

Science and conservation in whale strandings: the role of the public authorities

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Abstract

Whale strandings convey a great deal of information on the complex factors that affect the survival of cetacean species. International law protects cetaceans, and governments have committed themselves to conserve populations, to support research and to organise the scientific response to stranding events. In Belgium, a number of research units, public services and volunteers have been organized into an intervention network to deal with stranded animals. The practical difficulties are many and can only be overcome through good co-ordination, rapid response and full co-operation of experts in various fields. Though much progress has been achieved in the right direction, many problems remain to be solved. As was made obvious with the stranding of four sperm whales on the Belgian coast in 1994, mass stranding and the stranding of massive whales on amenity shores can only be dealt with using the standard techniques of disaster management.

Keywords: whales, cetaceans, stranding, disaster management.

Résumé

Les échouages de cétacés fournissent un grand nombre d'informations sur les facteurs complexes qui affectent la survie de ces espèces. La réglementation internationale protège les cétacés et les gouvernements se sont engagés à assurer la conservation de leurs populations, à soutenir la recherche et, en cas d'échouage, à organiser l'intervention scientifique. En Belgique, un certain nombre d'unités de recherche, de services publics et de bénévoles ont été rassemblés en un réseau d'intervention pour prendre en charge les animaux échoués. Les difficultés pratiques sont nombreuses et ne peuvent être surmontées que par une bonne coordination, une intervention rapide, et la pleine coopération d'experts appartenant à différentes spécialités. Quoique des progrès importants aient été réalisés dans ce sens, beaucoup de problèmes subsistent. Comme l'échouage de quatre cachalots à la côte belge en 1994 l'a démontré, on ne peut gérer des échouages massifs ou l'échouage de grands cétacés sur des plages touristiques qu'en faisant appel aux techniques classiques de la gestion de crises.

Mots-clés: cétacés, échouage, gestion de crises.

Introduction

Ever since Jonah's story (4th century B. C.), whales have captured the imagination of poets as well as common people. The excitement, the awe caused by the stranding of a large cetacean was certainly great in the past, and it remains powerful today. Children, seamen, nature lovers, scientists rush to the shore to contemplate the unfortunate giant. Such events nowadays even take a political dimen-

sion, and the public authorities quickly sense that they should become involved. Why this is so and how it can be done is what this paper ventures to examine.

Just as the whale in the Bible opened its mouth and let the prophet walk ashore, it seems as if modern whales exhaling their last breath on our beaches were delivering a message to the modern world: a prophecy on the state of the ocean, and on their own sad lot. This is no mythical imagery: strandings convey a great deal of information on the complex factors that affect the survival of cetacean species. Also, a carcass washed up on a beach carries in its organs, tissues and chemistry a record which reflects the quality of the environment in which the animal made its living. Interpreting this record is no simple matter: it requires the most sophisticated scientific techniques. But if the means are available and things are done correctly, bits of information add to each other and our understanding of marine life grows.

Clearly, whale strandings cannot be ignored. They need to be exploited for science, using the most rigorous methods. Recent international law has recognized this need and assigned specific tasks in this respect to the governments of coastal States. I will start by looking at this legal framework, its philosophy and the goals it pursues. I will then review the very practical problems faced by the public authorities in organizing their response to whale strandings, and the ways in which they can be solved. I will finally describe the attempts made in Belgium to offer a structural basis to the management of cetacean strandings.

The legal and political framework

Though it may be useful to recall here that whales are protected in Belgium¹, the point of this discussion is not so much to look at the obligations of citizens with respect to whales as to examine those of the administrations and public services when a stranding event occurs. These obligations proceed from two different sources which are of unequal status: international law and political commitments. In both cases, however, the attitude to be adopted by the authorities is clearly indicated. Two texts

spell out guidelines and obligations regarding the conservation of cetaceans: the European directive 92/46/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the "Habitat" directive), and the 1992 Agreement on the conservation of small cetaceans of the Baltic and North seas (ASCOBANS). Both are binding for Belgium. Additional guidance had already been given by the Ministerial Declaration of the Third International Conference on the Protection of the North Sea (The Hague, 1990) which more generally considered the stranding of all marine mammals.

The European Habitat Directive

The directive has placed all cetaceans in Annex IV, the list of species requiring strict protection. For these species: "*Member States shall take the requisite measures to establish a system of strict protection ... For these species, Member States shall prohibit the keeping, transport and sale or exchange, and offering for sale or exchange, of specimens taken from the wild ... [They] shall establish a system to monitor the incidental capture and killing of the animal species listed ...*" (art. 12); "*Member States shall undertake surveillance of the conservation status of the natural habitats and species ...*" (art. 11); and "*Member States and the Commission shall encourage the necessary research and scientific work having regard to ... the obligation referred to in Article 11*" (art. 18).

The ASCOBANS agreement

The treaty institutes a conservation and management plan for the small cetaceans, which governments are expected to implement. This plan is spelled out in the Annex of the Agreement. It says, in particular, that: "*investigations ... shall be conducted in order to ... identify present and potential threats to the different species ... with special regard to effects of pollution, disturbance and interactions with fisheries ...*" (para. 2). Furthermore, "*Each Party shall endeavour to establish an efficient system for reporting and retrieving by-catches and stranded specimens and to carry out, in the framework of the studies mentioned above, full autopsies in order to collect tissues for further studies and to reveal possible causes of death and to document food composition. The information collected shall be made available in an international database*" (para. 3). Finally, "*Information shall be provided to the general public in order to ... facilitate the reporting of sightings and strandings in particular*" (para. 5).

The Third North Sea Conference

The Ministers responsible for the protection of the North Sea environment decided in The Hague on 8 March 1990, among many other measures, to collaborate on research initiatives for the protection of species and habitats. Among those initiatives, the following was specifically identified: "*an international register recording all reports of strandings of marine mammals including external characteristics, post-mortem analysis, age, health, contaminant analysis and relevant research*" (Minister-

ial Declaration of 1990, see: Ministry of the Environment and Energy, 1995).

From the above texts, it may be concluded that governments have committed themselves to organize the scientific response to events of cetacean stranding. They must ensure, in particular, that complete necropsies and pathological and toxicological investigations are carried out and that the resulting information is centralized internationally. The task of organizing and controlling compliance with that commitment in Belgium has to a large extent been taken up by the Management Unit of the North Sea Mathematical Models (MUMM), the federal service responsible for marine environmental research and conservation. Through the North Sea Technical Commission (MNZ)² for which it serves as secretariat, MUMM has access to both federal and regional government services and is in a position to propose concerted initiatives for the implementation of provisions that are binding to all sectors of government, each in its own area of responsibility. I will now examine what specific objectives MUMM has brought forth to work out this programme.

Goals and objectives of the stranding response scheme

The overall aim of a marine mammal stranding programme is to respond to any stranding in a way that favours the chances of survival of cetacean species and their populations. The response scheme should meet the following goals and objectives.

First goal: To protect individual animals found to be in trouble, and to that end:

1. To rescue stranded animals

These animals should be afforded protection from other animals (seagulls, dogs), from ill-informed or ill-intended individuals, from stressful interactions with untrained people. Healthy animals should be refloated carefully, taking care to prevent them from coming ashore again. Fatally injured or debilitated animals should be euthanized by a competent veterinarian. Diseased or injured small cetaceans should be provided first aid on the spot, and be transported to safety in an adequate temporary transit facility until arrangements can be made for further professional medical care.

2. To cure and rehabilitate injured or diseased animals

No veterinary clinic for small cetaceans exists in Belgium at the moment. The delphinarium in Harderwijk in the Netherlands has built up considerable professional experience in caring for stranded sea mammals and is prepared to accept animals rescued on Belgian shores. Medical care and rehabilitation are chancy and labour intensive. But they provide a wealth of information on the

physiology and behaviour of these animals and, when successful, can be exceedingly rewarding.

3. To release rehabilitated animals in the North Sea

Rehabilitation should be carried out with the objective of releasing the animal in its natural environment. Ideally, the Belgian authorities prefer that animals rescued in Belgian waters be released in the same general area. Obviously this would be inadequate for species that stranded because they strayed far from their home environment.

Second goal: To acquire any information that is useful for the design of better conservation measures, and to that end:

1. To record sightings and strandings

Dates, places, number of individuals, sex, age, behaviour etc. should be noted carefully for every stranding, but also on the occasion of sightings at the coast and in the Southern Bight of the North Sea. This information is now reported to the ASCOBANS scientific committee to be evaluated, with the aim of improving the conservation and management plan under the Agreement. Consequently, any such information is urgently needed and must enter the public domain as soon as the observation is made. When scientists are involved, they might argue that the immediate release of the information is incompatible with the temporary confidentiality of scientific data before publication. In my view, however, it is reasonable to consider that this type of elementary data has now left the realm of science to enter that of management. The interpretation of the data – be they public or not – would seem to provide ample opportunity for original research without having to protect a sort of authorship of sightings.

2. To control the state of health of available animals

The health of a stranded cetacean might give a clue on the cause of the stranding. More fundamentally, a detailed health examination might provide crucial information on the state of health of the population. In particular, it may bring to light new diseases and important information on the pathology of the species and across-species epidemiology. Here, then, is perhaps the first of Jonah's messages on the state of the marine environment! Post-mortem examinations should also yield valuable information on the nutritional status of the animal, to be related with the feeding habits and the ecological niche of the species, and the status of its various prey.

3. To control the level of contamination of the animals

Whether the view that toxicology is central to the conservation of cetaceans is justified or not, the contamination of stranded animals by toxic pollutants deserves a thorough investigation. Here one may expect to find another of Jonah's messages. The pollution of the world ocean is only significant to the extent that it disrupts

ecosystem functions and structure. As top predators, toothed cetaceans should be good sentinels for the ailments that particular pollutants, be they heavy metals or persistent organics, can inflict on mammals. Target organs and tissues should be sampled systematically, physiological effects should be sought, detoxifying mechanisms should be explored. The mechanisms of transfer through the food web may become better understood as more precise data on pollutant loads in cetaceans of various areas of the ocean become available.

Third goal: To ensure optimal exploitation of the material

With the complete cessation of hunting for most cetacean species, biological material from bycatch and stranded animals has now become irreplaceable. All efforts should be made to exploit this material for scientific research to all possible extent. Genetics, morphology, embryology, pathology, physiology, endocrinology, parasitology have yet much to learn from stranded cetaceans, both dead and alive. It would be a shame to lose research opportunities because the necessary means or expertise are not locally available: here obviously is an area for cooperation between institutions in Belgium and abroad. It is also in this spirit that the Belgian authorities view the stranding response scheme that they have been setting up.

The practical problems

Surely, the many and various objectives set out above would make any scheme for managing whale strandings an ambitious proposition. The pitfalls and practical difficulties met in trying to run such a program are numerous, and are yet far from being solved to everyone's satisfaction. A few examples are given below.

Rescuing stranded cetaceans

Stranded cetaceans rarely succeed in returning safely to the sea on their own. When stranded, large whales die of asphyxia or heart failure and can almost never be helped. Small cetaceans can be refloated if sufficient experienced personnel is on site. Healthy animals often accompany diseased congeners: care should be taken not to return sick animals to the sea because they are likely to beach again, attracting the others with them. Manipulating and moving cetaceans may be harmful to the animal and should only be attempted when authorized by the site controller and under veterinary supervision. Mass stranding of course compounds the problem enormously. Stranded animals become the victims of various aggressions (sunlight, dessication, other animals and man). Infectious diseases can be transmitted from cetaceans to people and dogs and conversely. It can be concluded from this list of problems that the rescuing operation should be coordinated by an experienced super-

visor, with the assistance of a veterinarian and many helping hands. Volunteers should be reliable and sufficiently disciplined to act in co-ordination.

Post-mortem investigations

Although necropsies can best be carried out in a dedicated autopsy facility, the carcass will have to be opened on the spot if the size of the whale makes immediate transportation difficult. Decay sets in so quickly in dead cetaceans that the necropsy should be started without any delay. After a few hours, tissue alterations depreciate the value of the investigations. The transport of a sperm whale or any large whale requires heavy, expensive technical means. In any intervention on scene, elementary hygiene standards need to be respected. Large quantities of viscera should not remain on an amenity shore within reach of the public. As discussed elsewhere (TASSIJS, this volume), the disposal of carcasses remains a complex problem for which no single solution seems entirely satisfactory.

Incident management

As the stranding of four sperm whales in Koksijde and Nieuwpoort, Belgium, in November 1994 demonstrated, the interest of the public and the media for such an event makes it necessary to resort to incident-management techniques to deal with it. People react to spectacular strandings with the same emotions, behaviours and demands as in disaster situations. The public and the media are likely to interfere throughout every element of the whale stranding response scheme. Certainly, considering that every level of authority in the public services has some responsibility in disaster management, some contingency planning would be in order at the town and provincial levels. In this respect, it is feared that the present national stranding response scheme will remain largely insufficient to deal with all and especially the most aggravating aspects of whale strandings. Further efforts of co-ordination should be made and the relations with the media should be dealt with in a fully organized manner.

Solutions to the problems: the principles

The problem of organizing a response scheme for cetacean strandings has been tackled in many ways in various countries, but certainly the level of detail, integration and thoroughness of existing schemes varies greatly. Very useful analyses of the problem and well-structured response procedures have been proposed by WARNEKE (1986) and NEEDHAM (1993). The following points of organization emerge from these discussions:

- as soon as the stranding report is received, the responsible agency should appoint a site controller; the site controller represents the authority; he authorizes the rescue procedures; he makes his decisions in consultation with his superiors; in particular, manipulating or moving

stranded whales must be authorized and coordinated by the site controller, subject to veterinary advice;

- a rescue coordinator should be appointed; this is a different person from the site controller, but the two are expected to work closely together; key personnel and the necessary resources for the rescue and the scientific investigation are mobilized under the authority of the rescue coordinator;

- the circumstances and scale of the stranding must be assessed by a suitably qualified expert: species and number of animals involved, their status (live or dead), the practicality and requirements of a rescue operation;

- veterinary support should be obtained: in particular the veterinarian should assist the site controller with professional advice, he should ensure that the animals are treated humanely, he is responsible for medical diagnosis and investigative procedures, and for performing euthanasia when required;

- sufficient scientific staff should be available to carry out the measurements and the gathering of biological data; necropsies should be conducted by scientists and veterinarians working together;

- the rescue of live cetaceans requires many more personnel than the investigation of dead animals (for example, a live pilot whale may require up to 10 helpers: see NEEDHAM, p. 417);

- volunteers must be registered; personnel should be logged on and off a congested stranding site; facilities for first aid and for feeding and resting personnel should be provided.

These principles have inspired several of the features that have already been adopted in the response scheme the authorities have developed in Belgium under the coordination of MUMM to deal with stranded marine mammals at the Belgian coast. The following section gives a short description of the existing arrangements and the plans for the future.

The Belgian response scheme for stranded animals

In organizing the response to stranding events at the Belgian coast, MUMM has drawn on the financial resources of the federal Government, on the human resources of central and local administrations, and on the collaboration of nature-conservation organizations and volunteers. The scheme is not limited to the stranding of cetaceans but it extends to all marine mammals and to seabirds. Oiled birds, for example, are collected and examined for pathology and toxicology in the same laboratories as are sperm whales. A significant financial impulse to this scheme was initially provided by the World Wide Fund for Nature (WWF Belgium) and by the European Commission. Thereafter, the costs of the programme were covered by the Federal office for scientific, technical and cultural affairs (SSTC/DWTC) and by the Federal ministry of social affairs, public health and environment. Practical experience led MUMM to seek co-ordination with the public authorities responsible for

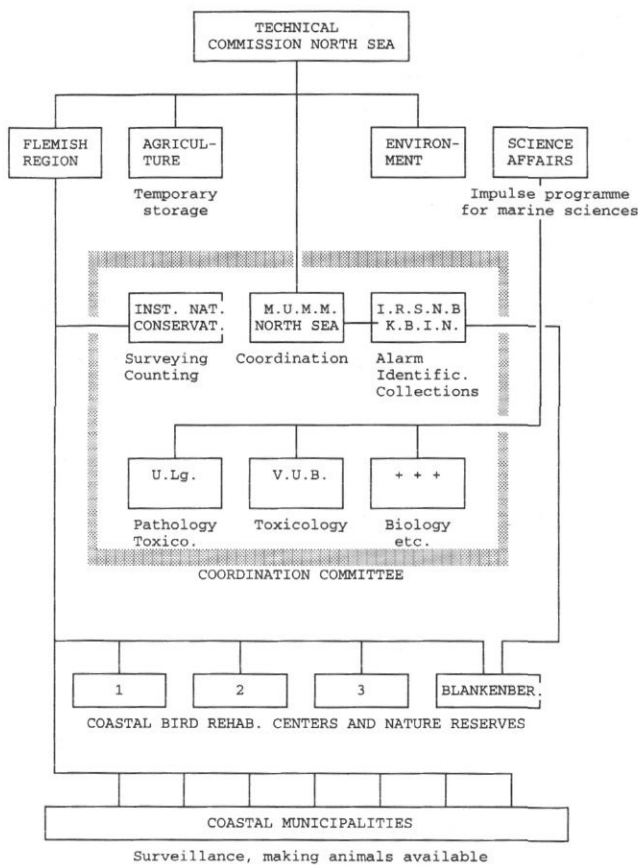


Fig. 1. – Intervention network for the study of marine mammals stranded on the Belgian coast or captured as bycatch

security, civil protection, hygiene, beach maintenance and waste disposal. An intervention network connecting the main partners in the scheme was established in 1992. The network ambitions to deal with stranded animals and animals caught as bycatch, although the bycatch problem is still very largely wanting administrative and organizational measures, and practical solutions.

The intervention network for seabirds and marine mammals

Figure 1 shows the general layout of the intervention network. Central to the response scheme is the capability to carry out detailed scientific post-mortem investigations. Pathological studies, and hence also the necropsies, have been entrusted to the Department of Veterinary Medicine of the University of Liège. Contamination by toxic organic residues and mercury is examined at the Laboratory for Ecotoxicology and Polar Ecology of the University of Brussels (Vrije Universiteit Brussel, VUB), and contamination by other heavy metals is studied at the Laboratory for oceanology of the University of Liège (ULg). The necropsies are performed on site or, preferably, in the laboratory, following internationally agreed protocols (European Cetacean Society, 1991). Veterinarians and biologists select samples from various tissues

and organs and dispatch them to the other laboratories in the network. International co-operation is strongly encouraged for any material which cannot be analysed, or is not fully exploited, in Belgian laboratories.

The Royal Belgian Institute of Natural Sciences (IRSNB/KBIN) is the central contact point of the network. It spreads the alarm in case of need, collects the carcasses and makes them available to the researchers. Being a reference centre for the CITES convention, the Institute is regarded as the normal repository for the bodies or parts of bodies of protected species, and as their final legal owner. The Institute of Nature Conservation (IN) is mainly responsible for beach patrolling, bird counts and contacts with the many volunteer helpers who keep the shore under constant watch. Bird revalidation centres cooperate in reporting strandings and in collecting live and dead animals. Intermediate storage facilities for the carcasses of small animals are made available by the State Marine Fisheries Research Laboratory (RvZ) in Ostend. The Department of Waterways and Coast (AWK) of the Ministry of the Flemish Community serves as an intermediary between the network and the coastal municipalities. All the coastal towns are informed of the response scheme and know the network's contact point.

To ensure that so complex a network of services and people with different locations, backgrounds, interests and responsibilities can perform its intended function is no easy matter. The planning and co-ordination of the activities of the network are the task of MUMM who chairs a co-ordination committee. Through the MNZ (see above), MUMM reports on the activities of the network to the national Interministerial Conference on the Environment.

It is a sad fact that more stranded animals are found dead on the beaches than alive. Yet, the rescue of living cetaceans remains a priority of the network. To save a stranded whale represents a bigger challenge than to organize a proper and comprehensive investigation of a dead animal. It is fair to say, however, that the intervention network cannot, at this point, claim credit for much success in meeting this challenge. Too often, the network is not immediately informed of the presence of a live animal on the beach and cannot intervene in time. Unfortunately too, no organization in Belgium can offer rehabilitation facilities for marine mammals. Two rehabilitation centres for seals in The Netherlands are prepared to accept injured, sick or debilitated pinnipeds: ECOMARE in Texel and "Zeeshondencrèche" in Pieterburen. The small cetaceans can be transported to the Marine Mammal Park in Harderwijk, also in The Netherlands, where dedicated professionals care for them until they can safely be released in the North Sea. Thus far, the conditions in which marine mammals stranded at the Belgian coast have had to wait for safe transportation to The Netherlands have been less than satisfactory. To remedy that situation, a first-aid transit centre for live porpoises, dolphins and seals has recently been set up at the MUMM laboratory in Ostend, in the facilities made

available to MUMM by the Belgian Navy. This centre is now accessible to the intervention network 24 hours a day. It is hoped that this initiative will improve the chances of survival of animals rescued on our shores.

Intervention procedure

Following the principles that have been outlined above, the intervention network has adopted a basic response procedure to be enacted when an important stranding is reported. Whoever first receives the information passes it on to the contact point of the Belgian Royal Institute for Natural Sciences. The contact point sends the alarm to key members of the network who spread it to all concerned personnel. The Institute mandates a site controller who immediately goes to the scene of the stranding to ensure protection of the animals and to prepare the grounds for the rescue or the scientific investigation. If needed, the site controller calls upon a veterinarian for immediate assistance.

Meanwhile, MUMM appoints a coordinator of the scientific activities. The coordinator mobilizes the necessary personnel, sends them to the scene with the necessary scientific equipment and, if necessary, joins them on the site of the stranding. He makes sure qualified experts can be brought to the scene to evaluate the situation, identify the stranded animals and assist the scientific staff. Together with the site controller, he organizes the work of the veterinarians, biologists and volunteers. The coordinator establishes contact with all the concerned public authorities: when needed, a crisis staff can be formed to decide on how the rescue or investigation will be organized, when and where to the animals should be carried away, and on the logistics of the operation. Finally, the coordinator decides with the local officials how the media should be kept informed of developments.

The above describes rather closely the procedure that was followed in Koksijde on 18 and 19 November 1994 on the occasion of the stranding of four sperm whales on amenity beaches. This was the first intervention of the network in a mass stranding event and it met with only partial success. Besides the staggering difficulty of carrying out simultaneously the necropsy of three of the large whales on a beach at night, between two high tides, the presence of thousands of people who came to see the whales, and the public hygiene problem of emptying the abdominal content of the animals on the beach complicated the operation remarkably. Disproportionate technical means including 8-track lorries, 4-track bulldozers and a caterpillar excavator were eventually required to complete the work. The need to better liaise with the local authorities, to better inform the press and the public, and to better organize the interaction with volunteers and whale-fanciers quickly became obvious. Much experience was gained in these areas, which should enable the network to perform better in the future. Essentially, without changing any of the principles followed in the intervention procedure, more preparatory work is required in contingency planning, in association with local authori-

ties. Also, much more effort should be invested in public relations during the operation.

Conclusion

Whale strandings have become significant events that cannot be ignored by the public authorities. Sperm whales coming to die on our shores tell us a message on the state of the ocean. It is up to us to read it and to interpret it. Our overall goal should be to increase the chances of survival of cetaceans and to better understand the requirements of sound marine conservation.

Only a well organized response scheme can provide the means and develop the procedures that are required to successfully rescue live stranded cetaceans and to ensure thorough scientific exploitation of the biological material when the unfortunate animals have died. These activities must be organized by the public authorities since governments have committed themselves to bring them about.

Both types of intervention – rescue and post-mortem investigations – may represent a considerable challenge, particularly in the case of mass strandings. Some contingency planning based on the principle of crisis management is in these cases indispensable.

The Belgian response scheme to whale strandings, however imperfect, represents a major step in the right direction. Assuming that the financial means for research remain available, that concrete progress is made towards better rehabilitation procedures, that volunteer helpers can be better controlled and integrated, and that more is invested in public relations, the intervention network and response scheme should prove their full usefulness in the future.

Notes

¹ The law of 28 July 1981 carrying approval of the Washington convention (CITES) forbids the import and export of cetaceans without a license.

² MNZ (Mer du Nord/Noordzee). Commission assembling representatives of the three Regions of the Belgian federation, and reporting to the Interministerial Conference on the Environment.

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