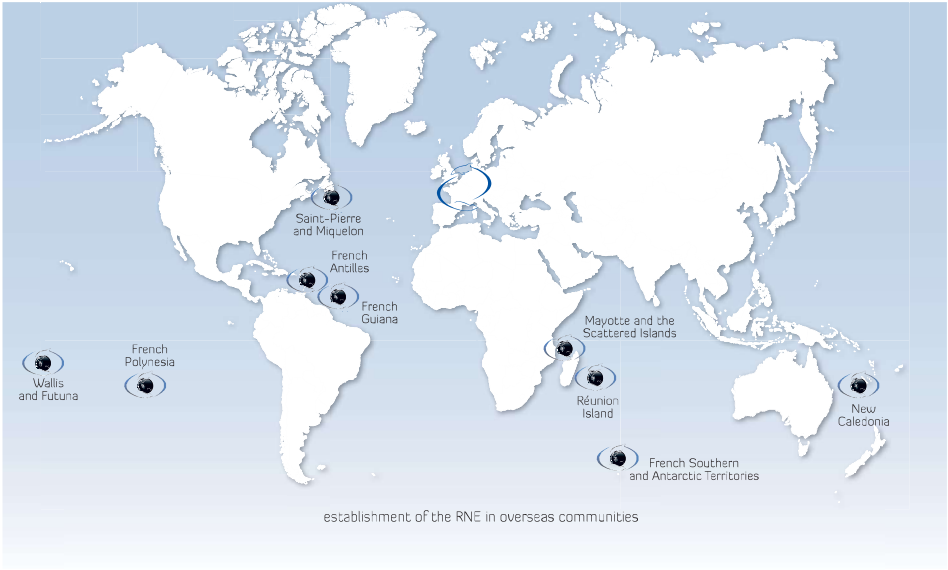
The workings of the RNE is specified in a charter that was established in order to define the role of each part (correspondents, scientific coordinator and monitoring committee) and to ensure the quality, traceability and accessibility of the data.

The charter also sets out the rules for the use and development of data and samples as well as the guidelines for the validation of authorization requests for intervention.

The centralization of data and samples is ensured by the scientific coordinator supported by local intermediaries, such as those in the Mediterranean and overseas. The stranding data is integrated into a national database that includes the records of over 20,000 strandings since the 1970s. Samples from these protected species are rare and difficult to obtain by other means, centralized sample banking and rigorous traceability are also offered.

Does the RNE exist overseas?

Local networks are also set up in most communities of the French overseas territories: in the French Antilles, French Guiana, Réunion Island, Mayotte and Saint Pierre and Miquelon; or are being set up, as in Wallis and Futuna, in New Caledonia and in French Polynesia. About fifty volunteers are in contact with the coordinator and apply the examination protocols provided within the framework of the RNE. In the French Southern and Antarctic Territories, overwintering biologists are also trained each year to apply the protocols of the RNE in the event of a stranding.



establishment of the RNE in overseas communities

short-finned pilot whale stranded in New Caledonia

Research and conservation

KNOWLEDGE BASE

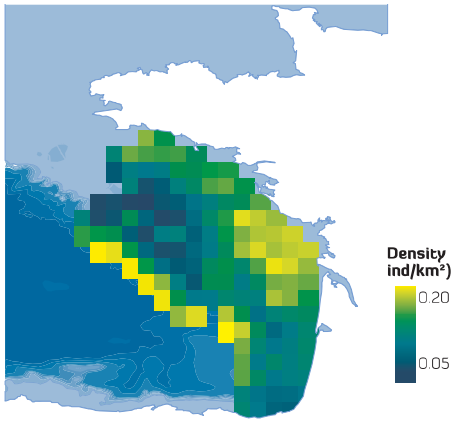
The National Stranding Network (RNE), as the main source of data and biological material for the study of marine mammals, is an essential support for scientific research and public conservation policies. Various community and international groups aim to assess the state of conservation and the pressures that impact marine mammals.

These include the Habitats Directive, the Marine Strategy Framework Directive and the Common Fisheries Policy, as well as regional conventions whose jurisdiction often extends beyond community waters (the OSPAR and Barcelona conventions, ASCOBANS and ACCOBAMS).

Do other systems exist for monitoring marine mammals in France?

The monitoring of marine mammals is based on a set of complementary monitoring systems. The Marine Strategy Framework Directive (MSFD) is the environmental pillar of the European Union's maritime policy. It establishes a framework for action in the field of marine environment policy and recommends an ecosystem approach aimed at maintaining or restoring biodiversity and preserving the functional relationships between species and their habitats. In real terms, the MSFD aims to achieve Good Environmental Status (GES) of the European marine environment by 2020. Eleven descriptors form the fabric of the multiple expertises on which its implementation by each of the member countries is based. Marine mammals are explicitly taken into account mainly within descriptors 1 (biodiversity), 4 (food webs), 8 (pollution), and 11 (noise and energy). The GES will be assessed through the MSFD Monitoring Programme.

The Monitoring Programme, adopted by interministerial decree in early 2015, is structured into 13 thematic programs, one of which is dedicated to marine mammals. This program is divided into 5 sub-programs: «Monitoring of coastal cetacean populations», «Monitoring of seal populations», «Monitoring of distribution and abundance at sea», «Monitoring of strandings» and «Monitoring of interactions with human activities ". The monitoring carried out by the RNE constitutes one of the essential links of the French strategy for monitoring populations of marine mammals and the MSFD gives it a strong responsibility in supporting public policies for the conservation of these species.



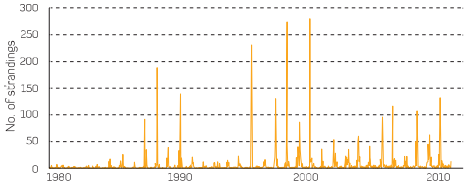
densities of common dolphins from observations made on fishing trips (PELGAS in spring)

What are the main parameters measured by means of strandings?

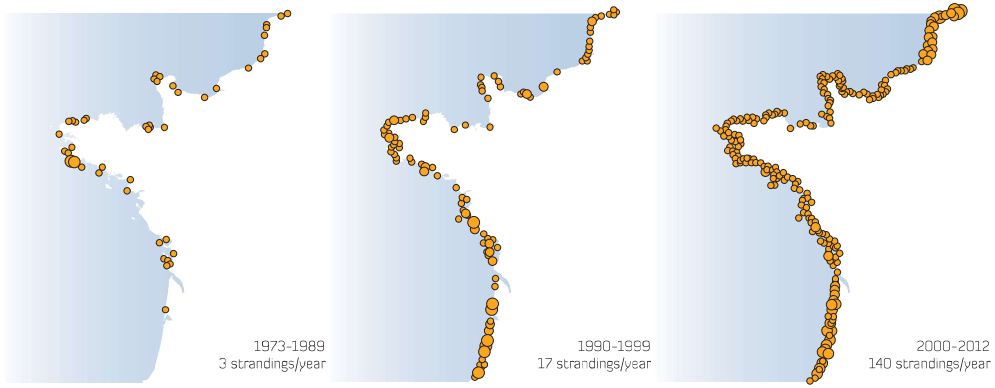
Strandings simultaneously provide dietary parameters and indicators of diversity, functioning, distribution, abundance and pressures.

SPATIAL AND TEMPORAL DISTRIBUTION

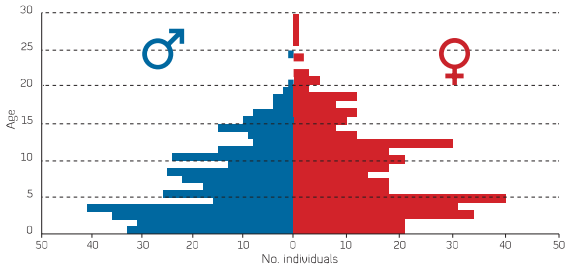
The continuous collection of stranding data on the French coast for over 40 years has provided a long time series that makes it possible to follow trends in stranding rates and highlight unusual events.
The most striking examples over the last 20 years are the sudden increase in strandings of harbour porpoises along the English Channel and the Atlantic coast and the stranding peaks observed in common dolphins in the Atlantic and striped dolphins in the Mediterranean..



temporal distribution of common dolphin strandings along the Atlantic coast



change in harbour porpoise stranding numbers between 1973 and 2012

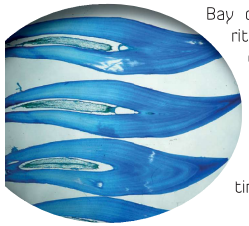


age pyramid of common dolphins

BIOLOGICAL AND ECOLOGICAL PARAMETERS

Strandings of marine mammals are the main source of biological samples for these species. The samples collected by the RNE are the source of much of the knowledge on the biology and ecology of marine mammals in France. The main parameters monitored provide information on population structure (genetics, age structure, reproductive status, etc.), foraging ecology (stomach contents, metallic and isotopic tracers, etc.) and health status (causes of mortality, contaminant levels, exposure to pathogens, etc.).

The teeth are used to determine the age of cetaceans and the examination of the gonads to determine reproductive status. Thus, for the common dolphin from the Bay of Biscay, the age of sexual maturity has been evaluated at 9 years, life expectancy at 35 years and the age structures for males and females are known today.



The analysis of stomach contents enables the determination of the animal's diet by identifying and counting undigested remains (otoliths and fish bones, cephalopod beaks, etc.).
Through the sampling of stomachs of stranded animals, the dietary preferences of the community of marine mammals in the French Atlantic waters are among the best documented among communities in the world, with around fifteen species studied. These results have provided evidence of the existence of food specializations, generally on a species level, as opposed to an opportunistic diet.

HEALTH STATUS

The state of health and cause of death are assessed during necropsies, as well as measuring the level of contaminants (metals, organic pollutants, etc.) in soft tissues like muscle, kidney or blubber. The examinations carried out on the common dolphins during the winter stranding peaks made it possible to identify that the extreme mortality was the result of incidental bycatch, while the concentrations of heavy metals remain low in the majority of cetaceans.

left: tooth sections of a common dolphin under the microscope

right: stomach contents of a common bottlenose dolphin

2

Procedures to follow

General framework

The procedures to be followed and protocols for data acquisition cover all species of marine mammals: cetaceans (whales, dolphins and porpoises), pinnipeds (seals and sea lions) and sirenians (dugongs and manatees).

For animals stranded dead, after an evaluation of the state of decomposition and size, and depending on the means available, an examination will be carried out by an RNE correspondent according to the standard protocol.

In the case of live animals in distress, human intervention can relieve the situation and save the animals. As soon as this is possible, appropriate procedures must be implemented, in conjunction with the scientific coordinator of the RNE.

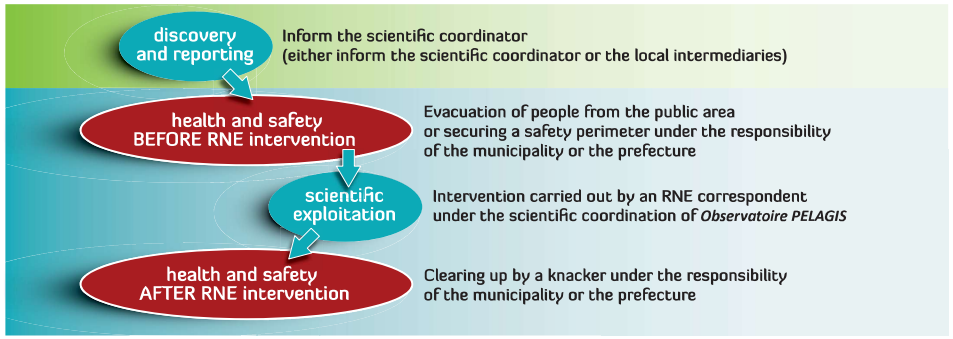
REPORT

The reporting of a stranded, drifting or distressed animal and its scientific exploitation are compulsory and must be systematic, even for a fragmentary carcass.

The regulatory procedure specifies that:
«*any marine mammal, found dead or in a situation of distress, must imperatively and immediately be brought to the attention of the scientific coordinator of the RNE (Observatoire PELAGIS) in order to arrange for intervention and scientific exploitation as soon as possible. It is essential that any carcass of a stranded marine mammal, even one in a very degraded state of decomposition, be subject to an examination by the RNE before its elimination, so as to take record of the stranding and to collect the data and samples necessary for fulfilling its mission of monitoring marine mammal populations.*»

COMMUNICATE

To facilitate the communication between the coordinator and the interveners, it is very important to note the initial facts that the informant can give when indicating a stranding, particularly the exact stranding site (municipality, location and landmarks on the shore) and its accessibility (sandy or rocky shore, tide level, etc.).
This information can be supplemented by the weather conditions observed, particularly in the case of a live animal. Finally, always ask the informants to take and send a photograph if they have a camera, and note their contact details, name and telephone number.



common dolphin stranded on a Vendée beach

Dead seals or small cetaceans

Strandings of dead seals and small cetaceans (less than 5 m in length) represent 95% of all strandings along our coasts. Every day of the year at least one stranding is reported to *Observatoire PELAGIS* and on certain days these reports can reach several tens.

PROTECT

For public health reasons and to prevent the carcass from being drawn back out to sea, evacuation of the carcass must be carried out by municipal technical services who need to be contacted as soon as possible.

If the stranding site is inaccessible to the municipality's technical services or the necessary means for evacuation aren't available, a perimeter should be secured around the carcass until the necessary means can be arranged.

Once evacuated, the animal will be placed in an isolated, fenced-off area that is accessible to the rendering service, preferably an area that is washable, such as a municipal workshop or depot, etc. Whenever possible, isolation and protection measures will be put in place for the comfort of municipal workers and residents, as well as for the conservation of the carcass: by placing the carcass in the shade, under a tarpaulin, in a room, in a freezer dedicated to wildlife, etc.

ACT

The scientific coordinator and the RNE's correspondents then have a legal period of 48 hours to intervene and organize the examination before the removal of the carcass by the rendering services. The level of detail of the examination depends on the state of decomposition, scientific interest, and the skills and means available.

Once the examination is done and samples have been taken, it is crucial that one single batch of biological waste (organs) in plastic bags and a hollowed-out carcass be left. If the animal has been examined directly on the beach or in a depot area where many stranded animals are found, each one should be identified by marking it, using tape for example.

ELIMINATE

Once the examination has been completed, the technical services of the municipality must be notified so that the carcass can be removed and disposed of by rendering. It is compulsory for animals found dead in a public domain (wild fauna or «without an owner») to be disposed of by rendering services for health and safety reasons. This is seen to by France Agrimer, a national establishment under the authority of the Ministry of Agriculture. The municipality can contact the Departmental Directorate for the Protection of Populations (veterinary services) to request the details of the designated rendering service in a given sector. Some exceptions to this rule may exist, either due to the absence of a local rendering service, or occasionally due to poor accessibility to the carcass on the shore.

left: safety perimeter around a harbour porpoise that washed up in Gironde

right: evacuation of a stranded common bottlenose dolphin in Guadeloupe

Live cetaceans

Intervention on a live stranded cetacean must follow a unique approach in order to optimize the animal's chances of survival while guaranteeing the safety of the responders.

RESCUE

The survival of a live stranded cetacean depends entirely on human intervention. Unlike for seals, there are no cetacean care centres in France. However, it is necessary to assess the condition and weight of the animal. The first priority is to take or request one or several photographs in order to accurately identify the species.

The preferred solution is to refloat the animal with the help of emergency services. Ideally, the animal should be refloated using a boat, provided that the stranding area is accessible, that the animal can be handled and that the sea conditions allow it.

This method allows for the animal to be moved further from the coastline (if possible, to beyond 1 nautical mile) and thus increases its chances of survival. The rescue of animals in distress is one of the roles of the fire department. However, this type of mission is not a priority and can only be carried out with the hierarchical agreement of the operational centre (SDISS or CODIS).

ACT, BUT NEVER ALONE

While waiting to mobilize the rescue means and services, the animal must be placed in a so-called comfort or waiting position. The coordination of rescue services is crucial to the success of the rescue operation. The coordination can be carried out by the scientific coordinator of the RNE, allowing the correspondent on site to focus on the comfort of the animal and the collection of basic information (species, length, sex, external examination).
A live cetacean is capable of sudden movements and reactions, a stressful situation will only worsen its already precarious state of health and jeopardize the chances of a successful rescue operation. In the case of an animal in a critical state, only a veterinarian is permitted to administer end of life care to the animal through euthanasia (concerted decision made between the veterinarian, the correspondent and the scientific coordinator).

Beware of the tail and of expulsions from the blowhole.

Never pull or lift the animal by its fins.

GOOD GESTURES

1-Ensure the vitality of the animal by checking the respiratory rate (1 to 3 breaths per minute, increases with stress), the state of consciousness (palpebral and anal reflexes) and the emission of vocalizations (decrease with stress).

2-Examine its body condition (flanks and back of the head hollowed out, protrusions of the ribs, etc.), the presence or absence of discharge by natural orifices and external trauma, the condition of the skin (cracking, peeling).

3-On the sand, position the animal on its stomach, taking care with the fins. Dig holes under the pectoral fins. On a harder substrate (rock, pebbles) the animal can temporarily be left on its flank or, better yet, be placed on a mattress, ground sheet or stretcher.

4-Keep the animal's skin moist and protect it from the sun using sheets or towels. Also protect the blowhole and the eyes from splashing water and sand.

5-Ask the interveners and the public present to speak in a low voice, to avoid sudden movements and to keep any pets away. Ideally you should ask the local authorities to maintain a safety perimeter around the animal.

6-Refloating with the aid of a boat is preferable. For a small cetacean, the use of human first aid equipment (stretcher, mattress, vacuum matress) can facilitate its transport. If the weight of the animal and the number of participants allow, lift the animal by placing hands under the head, the belly and the caudal peduncle, but never lift it by the fins. Gently lay the animal in the boat using a stretcher of preference and isolate the animal's body from the floor (using groundsheeting or towels). Keep it wet during the journey, which should be done at low speed (to limit noise and vibration).

7-If the conditions are not condusive to a rescue operation by boat, the animal can be immediately placed back in the water while waiting for high tide and helping it acclimatize to the surf. Another option is to transport it to a site more suitable for refloating by boat.

8-Once in the water, support the animal until it regains balance and the voluntary movements needed for it to breathe above the water and swim. This operation should only be done if the safety conditions are met, and should never be done alone.

All handling must be done with gloves.

acclimatization of a common dolphin in the rising tide

right: a live stranded common dolphin awaiting rescue
below: refloating of a common dolphin with the help of a boat

placing a striped dolphin in a waiting position and organizing its rescue

Live seals

ASSESS

Seals occur naturally along the coasts of the English Channel and the Atlantic Ocean. They use the littoral zone to rest, moult or reproduce. It is essential to assess their condition before capturing them. Unlike for cetaceans, there are five seal care centres in France (Nord-Pas-de-Calais, Picardy, Normandy, Brittany, and the Atlantic coast). The majority of the so-called "stranding" cases involve young grey seals (in winter), usually weaned pups, or young harbour seals (in summer), usually unweaned. Adult cases are rarer and often involve moribund animals for which intervention is more complex and the chances of survival more limited.

Newborn pups can be temporarily isolated and still benefit from their mother's care. It is therefore necessary to take time to study the environment and the behaviour of the animal before intervening. If the animal is truly in distress, intervention is necessary for their survival.

The course of intervention for a seal in distress depends on its general condition, of which the first criterion is its girth. It is possible to estimate the girth based on photographs taken when the animal is reported (private individual, emergency services, gendarmerie, etc.). Individuals in proven distress also appear weakened and have very little reaction to the approach of a human.

1-Alert young grey seal, appears to be healthy, resting on the beach while waiting for the next tide.

No intervention = observation

2-Young grey seal which may be in difficulty, in intermediate stage of distress, intervention is not urgent, the animal should be able to leave on its own after a period of rest on land.

No intervention but monitoring

3-Young grey seal that appears to be in difficulty whose survival depends on intervention by a care centre.

Intervention required

newborn grey seal (whitecoat) and harbour seal

INFORM AND COMMUNICATE

Reports of seals on our coasts are becoming more and more numerous and care centres have limited capacities which can be reached quickly. One of the roles of the RNE correspondent is to keep witnesses or emergency services well informed about the presence of seals on our shores and to limit interventions if the animal is not verifiably in distress.

It must be confirmed that the condition of the animal requires intervention (assessed by photographs and by asking the informant about the behaviour of the animal) and that a care centre can accommodate the animal. In all cases, communicate with the scientific coordinator of the RNE and the health centres before capturing the animal.

GOOD GESTURES

1-Determine the necessity of capturing the animal (photographs, behaviour), contact a care centre beforehand and organize the logistics of its transport to the centre.

2-Limit stress, capture the animal by applying rapid, precise and unhesitating gestures as best as possible in order to isolate it quickly in a preferably closed (but ventilated) box. In order to avoid bites, grey seals should preferably be caught just above the hind flippers and lifted while keeping your arms straight. A blanket can also be used to cover the animal's head when approaching.

3-Stay in contact with the care centre in case the animal's condition requires that they complete these first steps (hypothermia or severe dehydration for example).

4-While awaiting collection and during transport, isolate the animal from noise and light, place it at room temperature and in a dry place. Do not water it, do not try to feed it, and under no circumstances touch it.

Stay alert: a live seal, even an apathetic one, can bite.

below: harbour seal pup stranded in Baie de Somme

top right: young harbour seal being transported to a care centre

Health and Safety

RISKS OF CONTAMINATION FOR HUMANS

Microorganisms carried by marine mammals can be present in their saliva, expired air, blood, urine, faecal matter and in various organs. The usual routes of entry for potentially pathogenic biological agents harboured by animals are the ocular, respiratory and dermal routes.

DEAD ANIMALS

Rotting carcasses harbour an often larger but less pathogenic bacterial reservoir than live animals. Pathogenic microorganisms are effectively more demanding and stricter than those linked to putrefaction. The decrease in body temperature leads to the disappearance of many severe pathogens which generally develop between 35 and 39 °C.

LIVE ANIMALS

A live animal shelters an abundant microbial flora which, even if not pathogenic for itself, can become pathogenic for a manipulator under certain conditions.

Animals found stranded alive are most often animals that are dying, which have a high potential for transmission of severe pathogens. Added to that is the additional risk associated with biting or scratching inherent in the handling of a live animal under stress and this therefore creates a risk of transmission of microorganisms through injury.

All interveners must wear dedicated protective clothing, gloves and glasses. A mask is also strongly recommended. This personal protective equipment is absolutely essential when handling live animals. It is imperative that these instructions be communicated in the case of interventions by third parties such as private individuals, firefighters, maritime gendarmes or technical municipal agents.

Wear dedicated protective clothing, gloves and glasses.

RNE correspondent wearing protective gear during a common dolphin examination

Regulations

A SPECIFIC REGULATORY FRAMEWORK

All species of marine mammals are fully protected within the French territory as determined by the Ministerial Decree of July 1, 2011. This decree constitutes the main national provision for their protection. To allow scientific interventions by the RNE, an exemption is provided (Article R411-7 of the Environmental Code).

In 2015, a ministerial decree, relating to the implementation of the monitoring program of the action plan for the marine environment (application of the Marine Strategy Framework Directive — MSFD), fixed, among other things, the list of parameters to be monitored, including the number of strandings of marine mammals, the main causes of mortality and other parameters related to samples from strandings such as demography, health status, diet, contaminants, etc.

Since 2000, a ministerial decree has authorized the scientific coordinator of the RNE to carry out — for scientific analysis and rescue purposes — the capture, sampling, transport and use of specimens of all species of cetaceans, pinnipeds and sirenians found stranded along the entire coast of metropolitan France and in overseas departments and collectivities. Thus, the RNE's correspondents act under the cover of an authorization (known as a «green card») issued by the *Observatoire PELAGIS*, the terms of delivery of which are stipulated in the RNE Charter.

FROM SPECIES PROTECTION TO HEALTH PROTECTION

Since 1988, a ministerial circular has recognized the value of the observatory for monitoring marine mammal strandings and the organization of the RNE. It indicates that all strandings of marine mammals must be reported to the scientific coordinator who will organize the examination.

For health reasons, an article of the Rural Code (L226-1) governs the execution of the public rendering service. The elimination of wild animal carcasses constitutes a public service duty, the application of which is the responsibility of the municipality. Any carcass or portion thereof must be eliminated by rendering, except in cases of *force majeure* (extreme unforeseeable circumstances).

RESPONSIBILITY OF THE MAYOR

The mayor of the municipality concerned by the stranding must ensure that:

1- The carcass is evacuated from the public maritime domain.
2- The scientific coordinator of the RNE is notified in order to carry out the scientific examination.
3- Disposal is done by the public rendering service.

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reporting of a common bottlenose dolphin in the Landes

3

Recommandations for special cases

Stranding of a large dead cetacean

A LOGISTICAL CHALLENGE

Large cetaceans typically need to be cut up at the stranding site to allow for their evacuation. This type of operation is therefore an opportunity to take samples and must be coordinated by the RNE. These cases generally involve rorquals or sperm whales larger than 10 meters for which specific and heavy logistics are required (public works machinery). Strong coordination is required in advance to manage the evacuation and scientific exploitation, while respecting safety rules. Large whale strandings also tend to attract attention from the public and the media which require management to prevent risks and respond to questions.

ORGANIZE

It is necessary to take the time necessary to gather human and technical resources, define the role of each person, designate the spokesperson(s) and notify the appropriate authorities.

Human resources include both the correspondents of the RNE and several external stakeholders.

STAKEHOLDERS AND ROLES

1-Municipality, gendarmerie, police or fire department are responsible for the establishment of a safety perimeter as soon as the animal is discovered, as well as surveillance throughout evacuation operations.
2-Scientific coordinator of the RNE and the RNE's correspondents for scientific exploitation.
3-Departmental Directorate of Population Protection (DDPP) for the management of the evacuation by the rendering services, including the installation of skips allowing the immediate evacuation of the carcass.
4-Technical services of the municipality or beach cleaning services for the provision of equipment, mainly public works machinery. If the municipality does not have suitable equipment available, they can request support from the prefecture.

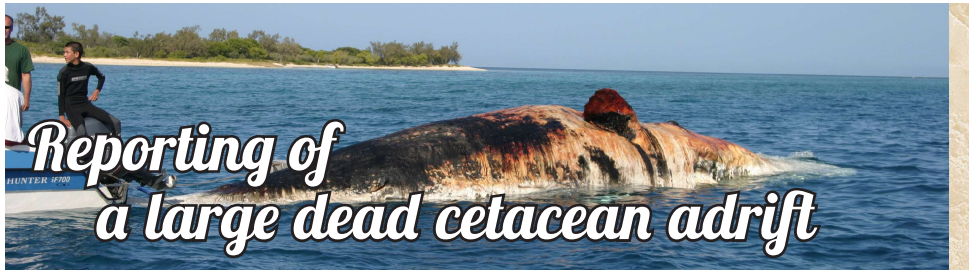
COORDINATE

The equipment and resources deployed depend on the state of the animal, its size and accessibility to the stranding site. The examination and collection of samples must be carried out when the carcass is being cut into pieces for disposal, all of which must be coordinated simultaneously. The opening of skin sections to access the organs is largely done manually to take samples according to the standard protocol.

The team, made up of RNE correspondents, remain committed to following the sampling protocol. Roles assigned include designated operators (who carry out the cutting, collecting and packaging samples) as well as a site coordinator responsible for establishing links with the external interveners, including machine operators. It is also recommended that a person be designated to respond to questions from the public and the media during the operations.

left: disposal of a fin whale carcass that washed up on the Atlantic shore

right: examination and sampling of a fin whale stranded in the Mediterranean



Reporting of a large dead cetacean adrift

All marine mammals (regardless of size) reported to be dead and adrift in territorial waters are to be recorded in the same way as strandings. Most of the time, identification is done based on photographs.

REPORT

Reports of large cetacean carcasses adrift from the centres for operational surveillance and rescue (*les centres opérationnels de surveillance et de sauvetage,* CROSS) are most often dealt with by the maritime prefecture. The maritime prefecture will make a judgement about the situation, particularly whether the carcass presents a danger to navigation, and they may decide that it should be eliminated. A drift simulation can also be carried out and the scientific coordinator of the RNE will be notified. Among the useful details, ask for photographs (species and state of decomposition), the approximate size, the date, time and position of the carcass at the time of reporting and, if possible, the stranding forecasts provided by the drift simulation model.
For many years when a carcass presented a danger to navigation, it was towed offshore and «blasted» by the French Navy. This method is being used less and less because of several drawbacks in terms of safety and environmental impact. It also has a high cost, prevents any scientific exploitation and only partially eliminates the carcass, with a high probability of the remaining chunks of the carcass washing up in areas several kilometres for the blasting site.

CONFER

When possible, the ideal situation is for the animal to be towed to a site where it can be treated as if it had stranded and be evacuated by the rendering services, usually a large port with suitable means (floating dock, hoisting machinery, etc.).
The decision to take this course of action needs to be confirmed by the maritime prefecture in consultation with the port authorities and the scientific coordinator of the RNE.

EXPERIMENTAL PROCEDURE

An alternative to blasting or rendering is the submersion of carcasses. This technique also requires significant logistical resources, but it has the advantage of preserving the ecological role of whale carcasses in the deep sea. This technique has been tested in the USA and in northern Europe and remains experimental at this stage. It could be proposed in the Mediterranean, while maintaining compliance with RNE examination protocols.

left: intervention by the French Navy on a fin whale carcass in the English Channel

right: sperm whale carcass found adrift and deposited on a quay, Port of Marseille

Stranding of a large live cetacean

ASSESS

The course of action to follow will depend on the size and weight of the animal, the accessibility to the stranding area, the weather conditions and the means available, particularly the nautical means. Above all, it is crucial that the scientific coordinator of the RNE be contacted in order to assess the situation and to apply the most appropriate course of action with proper support.

The first priority in all cases is the establishment and maintenance of a safety perimeter by local authorities in order to protect both humans and the animal. Stranded large cetaceans are still capable of unpredictable movements which present a real danger when approached.

MANAGE

In most of the cases treated by the RNE, stranded animals have died fairly quickly after discovery, even before the correspondent could intervene. Large whales are directly affected by the effects of their own mass, which causes irreversible damage to their organs.

Sperm whales or smaller baleen whales seem to be less prone to rapid death and can sometimes survive being stranded for hours or even days.

As in the case of small cetaceans, refloating the animal would be the preferred solution. However, this presents a logistical challenge that is rarely realistic, with very limited chances of success. It is therefore necessary to bring together expertises (scientific coordinator of the RNE, veterinarians and authorities) to make a reasonable recommendation as to what can be done.

If refloating proves to be impossible, the process of providing end-of-life care is complex. Given the size and weight of these animals, the usual substances used for euthanising an animal is rarely effective. Even if methods were proposed that may work, implementing them requires skills that are rarely available or easily mobilized in an emergency situation. The few cases managed by the RNE have resulted in securing the site and waiting.

Fin whale stranded live on a Gironde beach

Cetacean tangled in fishing gear

Entanglements of large cetaceans are reported more frequently overseas than in metropolitan France, particularly in the Antilles. Passive fishing gear (nets, trap lines, fish aggregating devices, etc.) or drifting gear, but also debris, can be the cause of these entanglements. Entanglements may restrict the movement of animals and sometimes cause severe lacerations that get infected. Without human intervention the chances of the animal surviving are often slim.

Releasing a large live cetacean from entanglement in the open sea is difficult and particularly dangerous for the intervenors. In the Antilles, where the most reports of this nature occur, the RNE's correspondents have undergone training provided by experts from the International Whaling Commission and they have special equipment particularly for this purpose.

PREPARE

The disentanglement procedure is summarized here for information only, it is technical and very dangerous for those involved. Remember that this type of intervention requires special training and specific equipment. One of the most important rules to follow is to never get in the water with the animal. Fatal accidents have been reported in other countries.

After the evaluation of the extent of entanglement and the means of available, the strategy for disentangling the animal can be put into action.

For intervention under the best possible safety conditions, the use of a small manoeuvrable pneumatic or semi-rigid boat is recommended when approaching the animal.

Personal protective equipment is also required, wearing of a helmet and a life jacket in particular are mandatory. In order to avoid all risks, it's preferable that the ties be cut at a distance from the boat using poles. In some cases, buoys may be used to slow the animal down and to keep it and the ties at the surface.

As in most special cases, it is essential to surround yourself with and gather resources and skills (RNE scientific coordinator, authorities, emergency services) in order to establish a plan of what can reasonably be undertaken.

Never get into the water with the animal!

example of a humpback whale entangled in fishing nets

Other cases of trapped marine mammals

SEALS ENTANGLED IN FISHING GEAR: DO WE NEED TO INTERVENE?

Observations of seals entangled in debris from fishing equipment (trawls, nets, ropes, etc.) are not uncommon and this entanglement reduces the seal's chance of survival. However, if the animal is not in a stranding situation, intervention is most often decided against, especially in the case of adults or subadults which are difficult to capture, handle and therefore treat. It should also be noted that the removal of an object severely encircling the animal's neck may be fatal.

OTHER TRAPS: WHAT TO DO?

Marine mammals can also become trapped by coastal developments, both seals and cetaceans. In this case, human intervention can relieve the situation.

The most frequent cases involve animals trapped in a water basin (port, marsh, canal, etc.) by the closing of a lock, for example. Cetaceans may also become trapped by shellfish infrastructures which form a barrier at ebb tide.

Several cases also arise from dams, such as the tidal power station at Rance (Ille-et-Vilaine).

Remember that if the animal is in open water, it will be very difficult to attempt to capture and move it, whether seal or cetacean. It is therefore preferable that the authorities be contacted, and the potential openings and release methods be studied, even if this takes several days. In open water, one possibility is to push the animal outward using one or more small manoeuvrable boats. Depending on the size of the basin, this manoeuvre is delicate because it can cause intense stress for the animal. It is necessary to act calmly.

If the animal is stranded or immobilized due to too shallow water (low tide), the response will be similar to the treatment of a live stranding.

Finally, some reports have mentioned animals «caught» in fish farms. Knowing that in this case the animal (often seals) got in on its own, it can sometimes come out on its own. However, to encourage it to leave, the primary action it to create openings (by opening the flap edges of the net several meters below the surface). Avoid any attempts to capture the animal because it is dangerous for both the animal and the responders.

Always act calmly!

left: grey seal entangled in fishing debris

bottom: common dolphin being evacuated from a shellfish farming are

Mass strandings

A mass stranding is defined as the simultaneous stranding of several living cetaceans, two or more, excluding a cow-calf pair. They occur on several scales depending on the number of individuals, their size, access to the stranding site and the environment (topography, tide, weather). Each case is therefore particular. Of those recorded by the RNE, mass strandings most often involve groups of small cetaceans with less than 10 individuals, except in a few exceptional cases.

SOME EXCEPTIONAL CASES

2001-3 sperm whales in the Landes
2002-150 common dolphins in the Côtes d'Armor
2003-41 short-finned pilot whales in Saint-Martin (Antilles)
2013-6 Longman's beaked whales in New Caledonia

Older:
1963-96 long-finned pilot whales on the Île d'Yeu in Vendée
1978-156 long-finned pilot whales in Saint Pierre and Miquelon

PREVENT

Mass strandings may be preceded by unusual sightings of groups of cetaceans near the coast. These observations may constitute warning signals and must be systematically reported to the authorities and local intermediaries of the RNE.

Actions can be implemented depending on the site (closed or open), species, topography and tide, weather, and of course the means available, particularly nautical means.

INTERVENE

When prevention is not possible, the RNE correspondents must come together and organize themselves. The most important thing is not to panic; to surround yourself with support: scientific coordinator and correspondents of the RNE, rescue organizations and possibly individuals present at the site; and to follow clear instructions for effective action. The ideal situation would be to have more rescuers than there are stranded animals.

As with any live cetacean stranding, returning the animals to open sea is recommended. Also, whenever possible arrange for the release of several individuals simultaneously. While waiting for conditions conducive to refloating (tide, weather, human resources and equipment), the animals should be put in the so-called comfort or waiting position (see the procedures to follow during strandings of live cetaceans).

Once again, good coordination is essential. For example, tasks can be delegated to several teams: one team can be in charge of protecting the animals, another in charge of transport and release, and another can see to maintaining the animals in the water.

OPERATE

It is common that at least some animals do not survive stranding. Mobilizing the RNE is thus also essential in order to ensure the scientific exploitation of the carcasses. The standard management and examination of a stranding must be applied, however, depending on the state of freshness of the animals and the number of individuals to be treated, it will be necessary to arrange that the work be done in teams.

The ideal would be to delegate the different activities to be carried out for the examination and to work in a workshop (referencing, biometrics, collection of samples and packaging).

mass stranding of short-finned pilot whales in Saint-Martin (Antilles)

4

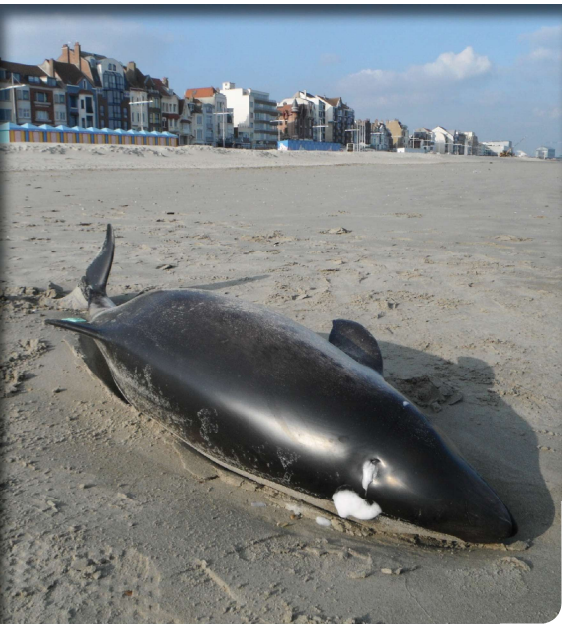
Data collection

How to complete the stranding sheet

This section is mainly intended for the RNE correspondent, it is a reminder of what is expected in terms of data collected using the stranding sheet. This sheet is used to transmit and archive descriptive data for all marine mammal strandings. All of the sections must be filled in carefully and in a standardized manner for each animal examined. It is also essential that the writing be legible.

The information gathered can then be entered on the form available online (access reserved for RNE correspondents). The paper form completed on site initially must however be kept.

For dead animals, data are collected according to standard protocols by trained and authorized RNE correspondents. The level of examination (biometrics, external exam, internal exam and collection of samples) will depend on the state of the animal, the level of training of the correspondent and the logistical means available (storage of samples for example).



LOCATION

Indicate the commune in which the stranding occurred as well as the department and the exact location of the stranding (name of the beach, place name or locality, or distance to a known place). In the case of a dead animal, the carcass is generally moved to a depot centre or municipal space before the intervention of the RNE. If this is the case, ask the informant for details of where the animal was found. You can also indicate the geographic coordinates of the stranding (latitude and longitude preferably in decimal degrees) using a GPS at the site or retrospectively using a mapping tool (e.g. Geoportail, Google Earth).

DATES

Note the date of observation, which is the day the intervention on the animal is carried out, samples are collected, and the stranding sheet is completed. This date field is compulsory.
Note the stranding date, which is the day the animal was initially reported, ask your informant.
Note the date of death only if it is precisely known, and do not attempt to estimate it. This date is known in the case of a live stranded animal that died consequently during the rescue operation or in a care centre.

CONDITION: LIVE or DEAD

If the animal stranded alive, check the relevant fate of the animal. The rescue operation is considered a success when the animal has set out to sea again without being seen again. In the event of natural death, specify whether it occurred before, during or after the attempted rescue. For live seals sent to a care centre, the dates and places of care to which the animal was sent must be indicated. Also fill in information such as weight and ring number.

If the animal had stranded dead, indicate the decomposition code (DCC).

DECOMPOSITION STATE

CRITERIA	SEAL	CETACEAN
Extremely fresh: (observed alive beforehand) Carcass not inflated Clear eyes Intact skin and mucous membranes --- Intact viscera Non-haemolyzed serum*		
DCC 1		
Fresh: (more than 48 hours after death) Carcass not inflated Lifeless eye Intact mucous membranes, possible peeling --- Intact viscera not distended by putrefaction gases Haemolyzed serum*		
DCC 2		
Slight decomposition: Inflated carcass Partial detachment of the skin Possible protrusion of the tongue and penis --- Viscera distended by putrefaction gases Slight organ degradation		
DCC 3		
Advanced decomposition: Oozing of fluid from body orifices Detachment of skin flaps on large surfaces --- Severe organ degradation (modification of colour, consistency, etc.) Some viscera not identifiable		
DCC 4		
Remains: fragmented carcass or mummification --- Absence of organs		
DCC 5		

* test on a blood sample to be carried out during an internal examination

isolated stranding of a harbour porpoise in the department of Nord

right: isolated stranding of a common bottlenose dolphin in Charente-Maritime

SPECIES

The determination of the species must be carried out systematically to the most precise taxonomic level possible taking into account the animal's state of decomposition (see chapter 5: Species identification).
On a carcass with DCC 3 to 5 (see DCC table p 39), the pigmentation is usually only barely visible or not visible at all, in this case the species will need to be identified according to the dental formula, morphology, size of the animal, or the bones.
If in doubt, circle the word "probable".
In all cases, photographs should be taken according to the instructions given in the next section (p 44).

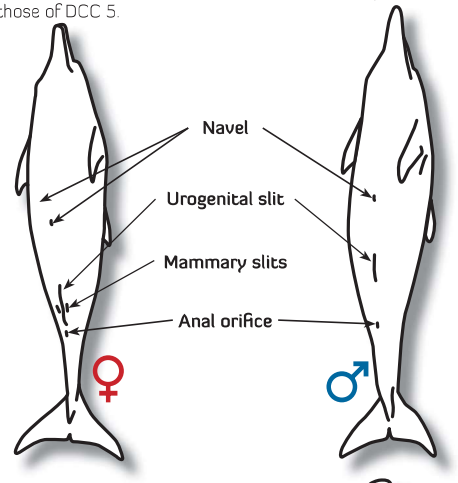
SEX

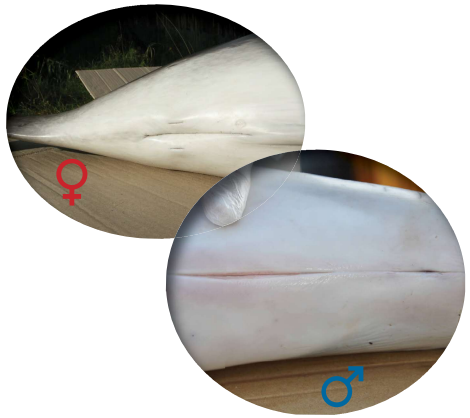
Determining the sex is done systematically. It is a delicate task in animals with DCC 3 or 4 and often impossible in those of DCC 5.

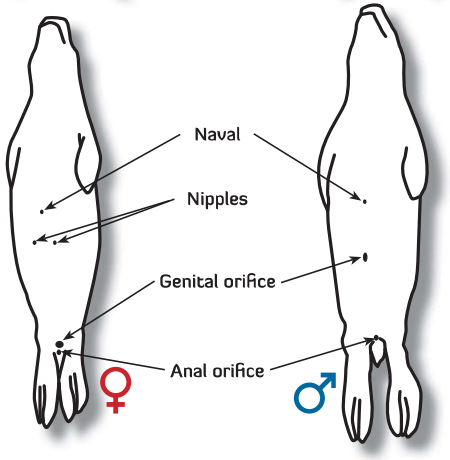
Cetaceans: for females, the anal orifice is adjacent to the urogenital slit, with the mammary slits located on either side. For males, the genitals are contained within the abdominal cavity. The anal slit and the urogenital slit are clearly separated. Protrusion of the penis may be observed depending on the condition and in certain species, such as rorquals and beaked whales, mammary slits may be present in males. In juveniles, be careful not to confuse the navel with the genital orifice.

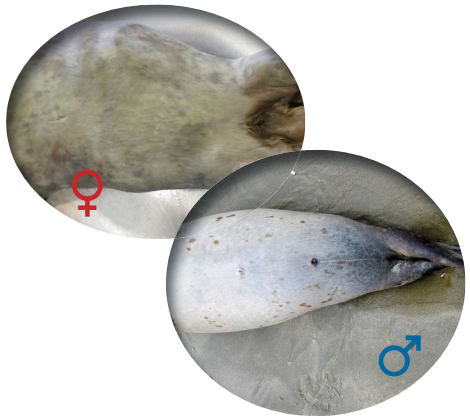
Seals: for females, the genital orifice is adjacent to the anus and is located between the hind legs.

In adults, two nipples are present that are barely visible under the fur. For males, the genital orifice is located about halfway between the navel and the anus. Do not confuse a female's navel with a male genital orifice.





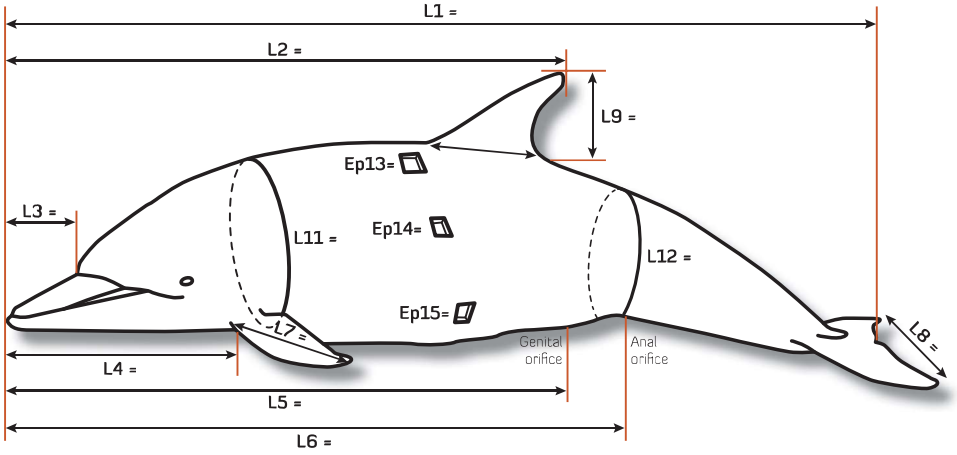




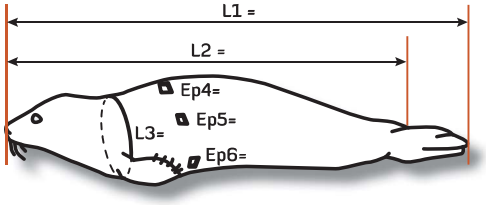
BIOMETRY

All measurements are taken by positioning the animal as straight as possible, placing the measuring tape on the ground parallel to the carcass and using perpendicular transfers.
The lengths (L) are noted in centimetres while the blubber thickness (Ep) is noted in millimetres.

Cetaceans: the total length of the animal (L1) is measured from the tip of the rostrum to the notch of the caudal fin. If the carcass is in fragments, the measurement is given along with an indication that this value is approximate. The fragments missing from the carcass are to be shaded or cross-hatched. Measurements L5 and L6 are to be taken from the tip of the rostrum to the genital orifice and to the anal orifice respectively, measuring to the orifices themselves and not to the centre of the slits. The circumferences and blubber thicknesses are recorded only for animals with DCC 1 to 3.



Seals: the total length of the animal (L1) is measured from the end of the head to the end of the flippers. If the carcass is in fragments, the measurement is given while indicating that this value is approximate. The fragments missing from the carcass are to be shaded or cross-hatched.
Length L2 is to be measured from the head to the end of the tail. The circumference and the blubber thicknesses are recorded only for animals with DCC 1 to 3.



Also indicate the number of teeth and/or sockets, or baleen, per half-jaw in the field provided for this purpose. This data is essential to confirm the species identification, especially when the animal is in an advanced state of decomposition. Finally, if you can, record the actual weight. The technical services or analysis laboratories should have scales. In some cases, the estimated weight can be evaluated in order to adapt the means needed for evacuating the carcass. For large cetaceans, the weight can be provided by the rendering services.

EXTERNAL EXAM

The determination of the species, sex and decomposition code (DCC) as well as the measurement of biometrics constitute the first steps of the external examination of a stranded animal. In order to provide indicators of the state of health and possibly causes of mortality, this examination may be supplemented by a description of the general condition, injuries, lesions and visible marks on the animal's body.

Firstly, observations of the protrusion of bones provides evidence of malnutrition. Then, preferably before any manipulation, it is necessary to locate and photograph, with a metric unit for scale, all the wounds, lesions and markings observed on the animal. It is important to study these marks carefully and to identify their origin: stranding, scavenger, putrefaction, transport, disease, incidental bycatch, collision, etc.

It is therefore important to focus on differentiating between ante-mortem and post-mortem wounds. When an injury is inflicted before death, there will be signs of inflammation, haemorrhaging and oedema in the surrounding tissues.

Care must be taken during examination because injuries are usually numerous on a stranded animal, but their origin is often post-mortem.

It is essential to complete the external examination using the standardized terms defined in the technical sheets for the description of injuries, lesions and marks.

Marks caused by incidental bycatch and scavengers

Marks caused by incidental bycatch

Social bites

Pathological lesion

Pathological lesions

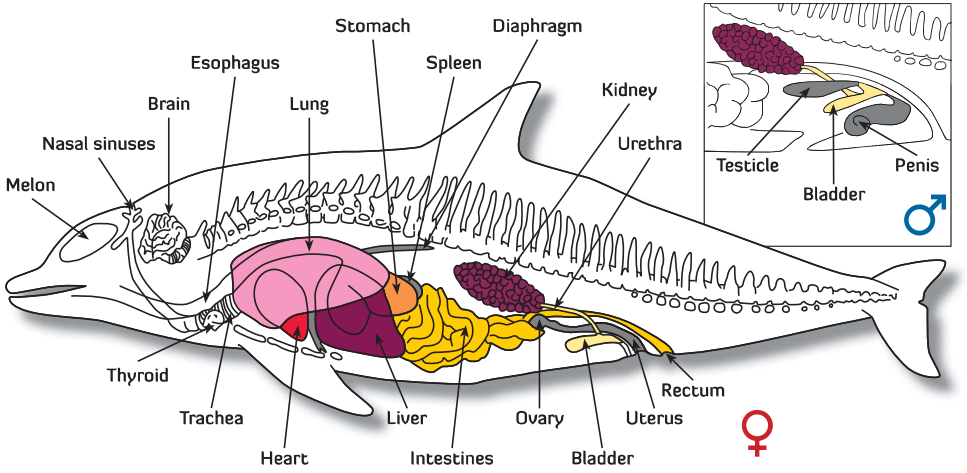
Predation

weighing a harbour porpoise of 35 kg

INTERNAL EXAM

The purpose of the internal exam is to assess the animal's state of health and the cause of death by examining the internal organs. This requires the opening of the thoracic and abdominal cavities at a minimum. Internal examinations can only be performed on fresh carcasses. Depending on the species, the state of freshness and the circumstances of the stranding, the internal examination may be supplemented with that of the head, particularly that of the inner ear, for which there is a specific protocol for extraction and preservation.

From the internal examination, a description of the lesions observed is expected. Each organ must be examined one after the other and any lesion must be described by its location, size, extension, appearance, colour and shade. All these parameters will then be compared with the normal tissue adjacent to it. The description of the lesional table, its interpretation and the evocation of diagnostic hypotheses require skills in veterinary pathology. During the internal examination, the standard sampling protocol (kidney, liver, stomach, gonads, etc.) for determining the ecological and bio-demographic parameters will be applied and may be supplemented by samples intended to refine the diagnosis.



anatomy of a small cetacean

NOTES, INTERVENORS AND INTERVENTION REPORT

If necessary, detail the circumstances and history of the stranding, for example in the case of a live stranding, the rescue attempts made, the people and organizations involved in the operation, the care provided by the veterinarian, their name, etc.

This is very important for subsequent communication (to thank them, for health monitoring after the stranding, etc.). Finally, do not hesitate to write down any information you think would be useful.

If applicable, check the boxes corresponding to the taking of photographs, external exam, internal exam, samples and an examination report.

INFORMANT and CORRESPONDENT

Note the names of the person(s) and/or organization(s) that reported the stranding to the RNE (individual, rescue centre, town council, gendarmerie, etc.) as well as the names and affiliations of the RNE correspondents involved in the stranding (association name, ONCFS, aquarium, etc.).

Submit the stranding sheet as soon as possible.

internal exam of a harbour porpoise

Instructions for photographs

NORMALIZE

Whether the animal is alive or dead, photographs are essential to confirm the species and the decomposition code, to verify the indicators of causes of mortality (marks, injuries, pathological lesions, etc.) and also to evaluate its physical condition based on its girth.

Photographs must therefore be taken systematically, taking care to capture images from useful viewing angles with proper framing. In certain cases, it is necessary to clean the carcass in order to distinguish the pigmentation and marks.

STANDARDIZE

It is important to take standard shots.
For example, on a fresh and easily manipulated carcass, a minimum of six pictures must be taken and, if necessary, supplemented with photos of the marks and lesions present on the animal's body.

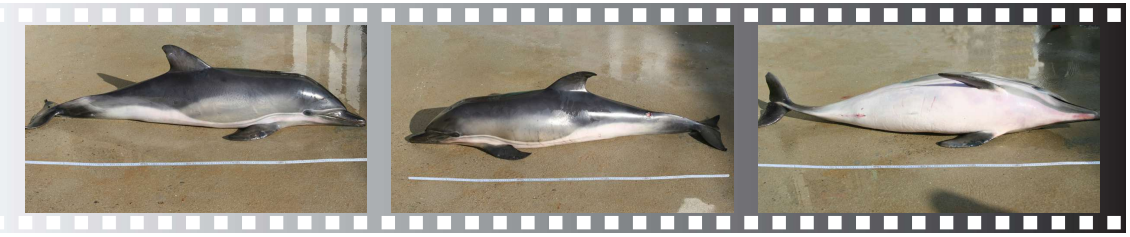
Similarly, during the internal examination, photographs can help with the diagnosis (malformation, necrosis, disease, parasites, foreign bodies, etc.). A unit of measurement should be placed in each shot to indicate the size of the lesions.

In the case of carcasses with an advanced state of decomposition for which species identification is difficult, photographs of the skull (top and bottom view), fins, vertebrae or other bony parts are useful to identify the species.

PHOTO-IDENTIFICATION

Certain coastal species are monitored by photo-identification, mainly the common bottlenose dolphin (Normandy, Brittany, Mediterranean) and the grey seal (Manche). In order to compare individuals with the catalogs, consider taking additional photographs:

- both sides of the dorsal fin for a cetacean, preferably on a white background,
- the head and neck of each profile for a seal, preferably with the fur wet.



series of 6 standard shots to take during a stranding

Collection of samples

Strandings represent the main source of samples, the analysis of which serve several purposes. Collected in a standardized way, they contribute to the monitoring of ecological, health and biodemographic parameters of the populations. By sampling according to the lesions observed during an internal examination, they also help to determine the cause of death.

It is necessary to separate the examination from the collecting of samples. As a matter of fact, samples of internal organs can be removed without a thorough examination of their condition. The objective is to contribute to the biological sample bank dedicated to the determination of ecological (diet, tracers) or demographic (reproductive status) parameters. Likewise, an external examination of visible marks and lesions on the animal's body can be carried out without taking samples.

The level of examination as well as the level of sampling are defined according to the species and the state of decomposition of the animal, the training and skills of the correspondents, and the means of sampling, preparation and storage available (autopsy room, freezer, etc.).

When collecting samples, standard protocols can be applied ranging from simple tooth sampling, which can be done regardless of the state of decomposition, to a sampling of all major organs (stomach, gonads, kidney, liver, muscle, blubber, etc.). In all cases, do not hesitate to contact the scientific coordinator of the RNE to assess the level of sampling that can be done, particularly according to skill requirements.

	DCC	1	2	3	4	5
Examination	Species	x	x	x	x	x
	Sex	x	x	x	(x)	(x)
	Biometry – length	x	x	x	(x)	
	Biometry – circumference / blubber thickness	x	x	(x)		
	External exam of signs/marks/lesions	x	x	x	(x)	
	Internal exam*	x	x			
Sampling	Teeth	x	x	x	x	x
	Skin (+ blubber)	x	x	x	x	
	Gonads	x	x	x	x	
	Stomach	x	x	x	x	
	Blubber/muscle/liver/kidney	x	x	x		
	Other organs (spleen, lung, etc.)*	x	x			

*Examination and sampling for the purpose of determining the causes of death.

levels of examination and sampling according to the state of decomposition

samples prepared during the stranding of a large cetacean

TRACEABILITY OF SAMPLES

Any animal subject to sampling must be identified by a unique reference which will be reported on each sample as well as on the sampling and stranding sheets. This point is extremely important in order to ensure proper traceability of the batch of samples.

To avoid the loss of labels or erasing of the reference: double wrap the samples intended for freezing; note the reference on the label (pencil) and on the bag (permanent marker); include a copy of the stranding sheet with the batch of samples.

Each sample must be marked with a legible and standardized reference.

Reference example: 17 - FP - 12/02 /15 - Dd - F/03 - liver

In Charente-Maritime (17), François Pignon (FP) worked on 12 February 2015 (12/02/2015) on a common dolphin (Dd for Delphinus *delphis*) female (F), this is his third stranding for the year (/03) and the sample enclosed is of the liver.

STORAGE AND CENTRALIZATION OF SAMPLES

Samples taken in the field require storage dedicated to this purpose in order to ensure proper hygiene and safety. A network of freezers has been set up in a large number of regions and continues to be developed. Regardless of the means of conservation, whether freezing or other, records of entries and exits must be kept up to date for the traceability of samples.

The majority of analyses (ecological and demographic parameters) are not carried out one at a time and require a prior inventory of the collections available.

As a matter of fact, the laboratory analysis strategy depends on the species and the number of samples available. It is also dictated by the prioritization of scientific and conservation questions being considered.

The samples are periodically centralized at the *Observatoire PELAGIS* facilities, by refrigerated transport or during trips made by the RNE correspondents. The authorization issued to correspondents covers temporary storage and transport for analysis purposes within French territory. For overseas territories, the transport of samples requires specific authorizations in accordance with regulations.

top: batch of sample bags, with standard references, prepared before the dissection of a common dolphin

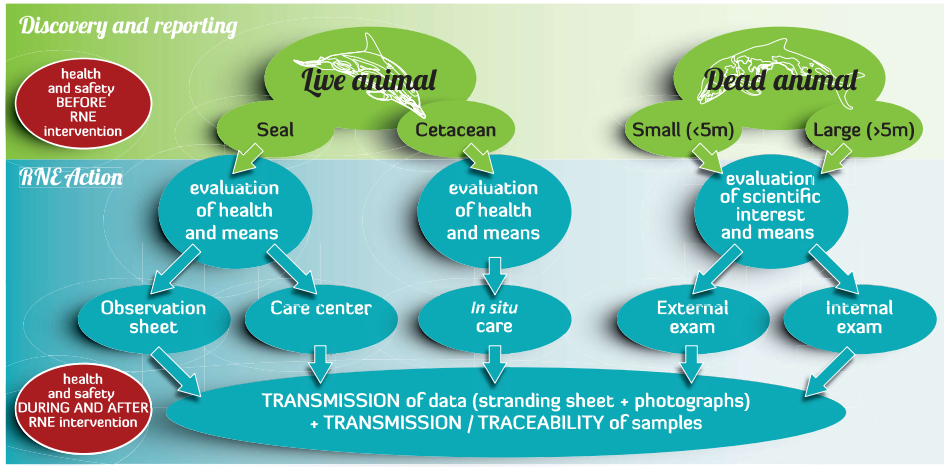
CONFER

The success of an intervention lies in the coordination of resources and the pooling of skills. It is very important not to act alone, to remain in communication with the scientific coordinator and to request the services of the communes or emergency services. Haste is not a good ally, we must take the time to explain or recall the objectives of the intervention and the role expected of each person.
And since each case is different, it is also necessary to be adaptatable and show common sense but always in a spirit of cooperation.

TRANSMIT

The success of the scientific exploitation of a stranding also depends on respecting the procedures and standard protocols to be followed, on rigorous data collection and on the proper traceability of samples.

Finally, do not forget that the results of an intervention can be totally lost if the data is not correctly transmitted to the scientific coordinator who will ensure the banking, analysis and restitution thereof.



SUMMARY OF NECESSARY MATERIAL (not exhaustive)

The essentials are a stranding sheet, a pencil, a rigid ruler and a tape measure, as well as a camera.

For health and safety, wear dedicated protective clothing, disposable gloves, glasses and a face mask. Alcohol based hand sanitizer and a first aid kit are also essential.

For collection of samples, the equipment will be completed with knives (a carving knife with a 15 cm blade and an oyster knife), pruning shears and sample packaging materials. Garbage bags can be used for bulky samples (stomach), for biological waste intended for rendering and to transport soiled materials.

Intervention on a live seal requires gloves that protect against bites (heat resistant type gloves: thick with an oversleeve), a covering, and a transport case of suitable size (L100 x W80 x H70).

Intervention on a live cetacean cetacean requires sheets, a bucket, groundsheeting and a soft stretcher or tarpaulin.

5

Species identification

Means of identification

Species identification is based on different criteria depending on the state of the carcass. If it has been well conserved, the size, the shape of the body, head and fins, the presence of a rostrum and the pigmentation are enough to confirm the species.

In the case of a very degraded carcass, the identification of the species is more complex. It is based on the examination of the skull and particularly counting the number of teeth (or sockets if the teeth have fallen out). The colour and number of baleen in baleen whales can also help identify the species.

For a fragmentary carcass, particularly one without a skull, a more general taxonomic level will be indicated. Indicate «delphinid», for example, if it cannot be distinguished whether it is a common dolphin, a striped dolphin or a common bottlenose dolphin, and «small odontocete» if there are no criteria by which to differentiate these dolphin species from a harbour porpoise.

Species identification by DNA barcoding could also complete the description noted in the field. These genetic analyses can be performed on any tissue sample that is properly prepared.

Common bottlenose dolphin | Common dolphin | Striped dolphin | Harbour porpoise

series of skulls, taken of the ventral side in order to see the identification criteria

Metropolitan species

The list presented here corresponds to the species counted in metropolitan France, most of which can also be observed overseas.

A total of 32 species of marine mammals have been recorded during strandings in metropolitan France.

However, more than 95% of strandings are represented by only 8 species (common dolphin, striped dolphin, common bottlenose dolphin, harbour porpoise, long-finned pilot whale, Risso's dolphin, grey seal and harbour seal), while the other 24 species represent only 5% of strandings.

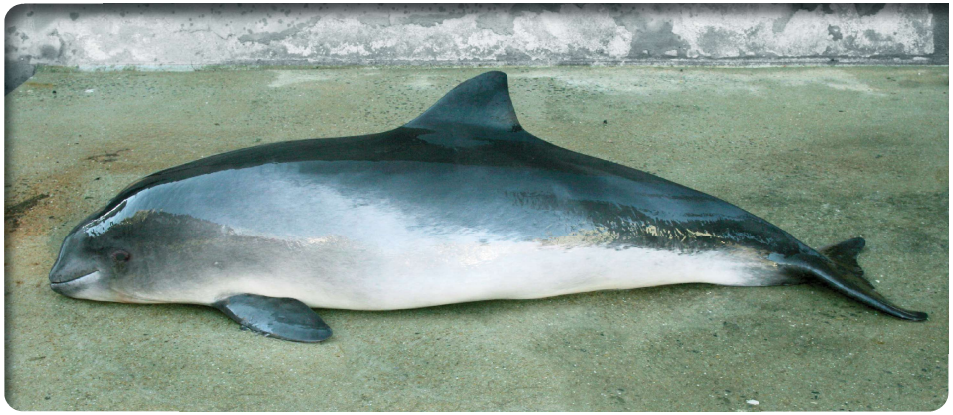
NUMBER OF STRANDINGS BY SPECIES FROM 1970 TO 2014 < 1 % | 1 à 10 % | > 10 %

		Manche	Atlantic	Mediterranean	%
Dolphins	Common dolphin	397	7 249	25	44.9
	Striped dolphin	53	883	1 472	14.1
	Common bottlenose dolphin	166	434	238	4.9
	Atlantic white-sided dolphin	4	34	-	0.2
	White-beaked dolphin	24	1	-	0.2
	Risso's dolphin	25	76	72	1.0
	Long-finned pilot whale	98	474	57	3.7
	Short-finned pilot whale	-	7	-	<0.1
	Killer whale	-	6	-	<0.1
	Melon-headed whale	-	3	-	<0.1
	Fraser's dolphin	1	-	-	<0.1
	Atlantic spotted dolphin	-	1	-	<0.1
Porpoise	Harbour porpoise	1 474	1 234	-	15.8
Sperm whales	Sperm whale	2	33	33	0.4
	Pygmy sperm whale	-	28	-	0.2
	Dwarf sperm whale	-	3	-	<0.1
Beaked whales	Cuvier's beaked whale	2	85	25	0.7
	Sowerby's beaked whale	9	7	-	<0.1
	Blainville's beaked whale	-	4	-	<0.1
	Gervais' beaked whale	-	1	-	<0.1
	Northern bottlenose whale	5	5	-	<0.1
Rorquals	Common minke whale	15	36	5	0.3
	Fin whale	20	48	90	0.9
	Humpback whale	5	5	2	<0.1
	Sei whale	1	1	-	<0.1
Pinnipeds	Grey seal	354	966	-	7.7
	Harbour seal	708	14	-	4.2
	Hooded seal	8	28	-	0.2
	Harp seal	7	8	-	<0.1
	Ringed seal	5	5	-	<0.1
	Bearded seal	2	1	-	<0.1
	Walrus	-	2	-	<0.1
	Total	**3 385**	**11 682**	**2 019**	**100**

Harbour porpoise — *Phocoena phocoena*

Birth size / average / maximum*: 0.7 / 1.3 / 1.9 meters

Adult weight: 40 to 70 kg



No rostrum, plump body and obtuse head, rounded pectoral fin ends, small triangular dorsal, spatulate teeth. Dark grey to black pigmentation that lightens on the sides and ventrally.

Dental formula
22-28**
21-26**

Common bottlenose dolphin — *Tursiops truncatus*

Birth size / average / maximum: 1.0 / 2.5 / 3.9 meters

Adult weight: 150 to 400 kg

Short rostrum, stocky body, high sickle-shaped dorsal fin. Dark grey pigmentation on the back and white pigmentation on the ventral side, generally devoid of very marked patterns.

Dental formula
20-27
18-27

POSSIBLE CONFUSION: At the newborn stage, it can be difficult to differentiate between the common dolphin, the striped dolphin and the common bottlenose dolphin. In case of doubt, taking systematic photographs and counting the teeth (or sockets) are essential to the examination. In the Indian Ocean and the western Pacific, care will need to be taken to distinguish the common bottlenose dolphin from the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), which has a proportionally longer rostrum, among other differentiating criteria.

* average based on measurements from strandings in metropolitan France

** number of teeth per 1/2 jaw: upper / lower

Common dolphin — *Delphinus delphis*

Birth size / average / maximum: 0.8 / 1.9 / 2.7 meters

Adult weight: 80 to 150 kg

Long rostrum and slender body. Black pigmentation on the back, white on the belly, ochre colour and inverted black triangle on the flanks at the height of the dorsal fin, black line from the lower jaw to the pectoral fin. Presence of a deep crease between the melon and the beak.

Dental formula
40-60
40-60

Striped dolphin — *Stenella coeruleoalba*

Birth size / average / maximum: 0.8 / 1.8 / 2.6 meters

Adult weight: 80 to 150 kg

Long rostrum and slender body. Grey pigmentation lightening ventrally, silver grey flame flowing towards the dorsal fin, dark lateral lines from the eye to the anus and from the eye to the pectoral fin. Absence of a deep crease between the melon and the beak.

Dental formula
39-53
39-55

POSSIBLE CONFUSION: in an advanced state of decomposition, the striped dolphin can be confused with the common dolphin. The deep crease located between the melon and the beak make it possible to differentiate them, this is present in the common dolphin and not in the striped dolphin. Overseas, and especially in tropical regions, these species can also be confused with all those of the genus *Stenella*.

Atlantic white-sided dolphin — *Lagenorhynchus acutus*

Birth size / average / maximum: 1.1 / 2.2 / 2.8 meters

Adult weight: 150 to 200 kg

Stocky appearance, very short rostrum, large caudal peduncle and prominent dorsal fin. Upper part of the body is black in colour then dark grey on the sides, longitudinal white spot on the anterior sides followed by a yellowish band.

Dental formula
29-40
29-40

White-beaked dolphin — *Lagenorhynchus albirostris*

Birth size / average / maximum: 1.1 / 2.3 / 2.9 meters

Adult weight: 150 to 200 kg

Chunky body, very short rostrum, large, sickle-shaped dorsal fin. White rostrum, dark grey to black cape that extends to the top of the flanks, large grey lateral bands from behind the eye to the anal region, white ventral side.

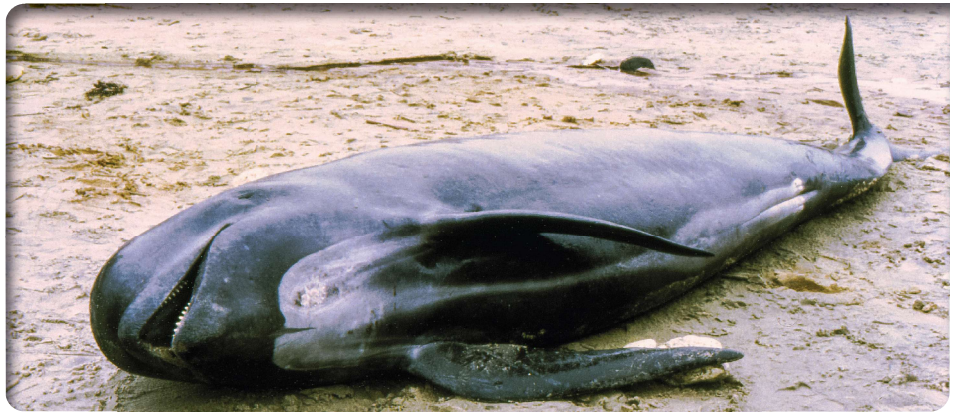
Dental formula
22-28
22-28

POSSIBLE CONFUSION: members of the genus *Lagenorhynchus* can be confused with each other and sometimes with the common dolphin, the striped dolphin or the common bottlenose dolphin. However, criteria such as the absence of a rostrum, the number of teeth, the shape of the caudal peduncle and the size of the dorsal fin should help avoid confusion.

Long-finned pilot whale — *Globicephala melas*

Birth size / average / maximum: 1.8 / 3.9 / 7.0 meters

Adult weight: 1 to 3 tonnes



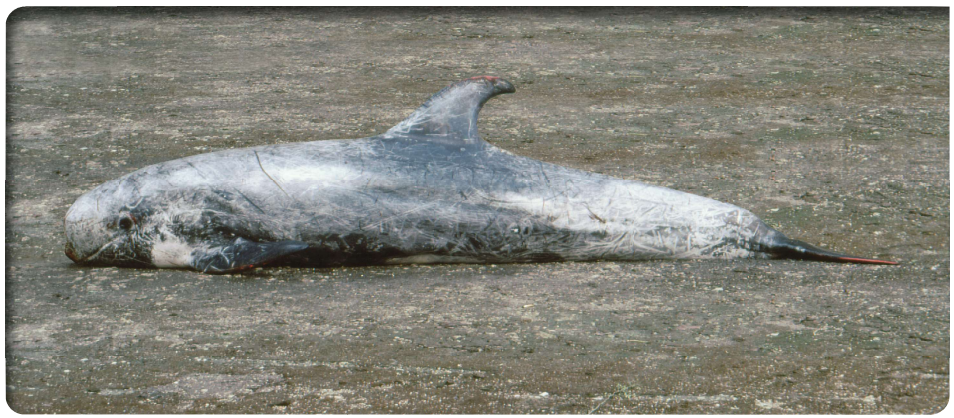
Robust body, globose head, low dorsal fin that curves backwards, very long pectoral fins reaching about 1/3 of the body length with very angled leading edges. Black pigmentation with light grey underside continuing to the anal region and forming a «W» shape under the chin.

Dental formula
9-12
9-12

Risso's dolphin — *Grampus griseus*

Birth size / average / maximum: 1.3 / 2.6 / 3.8 meters

Adult weight: 200 to 500 kg



Rounded head with abrupt forehead, long pectoral fins and high dorsal fin. Grey to white pigmentation that is more accentuated with age and marked with linear scarring.

Dental formula
0
2-7

POSSIBLE CONFUSION: Four cases of short-finned pilot whale strandings have been recorded in metropolitan France since 2008. The pectoral fins in short-finned pilot whales are shorter (1/6th of the total body length) than those of long-finned pilot whales, and short-finned pilot whales have between 7 and 9 teeth per half-jaw. Confusion between a young Risso's dolphin and a long-finned pilot whale can occur, but the number of teeth on the upper half-jaw enables the differentiation between these two species. If the teeth are not visible, the gum must be removed with a knife in order to count them. Overseas, and especially in tropical regions, pilot whales can also be confused with the false killer whale.

Sperm whale — *Physeter macrocephalus*

Birth size / average / maximum: 3.5 / 11.0 / 17.0 meters

Adult weight: 10 to 50 tonnes

Head is massive, broad and rectangular and has a single blowhole offset to the left, long and robust body, dorsal fin forming a hump, serrated crest from the dorsal fin to the tail, the flukes are broad, dark and triangular. Grey-black pigmentation, ventral area lighter or sometimes white depending on age.

Dental formula
0
18-25

Pygmy sperm whale — *Kogia breviceps*

Birth size / average / maximum: 1.2 / 2.3 / 3.5 meters

Adult weight: 300 to 400 kg

Rectangular head, stocky body, short and wide pectoral fins, small sickle-shaped dorsal fin. Dark grey pigmentation on the back and light pigmentation on the belly, light pigmentation shaped like gills behind the eye.

Dental formula
0
10-16

POSSIBLE CONFUSION: the pygmy sperm whale and the dwarf sperm whale (*Kogia sima*) are very similar species, the dwarf sperm whale's dorsal fin is proportionally higher and wider than the pygmy sperm whale and it may have up to 3 teeth on the upper jaw.

Cuvier's beaked whale — *Ziphius cavirostris*

Birth size / average / maximum: 2.2 / 5.0 / 7.0 meters

Adult weight: 1.5 to 3 tonnes

Robust and plump body, poorly defined beak with concave profile, two «V» shaped grooves under the head, the dorsal fin is positioned about 2/3 of the length from the beak, no median notch on the caudal fin. Pigmentation ranges from brown to light grey, varying according to sex and age, head often paler or even whitish and body may have long scars.

Dental formula
0
1
only in males

Sowerby's beaked whale — *Mesoplodon bidens*

Birth size / average / maximum: 2.0 / 4.1 / 5.5 meters

Adult weight: 800 kg to 1.3 tonnes

Head has a poorly developed melon, elongated beak, two «V» shaped throat grooves, the dorsal fin is located 2/3 of the way from the beak, and the caudal fin has no median notch. Variable pigmentation usually slate grey and paler below. In males the tooth is positioned in the middle of the lower jaw.

Dental formula
0
1
only in males

POSSIBLE CONFUSION: There are 21 species of beaked whales described worldwide. In metropolitan France, five species have been reported: Cuvier's beaked whale, the northern bottlenose whale, Sowerby's beaked whale, Blainville's beaked whale and Gervais' beaked whale. Overseas, especially in the southern hemisphere, several other species of beaked whale can be observed. Juveniles and females are particularly difficult to distinguish; samples for genetic identification as well as a skull sample are highly recommended.

Common minke whale — *Balaenoptera acutorostrata*

Birth size / average / maximum: 2.5 / 5.0 / 9.0 meters

Adult weight: 3 to 8 tonnes

Slender body, very pointed head with a prominent median ridge, sickle-shaped dorsal fin.
Dark grey to brown pigmentation, broad white stripe on the pectoral fins. The baleen are white.

Fin whale — *Balaenoptera physalus*

Birth size / average / maximum: 5.0 / 14.0 / 20.0 meters

Adult weight: 20 to 70 tonnes

Very elongated body, pointed head with a single median ridge, small sickle-shaped dorsal fin. Dark grey pigmentation on the back and light grey on its ventral side, strong asymmetry in the colour of the head: right side is white and left side dark. The baleen are brown except for the 1st third on the front right side which are white.

POSSIBLE CONFUSION: at an advanced stage of decomposition it is difficult to differentiate between the various rorqual species. Take care not to confuse these species with the blue whale, the sei whale or the humpback whale. Overseas, other species can be confused, such as the Antarctic minke whale, Bryde's whale or Omura's whale.

Grey seal — *Halichoerus grypus*

Birth size / average / maximum: 0.8 / 1.8 (female) and 2.5 / 2.8 meters (male)

Adult weight: 125 to 290 kg
Newborn: 15 kg

Head with elongated and straight muzzle (more pronounced in males), subparallel nostrils not contiguous at the base, general elongated shape, short foreflippers with large claws visible.
Pelage colours vary, ranging from light grey to black, silver or brown with lighter ventral area, regular spots on the back. Newborns have a white coat for up to 3 weeks.

Dental formula* I=3/2 ; C=1/1 ; PC=5/5**

Harbour seal — *Phoca vitulina*

Birth size / average / maximum: 0.9 / 1.3 (female) and 1.6 / 1.9 meters (male)

Adult weight: 200 to 500 kg
Newborn: 10 kg

Round head that tapers between the forehead and the muzzle, similar to that of a dog, nostrils form a «V», short foreflippers on which claws barely protrude from the fur. General colouration varyies from white-grey to yellow-grey, often darker on the back, many dark spots of irregular shape and distribution.

Dental formula* I=3/2 ; C=1/1 ; PC=5/5**

POSSIBLE CONFUSION: with strandings of polar seals, the most common of which is the hooded seal. These strandings are irregular on our coasts, between 1972 and 2015: 36 hooded seals, 15 harp seals, 10 ringed seals and 3 bearded seals were recorded.

*** number of teeth per upper / lower half jaw: Incisors; Canines; Post-Canines

Overseas species

Marine mammal diversity is unsurprisingly higher within the overseas territories due to the geographic dispersion of the territories and the diversity of habitats.

A total of 50 species have been recorded to date by means of stranding. Only two species are represented in the strandings of most overseas communities (sperm whale and humpback whale) where they represent more than 20% of strandings.

NUMBER OF STRANDINGS BY SPECIES FROM 1980 TO 2014

< 1 % | 1 à 10 % | > 10 %

		Antilles	Guyana	Reunion, Mayotte and Scattered Islands	New Caledonia and Wallis and Futuna	French Polynesia	Saint-Pierre and Miquelon	Amsterdam, Crozet and Kerguelen	%
Dolphins	Common dolphin	-	-	-	-	-	3	-	0.8
	Striped dolphin	2	-	2	-	-	-	-	1.0
	Pantropical spotted dolphin	8	-	4	-	-	-	-	3.0
	Atlantic spotted dolphin	2	-	-	-	-	-	-	0.5
	Spinner dolphin	4	-	7	2	6	-	-	4.7
	Clymene dolphin	3	-	-	-	-	-	-	0.8
	Rough-toothed dolphin	2	-	-	-	1	-	-	0.8
	Common bottlenose dolphin	10	1	3	-	1	-	-	3.7
	Indo-Pacific bottlenose dolphin	-	-	1	-	-	-	-	0.3
	Fraser's dolphin	5	-	-	-	-	-	-	1.2
	Atlantic white-sided dolphin	-	-	-	-	-	5	-	1.2
	White-beaked dolphin	-	-	-	-	-	9	-	2.2
	Guiana dolphin	-	53	-	-	-	-	1	13.5
	Commerson's dolphin	-	-	-	-	-	-	1	0.3
	Risso's dolphin	-	-	2	-	-	-	-	0.5
	Short-finned pilot whale	9	-	2	5	2	-	-	4.5
	Long-finned pilot whale	-	-	-	-	-	9	7	4.0
	False killer whale	1	-	1	-	-	-	-	0.5
	Melon-headed whale	3	-	3	1	3	-	-	2.5
	Pygmy killer whale	4	-	1	6	-	-	-	2.7
	Killer whale	-	-	-	-	1	-	8	2.2
Porpoise	Harbour porpoise	-	-	-	-	-	2	-	0.5
Sperm whales	Sperm whale	22	-	3	18	6	9	7	16.2
	Pygmy sperm whale	-	-	2	8	-	-	-	2.5
	Dwarf sperm whale	3	-	2	5	4	-	-	3.5

		Antilles	Guyana	Reunion, Mayotte and Scattered Islands	New Caledonia and Wallis and Futuna	French Polynesia	Saint-Pierre and Miquelon	Amsterdam, Crozet and Kerguelen	%
Beaked whales	Cuvier's beaked whale	9	-	1	1	2	-	1	3.5
	Blainville's beaked whale	-	-	-	2	-	-	-	0.5
	Gervais' beaked whale	8	-	-	-	-	-	-	2.0
	Strap-toothed beaked whale	-	-	-	-	-	-	1	0.3
	Longman's beaked whale	-	-	-	1	-	-	-	0.3
	Northern bottlenose whale	-	-	-	-	-	1	-	0.3
	Southern bottlenose whale	-	-	-	-	-	-	1	0.3
	Four-toothed whale	-	-	-	-	-	-	1	0.3
Baleen whales	Humpback whale	5	-	6	1	10	4	-	6.5
	Common minke whale	-	-	-	-	-	1	1	0.5
	Antarctic minke whale	-	-	-	1	-	-	-	0.3
	Fin whale	-	-	-	-	-	1	-	0.3
	Blue whale	-	-	-	1	-	1	1	0.8
	Southern right whale	-	-	-	-	-	-	2	0.5
Sirenia	Dugong	-	-	2	25	-	-	-	6.7
	West Indian manatee	-	4	-	-	-	-	-	1.0
Pinnipeds	Hooded seal	2	-	-	-	-	2	-	1.0
	Harp seal	-	-	-	-	-	2	-	0.5
	Grey seal	-	-	-	-	-	++	-	++
	Harbour seal	-	-	-	-	-	++	-	++
	Leopard seal	-	-	-	-	-	-	3	0.8
	Subantarctic fur seal	-	-	1	-	-	-	++	++
	Antarctic fur seal	-	-	-	-	-	-	++	++
	Indeterminate fur seal	-	-	-	1	2	-	-	0.8
	Southern elephant seal	-	-	-	-	-	-	++	++
	Total	**103**	**58**	**43**	**78**	**38**	**45**	**34**	**100**

Subantarctic fur seal, stranded on Reunion Island

sperm whale observed during an aerial observation expedition (REMMOA Program)

IDENTIFICATION KEY FOR DELPHINIDS OF THE TROPICAL REGIONS OVERSEAS

	SPECIES		HEAD	PIGMENTATION AND OTHER CRITERIA	FINS	NUMBER OF TEETH PER 1/2 JAW	SIZE (m) (newborn/ average / max)
Delphinidae with a rostrum	Spinner dolphin	*Stenella longirostris*	Very long rostrum and receding melon	Dark grey pigmentation on the back, light grey on the sides and white on the belly	Sickle-shaped or triangular dorsal fin	42 to 64	0,8 / 1,8 / 2,3
	Pantropical spotted dolphin	*Stenella attenuata*	Long rostrum and receding melon	Steel grey pigmentation on the back, light grey on the sides and belly, lighter spots appear in adults and the tip of the rostrum is often white	Sickle-shaped dorsal fin	34 à 48	0,8 / 2 / 2,6
	Atlantic spotted dolphin	*Stenella frontalis*	Long rostrum and receding melon	Steel grey pigmentation on the back, light grey on the sides and belly, flame shape above the shoulder, appearance of dark spots on the belly and light spots on the back in adults	Sickle-shaped dorsal fin	30 to 42	0,8 / 1,8 / 2,3
	Clymene dolphin	*Stenella clymene*	Long rostrum and receding melon	3-tone pigmentation: black on the back, grey on the sides, and white on the belly	Sickle-shaped dorsal fin	36 to 49	0,8 / 1,7 / 2
	Indo-Pacific humpbacked dolphin	*Sousa chinensis*	Long, well-demarcated rostrum and convex melon	Variable pigmentation (ivory white to dark grey through pink), thick body, generally compact shape	Marked hump in front of the dorsal fin and distinctive ridge along the tail stock	27 to 38	0,9 / 2,2 / 2,8
	Guiana dolphin	*Sotalia guianensis*	Long, well-demarcated rostrum and convex melon	Grey pigmentation clearly distinct between the back (dark) and the belly (light, sometimes pink), small dolphin with a thick body	Triangular dorsal fin	26 to 35	0,7 / 1,6 / 1,9
	Indo-Pacific bottlenose dolphin	*Tursiops aduncus*	Rostrum well-demarcated and proportionally longer than *T. truncatus*, convex melon	Light grey to dark grey pigmentation on the back and white on the belly, robust body	Sickle-shaped dorsal fin	22 to 30	1 / 2,5 / 2,7
	Rough-toothed dolphin	*Steno bredanensis*	Long and narrow rostrum, no demarcation between the rostrum and melon	Grey-black pigmentation on back with white starred spots on the sides, ventral side white from the rostrum to the anus	High sickle-shaped dorsal fin	19 to 28	0,9 / 2,3 / 2,7
	Fraser's dolphin	*Lagenodelphis hosei*	Very short rostrum, receding melon	Grey pigmentation that lightens ventrally with light flame pattern on the side and a dark grey stripe from the eye to the anal region	Dorsal and pectoral fins small and slender	34 to 44	1 / 2,3 / 2,6
Delphinidae without rostrum	Pygmy killer whale	*Feresa attenuata*	Rounded head and convex melon, lips with white margins	Black pigmentation with white ventral area from throat to anus	Tips of the pectoral fins lightly rounded	8 to 13	0,8 / 2,3 / 2,6
	Melon-headed whale	*Peponocephala electra*	Elongated head and convex melon, lips with white margins	Black pigmentation with white ventral area from throat to anus	Tips of the pectoral fins pointed	20 to 26	1 / 2,2 / 2,8
	Short-finned pilot whale	*Globicephala macrorhynchus*	Rounded head and prominent melon	Black pigmentation with grey area in the shape of a "W" from chin to anal area	Dorsal fin rounded with wide base, long pectoral fins	7 to 9	1,4 / 5,5 / 6,7
	False killer whale	*Pseudorca crassidens*	Elongated head and convex melon	Black pigmentation with grey area on the belly between the pectoral fins	Short pectoral fins with protrusion on the leading edge	7 to 10	1,8 / 5 / 6

Technical sheets
for the correspondents
of the Réseau
National Échouages

Réseau National Echouages

Strandings of dolphins, whales, seals - live or dead

Contact the National Stranding Network
(Réseau National Échouages)
au 05 46 44 99 10

Réseau National Echouages

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