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Reducing the Impact of Oil Spills

# Action Plan

## Summary

This Action Plan is the main result from the RIOS (Reducing the Effects of Oil Spills on Wildlife) project carried out between March 2007 and September 2008. The RIOS project aimed to identify new areas for research and development in the field of oiled wildlife response and preparedness, in close cooperation with experts and stakeholders in Europe and North America.

Oil released in the marine environment as a result of an incident or otherwise, can potentially affect hundreds of thousands of animals, especially birds, and once washed ashore, a country can be faced with a significant animal welfare and management problem requiring immediate action.

Oiled wildlife response planning as an integrated part of a country's oil spill preparedness is the best guarantee that appropriate measures can be taken timely and effectively. To achieve an adequate level of preparedness, however, requires a good understanding of a large variety of issues, including, e.g. seasonal distribution of vulnerable species, the effects of oil on wildlife, methodology and trained personnel for treating oiled animals including rehabilitation and euthanasia, emergency response methods and response planning techniques, which include protection strategies. Over the past ten years, Europe has made considerable steps towards increased awareness of the importance of these issues, especially the importance of planning. Many activities have taken place in recent years and an increasing number of countries have started the process of oiled wildlife response planning.

This action plan has lists the main priorities for an international research and development programme and are presented as follows:

- Actions to identify species and areas vulnerable to oil pollution
- Actions to protect vulnerable species from oiling during a response
- Actions to enhance the treatment of live oiled animals
- Actions to enhance assessments of oil spill impact on wildlife populations
- Actions to enhance the effectiveness of an oiled wildlife response

The most important actions have been prioritised for short term and long term funding and per species group (birds, marine mammals and sea turtles).

## Preface

The EU scientific project titled Reducing impact of Oil Spills (RIOS) was granted by the European Commission under the 6<sup>th</sup> Framework Programme and was carried out between April 2007 and September 2008 and was led by a consortium of Nordeconsult (Sweden), Zoomarine (Portugal) and Sea Alarm (Belgium). The project aimed to develop an Action Plan for research and development activities that would contribute to minimising the negative impacts of oil spills on marine wildlife, in particular seabirds, marine mammals and sea turtles.

The project involved the contributions of experts from Europe and North America, who worked with the consortium to identify the main issues and to prepare for an international workshop at which these issues could be discussed by an international audience of stakeholders.

The RIOS workshop was held April 19-21, in the Algarve, Portugal and involved 49 participants from 15 countries, including Canada and the United States. The workshop aimed to look at all aspects of oiled wildlife response and preparedness and to identify priorities for research and development. The basis for the workshop was provided by a Background Document that was written by four international experts and made available to the participants. At the workshop 17 invited lectures provided an overview of the state of the art of oiled wildlife response and preparedness. The workshop programme provided many opportunities for the audience to discuss the various issues and to raise additional items. A final discussion at the workshop contributed to the identification of the priorities for an international research and development programme that should become part of the RIOS Action Plan.

This Action Plan, the main delivery of the RIOS project, was developed by the consortium in close cooperation with experts who provided contributions and comments. The Action Plan therefore should be considered as a broadly supported document produced by a group of outstanding representatives from the community of European and North American oiled wildlife responders and specialised scientists.

The Action Plan identifies the main priorities for a European Research and Development programme that would support oiled wildlife response and preparedness activities that are taking place in many countries and regions of Europe and that are in urgent need of sources of funding. It is hoped that the Action Plan could provide inputs to the European Commission while identifying research priorities for the 7<sup>th</sup> and even 8<sup>th</sup> Framework programme. Most and for all however, the Action Plan provides a state of the art overview of the most important scientific issues that need to be considered by authorities and stakeholders in Europe and elsewhere who aim to reduce the impacts of oil spills on marine wildlife.

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Nordeconsult  
Zoomarine  
Sea Alarm Foundation

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## Introduction

Marine oil spills are known to have potentially significant effects on the marine environment. Although incidents such as the *Exxon Valdez*, *Erika* and *Prestige* are best remembered because of their dramatic effects on humans, economies as well as natural habitats and wildlife, it is not only these large shipping accidents that are responsible for the release of oil into the environment. From year to year oil spills of all sizes do happen and are caused by collisions, groundings, fire and explosions, hull failures, or by various operations such as bunkering, loading or discharging. The term "oil spill incident" is normally used when the activity can be connected directly to a ship or an operator. But oil pollution of our environment and of the animals that live there happens every day, may have an origin in shipping, offshore operations or even land based sources, but cannot necessarily be attributed to a ship or an operation. This type of oil spill is often referred to as "chronic pollution" or, in the cases where their effects are as significant as if they were caused by an incident, "Mystery spills".

An oil spill may involve a variety of substances, including crude oil, refined petroleum products (such as gasoline or diesel fuel) or by-products, ships' bunkers, oily refuse or oil mixed in waste. The behaviour of each of these products in water is strongly dependent on properties such as their density, volatility, viscosity and pour point. The typical behaviour of most oils in water however is that they float, forming a layer on the water. In this way the oil could readily spread forming large floating slicks or sheens and become a considerable threat to organisms that spend most of their time on the surface of the water. Seabirds are especially vulnerable to coming into contact with the oil, but marine mammals and reptiles can be seriously affected too but are less likely to come to the public's attention.



Picture of a bird oiled at the beach in the aftermath of the Erika incident (Picture: Jan Rodts)

Oil penetrates and opens up the structure of the plumage of birds, thereby reducing its waterproofing and thus its insulating ability, so making these animals more vulnerable to extreme ambient temperatures and fluctuations. Oiled birds lose their buoyancy and often their ability to fly making it impossible for them to feed or to escape from predators. If a bird ingests oil, which will happen when it attempts to clean the oil from its feathers by preening, damage to organs such as the kidney, liver, lungs and red blood cells as well as immuno-suppression and damage to red blood cells will further compromise the animal's health. . These effects, along with potential starvation, will quickly cause dehydration and metabolic imbalances. Without human intervention, most birds die after oiling.

Marine mammals and reptiles such as sea turtles exposed to oil spills are affected in similar ways to seabirds. Mammals, such as otters and seal pups, that are dependent on their fur for insulation are particularly vulnerable,. Mammals, such as adult seals and cetaceans that receive thermal insulation from blubber, as well as sea turtles are less vulnerable to the physical effects of oil, but they may suffer from skin burns and/or various effects caused by ingestion.

An oil spill therefore primarily affects animal welfare but as the mortality increases vulnerable populations and even whole important sub-species may be at risk.

### Effects of oil on populations

Oil spills potentially can affect species at the population level, although this is difficult to demonstrate empirically. If oil is released in an area where vulnerable species are abundant numerous animals may become oiled, as some previous spills have demonstrated. Even relatively insignificant spills, such as the *Tricolor*, have caused the mortality of large numbers of seabirds because they happened in an area where tens or hundred thousand animals were concentrated at that particular time (e.g. wintering populations). The true effects on the breeding population

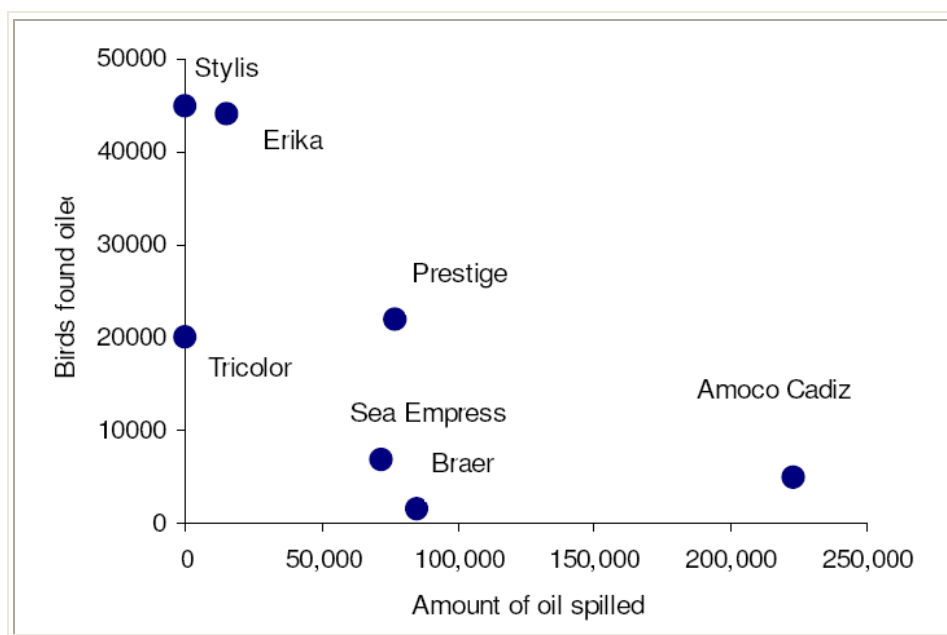
are masked and diffuse and difficult to prove. Some populations are more sensitive than others and the recovery of populations of certain slowly reproducing species (such as seabirds) may take many decades. Even a relatively insignificant volume of oil could have a significant effect on for example an endemic or localised population of critical conservation value (such as nearly happened with the *Jessica* spill on the Galapagos Islands in 2001).



*The Jessica spill threatened endemic populations of the Galapagos islands (Picture: Sea Alarm)*

### A ban on oil spills?

The best remedy for protecting the environment and vulnerable animals from oiling is preventing spills from happening. Although much has been achieved over the last decades to significantly reduce the number of oil spills, incidents cannot be avoided and will keep happening. Also the causes of chronic oiling (routine ship operations) are hard to tackle. Worldwide transport of goods and oil continues to grow, so increasing the potential risk of accidents and oil pollution, particularly in busy shipping areas and/or relatively rough weather and sea conditions. When such routes are close to areas where vulnerable species congregate, there is a considerable risk that even a relatively small oil spill has the potential to have serious implications for local and international marine wildlife resources. Reducing impacts of oil spills requires an adequate level of oil spill preparedness in every coastal country, including an operational strategy for the response to oiled wildlife.



*The amount of oil spilled versus numbers of seabirds found in recent oil spills in Western Europe (from: Camphuysen et al, 2005)*

### Oiled wildlife response

The animal welfare and potential conservation impacts of an oil spill on marine animals can be reduced by taking specific timely and effective measures as part of a wildlife response that is fully integrated in the overall oil spill response. An oil spill response aims at terminating the oil spill, clean oil from the sea surface before it spreads, protecting vulnerable areas from oiling and, if all of that has failed, to clean the oil from the shorelines. An integrated oiled wildlife response plan will assist the responsible authorities with explicit guidance on what can and cannot be done at any stage of the oil spill response to reduce the impact of wildlife. The plan provides critical information on wildlife and wildlife response options, presented in a straightforward, operational way and will allow

the oil spill responder to make important strategic decisions on wildlife in relation to other, non wildlife priorities that have to be taken into account at the same time.

**Box: the importance of pre-spill planning**

There are many critical questions requiring answers in the immediate aftermath of an oil spill in which wildlife is affected (see below). Many can be answered as part of pre-spill planning. Without such a plan in place, the answers will not be readily available and the relatively short windows of opportunity that appear will not be effectively used.

- Which vulnerable species are present in the threatened area or can be expected there soon, and in what densities? Are there species of conservation interest? Are there legal requirements for the treatment of these animals, whether they are live or dead?
- Can the oiling of these animals be avoided by taking certain preventive measures?
- How many animals and which species could get oiled and might be arriving on the shore and where?
- What can be done to mediate the harmful effects of oiling on these animals, in consideration of different scenarios ( a few, or hundreds or even thousands per day)?
- What effect will the arrival of oiled animals on the shore have on the public and how can their reaction be managed to support rather than disturbs the response?
- To what extent can a wildlife response be given sufficient resources so that responders are safe and that their efforts will lead to acceptable results?
- Which experts and work forces can be mobilised and how can their contribution be integrated?

It is therefore important to realise that the ultimate decisions that could effectively reduce the impact of an oil spill on wildlife are taken in the operations room of the oil spill responder. Whether or not wildlife will benefit from these decisions is dependent on:

- The quality of information available at any time
- Awareness of the specific response measures that can be taken and the windows of opportunity during which these measures would be most effective
- The level to which experts, manpower, equipment, facilities and other resources are readily available and/or can be mobilised
- The level to which adequate technologies and procedures have been developed and can be applied

**Towards a European R&D programme**

With regards to vulnerable wildlife, often highly migratory and valuable to Europe as a whole, it is important that European coastal countries have an integrated oiled wildlife response plan in place that sets out priorities and identifies how expertise and resources can be deployed readily and effectively. Such a plan should be incorporated into a well funded international research and development programme that stimulates scientific research, technical innovations, the development of good practices, exchange of experiences and knowledge, etc. Such a programme is absent in Europe and is greatly needed, especially with regards to the fact that more and more European coastal states are now working towards a higher preparedness for oiled wildlife response.

## The state of oiled wildlife response and preparedness in Europe

### Historic overview

#### Oiled wildlife incidents

European oiled wildlife experiences started as far back as *Torrey Canyon* (1967). Other important incidents include *Amoco Cadiz* (France and UK, 1978), *Christos Bitas* (UK, 1978), *Esso Bernicia* (UK, 1978), *Stylis* (Norway, 1980), *Braer* (UK, 1993), *Sea Empress* (UK, 1996), *Pallas* (Germany, 1998), *Erika* (France, 1999). More recent incidents include *Baltic Carrier* (Denmark, 2001), *Prestige* (Spain, 2002), *Tricolor* (France/Belgium, 2003), *Fu ShanHai* (Denmark/Sweden, 2003), *Rocknes* (Norway 2004), Glomma river spill (Norway, 2006), *Server* (Norway, 2007), *MSC Napoli* (UK, 2007), *Duncan Island* (Germany, 2008) and a number of so called mystery spills (Estonia, 2006; Germany, 2001, 2004 and 2008). All these happened in the North Atlantic, North Sea and Baltic Sea. Although oil spills have happened in the Mediterranean, there are no formal reports of wildlife responses having taken place. Another observation is that seabirds in all cases were the major animal group involved. In the history of European oil spills, only a few individual mammals have been reported oiled (*Esso Bernicia*, *Braer*, *Prestige*) and only a few oiled sea turtles (*Prestige*). The number of birds reported oiled ranged from tens to many thousands (*Tricolor*, *Prestige*, *Erika*).

#### Rehabilitation of casualties

##### Rehabilitation of oiled birds

Along many of the coasts facing chronic oil pollution, permanent wildlife rehabilitation centres were built specialising in the rehabilitation of oiled birds. Some, particularly in North France, UK, Netherlands, Belgium and Germany have been operational for over 30 years. Exchange of expertise between these centres has traditionally been limited resulting in the development of a range of rehabilitation methodologies. Now that exchanges are increasingly taking place, many of these methodologies, although developed separately, have much in common. The main differences appear in the details of some procedures. Also, some centres appear more successful in rehabilitating certain species than other centres. Very few of the currently practiced methodologies are well described which currently does not allow comparison between centres and scientific analysis of success or failure. In other areas known for high levels of chronic oil pollution, like the Baltic Sea, the rehabilitation of oiled wildlife has not been developed and specialised centres do not exist there. One reason is probably that the species most vulnerable to oil pollution, the long tailed duck, avoids coming ashore when oiled and most of the victims therefore die at sea and arrive on coasts dead.

##### Rehabilitation of marine mammals and sea turtles

The oiling of marine mammals and sea turtles due to chronic pollution is hardly known in Europe. Although permanent rehabilitation centres for otters, seals and sea turtles do exist, the primary cause of their debilitation on admittance is seldom oil pollution. A few rehabilitation centres have, however, developed protocols for cleaning these animals from oil pollution.

#### Assessments of mortalities

Every year many European coastal countries, especially countries bordering the North Atlantic and North Sea, experience oiled wildlife, as a result of chronic pollution. Countries such as the Netherlands and the United Kingdom have a long tradition of beached bird surveys, started by volunteer scientists and gradually taken over by research institutes, which have revealed a wealth of information over several decades on the oiling of seabirds. Scientists in other countries have more recently started to conduct similar programmes and as a result long term datasets are now available for many countries in Europe. Apart from delivering important long term data on seabird mortality, the problem of chronic pollution has also stimulated the development of assessment methodologies and the creation of a community of scientists dealing with these issues.

#### Box: Chronic oil pollution in Canada

One of the countries in the world with the highest levels of chronic pollution and related bird mortalities is Canada. The number of unattributed spills dramatically increased after 1990 and seems to be related to the adoption of the Oil Pollution Act by the United States in that year. This Act significantly increased the financial and legal consequences of being caught spilling oil in US waters. The practice of operational and illegal discharges moved from US to Canadian offshore waters where fines were less high. The increased level of pollution in the highly productive offshore ecosystems of Canada drastically increased seabird mortality. The situation has also led to a programme of seabird monitoring and impact assessment that is amongst the most advanced



in the world.
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### Oiled wildlife response planning

Some of the countries that were, in some cases repeatedly, confronted with oiled wildlife issues during one of these spills have subsequently developed an integrated oiled wildlife response plan, most notably the UK after the *Braer* and *Sea Empress*, France after the *Erika* and Belgium after the *Tricolor*. Within the framework of these plans, a better coordination between the authorities and Non-governmental Organisation (NGOs) have been established. The oldest European oiled wildlife response plan was developed in Shetland and originated from the building of the Europe's largest oil terminal at Sullom Voe (completed in 1982), which required integrated emergency planning. This plan proved its usefulness in the immediate aftermath of the *Braer* (1993) oil spill and was improved based on the lessons learnt from that incident. The national oiled wildlife response plan of the UK proved useful both prior to and in the aftermath of the *MSC Napoli* (UK, 2007).

### Overview of current preparedness and response activities in Europe and elsewhere in the world

The activities of many European organisations and experts have increasingly become coordinated and concerted, leading to better understanding, dissemination and implementation of good practices and increasingly successful responses to wildlife incidents.

### Conferences and workshops

To establish this coordinated network of responders in Europe, Sea Alarm organised the Sea Alarm Conferences the first of which was held in 2000,. These conferences held every two to three years (2000, 2001, 2004 and 2007) and aim to bring stakeholders together to identify priority actions for increased European preparedness. Where practical the Sea Alarm conferences have alternated with other international conferences held in Europe, on the same subject, such as the Effects of Oil on Wildlife Conference (Hamburg 2003), the Asinara Conference (Italy, 2002) and a series of three international EU workshops in 2006 (see box). All these meetings have contributed to the spreading of the news that a better preparedness for oiled wildlife incidents is needed.

#### Box: European workshops in 2006 and tools developed

As part of the funding mechanism of the *EU Community Framework for Cooperation in the Field of Accidental or Deliberate Marine Pollution*, in 2006 three European workshops were held to discuss different aspects of oiled wildlife response and planning. Each workshop was attended by formal country delegations and was aiming to provide the building blocks for the development of new tools.

#### Workshop on planning

June 15-18, an international workshop took place in Brest (France). Forty-two delegates, mainly authority officials and scientists, from sixteen European countries discussed the challenges of oiled wildlife response and planning. They looked at experiences from past incidents, such as those with the *Braer*, *Sea Empress*, *Erika*, *Prestige* and *Tricolor* and discussed different examples of wildlife response plans such as those available in Shetland, the UK, France and Belgium. The participants agreed that the best way to prepare for a response to an oiled wildlife emergency is to have an integrated oiled wildlife response plan available. Such a plan is best developed involving key stakeholders who could be expected to make a relevant contribution to the response.

#### Workshop on Impact Assessment

The second workshop was held in A Coruña (Spain) from 7-9 September. This time, thirty-eight scientists and governmental officials from eleven countries discussed good practices with regards to the assessment of impacts on seabird populations in the aftermath of an oil spill incident. Presentations on past experiences and the various techniques of data handling, necropsy and analysis were followed by in-depth discussions on the contents of an international handbook on the subject. The participants agreed that successful impact assessment needs careful pre-spill planning to avoid the loss of data and to enhance reliable data analysis and conclusions.

#### Workshop on oiled wildlife rehabilitation

The third workshop took place in the Algarve (Portugal) from 20-24 October. Forty-one wildlife rehabilitators, officials and scientists from nineteen countries discussed the animal welfare issues connected with an oiled wildlife incident and the best way of treating live casualties. Past incidents were reviewed, and views were exchanged on available rehabilitation techniques and various ethical questions. The group agreed that oiled wildlife rehabilitation is a delicate activity that should be well planned and led by experienced responders in order to provide acceptable results. The need for exchange of knowledge and training was addressed and the contents of a handbook on oiled wildlife rehabilitation were discussed.

### Developed tools

The three workshops contributed to the development of a set of new tools.

- The **Handbook on Good Practice for the Rehabilitation of Oiled Birds in the Aftermath of an Oil Spill Incident** has become a concise twenty-seven page booklet with key guidance on how oiled bird rehabilitation is best carried out under the circumstances of a larger incident. The Handbook can be downloaded from [www.oiledwildlife.eu](http://www.oiledwildlife.eu).
- The **Handbook on Impact Assessment** is an online document with a myriad of key information on best practice with regard to reliable scientific assessments on the impact of oil on seabird populations. In addition to protocols and examples of datasheets, species-specific information is also available and is continuously updated. The Handbook is accessible via [www.oiledwildlife.eu](http://www.oiledwildlife.eu).
- The **European Oiled Wildlife Response Plan – a proposal** provides a rationale for the need of oiled wildlife response planning in Europe. It proposes a model for an international response to large scale incident and includes an action plan for the development of a higher level of preparedness in Europe. The Plan is downloadable from [www.oiledwildlife.eu](http://www.oiledwildlife.eu).
- The website [www.oiledwildlife.eu](http://www.oiledwildlife.eu) has been developed as a central portal and information site that provide access to a variety of information with particular relevance to the European situation.

### Effects of Oil on Wildlife Conferences

International exchanges of experiences with oiled wildlife rehabilitation, the response to oiled wildlife incidents and aspects of preparedness have been the objective of the Effects of Oil on Wildlife Conferences (EOW). Started as a local initiative in the United States in 1990, these events have grown into the biggest scientific conference in this field. Initially all meetings were held in the US, but in 2003 the conference was organised in Europe (Hamburg), in 2005 in Canada (St Johns) and in 2007 in the US. The EOW has traditionally attracted participants from Europe, mainly scientists and rehabilitators. The EOW has been instrumental in creating strong bonds between professionally operating responders all over the world and the dissemination and publication of scientific papers and standards of best practice. The tenth EOW Conference will be organised in Europe (Tallin, October 2009).

### Response to oiled wildlife incidents

Because they were better communicating as a result of activities such as those by Sea Alarm, wildlife responders became better internationally organised and international responses did become increasingly professional. Examples of well coordinated international efforts were the responses to the *Prestige* (2002), the *Tricolor* (2003) and the mystery spill in Estonia (2006). Nowadays, responders work closely together with Sea Alarm's 24/7 emergency service, which coordinates responses where different organisations contribute. Also international training events ensure high levels of professionalism.

### Government involvement

National round table discussions have taken place in a large number of countries (Norway, Sweden, Estonia, Germany, Netherlands, Belgium, Ireland, Spain and Portugal), involving wildlife responders and government officials. Although these are informal meetings, they have already lead to the development of response plans in a number of countries including Belgium, the Netherlands and Germany. In the framework of the Baltic Sea cooperation (Helsinki Commission), it was agreed in 2007 to integrate oiled wildlife into oil spill planning and response. The countries bordering the North Sea have recently taken the decision to inform each other of oiled wildlife incidents to which they have responded. The issue has also been raised as part of oil spill response cooperation under the Barcelona Convention, and new discussions will probable take place in 2009 at the next meeting of Parties.

#### **Box: Oiled wildlife response and preparedness in the United States**

For decades the United States has been one of the world's largest importers. Due to heavy shipping traffic and a greater risk of accidental spillage, a large share of the reported oil spills from tankers over the last decade have happened in the United States (55 incidents out of 232 in 60 countries, Huijer, 2005<sup>1</sup>). The tradition of oiled wildlife response in the United States started in 1971, involving voluntary groups attempting to save oiled birds at the margin of any oil spill response carried out by the authorities.

<sup>1</sup> Huijer, K. (2005) Trends in Oil Spills from Tanker Ships 1995-2004 (2005). ITOPF. [www.itopf.com](http://www.itopf.com)

The passing of the Oil Pollution Act in 1990 formally integrated oiled wildlife response into the overall oil spill response and preparedness at a federal level and is carried out as part of the Unified Command System. In California, the 1990 Lempert-Keene-Seastrand Oil Spill Prevention and Response Act provided a unique legal and financial basis for the development of professional oil spill response. Due to its legal status and system of structural funding (from levies that are raised from every barrel of imported oil) that was created, wildlife response has developed to a high professional standard in the US, and particularly in California. State and federal agencies developed programs to gather data on seabird mortality during oil spills for litigation, expanded and improved programs for oiled seabird rehabilitation and beached bird surveys and developed large-scale seabird restoration programmes (Carter, 2003).

**Box: Wildlife response in South Africa: the benefits of adequate pre-spill planning**

Towards the end of the 20th century, South Africa had experienced a number of oil spills involving primarily penguins. Because of the protected status of this species and the continuous risks of oil pollution due to heavy shipping around the Cape, the authorities developed an oiled wildlife response plan. When the *Treasure* grounded in 2000, the plan allowed for the organisation and management of the largest oiled wildlife response ever, in which 20,000 oiled penguins were captured and treated for rehabilitation. Another 20,000 un-oiled penguins were captured, removed from areas threatened by approaching oil, and released at a site away from the oil pollution from which it was known that the animals would return to their breeding grounds. That provided enough time to clean their habitat and remove the threat of oiling there. The response to the *Treasure* spill was the largest oiled wildlife response ever. It had to deal with serious logistic challenges, but successfully saved an important species thanks to pre-spill planning.

**Training activities**

International training events on oiled wildlife response are being organised. Sea Alarm is coordinating a European group of oiled wildlife responders with representation from Norway, Sweden, Finland, Estonia, Germany, Netherlands, Belgium and the UK. Training events have taken place in 2006 and 2007, with one scheduled for 2008. WWF Finland has started training of volunteers on oiled wildlife response and this initiative has expanded to Norway and Estonia. International training opportunities on oiled wildlife rehabilitation are offered in Belgium (Wildlife Response Centre Ostend) and the UK (Royal Society for the Prevention of Cruelty to Animals). A pilot regional training workshop, aimed to inform potential wildlife responders at the international level of a regional sea, has been organised by Sea Alarm and WWF Finland, in close cooperation with the Finnish authorities in March 2008. The event was a success and it is the aim to organise these events on a more regular basis throughout Europe.

**Publications and web sites**

Much effort has gone into the production of international guidelines for oiled wildlife response and planning. Useful guidelines are now available from the internet, including IPIECA's Guide to Oiled Wildlife Response Planning<sup>2</sup>, the Guide to Impact Assessment, the Handbook on Good Practice for the Rehabilitation of Oiled Birds in the Aftermath of an Oil Spill Incident and the European Oiled Wildlife Response Plan<sup>3</sup>. An informative website has been set up as a result of an EU project in 2007 ([www.oiledwildlife.eu](http://www.oiledwildlife.eu)). The website contains a wealth of information and is regularly updated<sup>2</sup>.

**Financial constraints**

As a result of a recent reorganisation of its responsibilities, European Union funding for international activities with regards to oiled wildlife planning and preparedness have disappeared. For many years, the European Commission coordinated the *EU Community Framework for Cooperation in the Field of Accidental or Deliberate Marine Pollution*. The priorities for this programme were determined by the Management Committee for Marine Pollution (MCMP) in which the response authorities from all European Coastal States were represented. With the formation of the European Maritime Safety Agency (EMSA), which began its formal activities in 2004, the former coordinating role of the Commission was re-organised resulting in the following division of tasks as of 2007:

<sup>2</sup> An international standard on the planning of oiled wildlife response, available from [www.ipieca.org](http://www.ipieca.org) and from [www.oiledwildlife.eu](http://www.oiledwildlife.eu).

<sup>3</sup> See box "European workshops in 2006 and tool development"

- The European Maritime Safety Agency (EMSA) coordinating community action with regards to oil spill prevention, monitoring and combat at sea,
- DG Environment coordinating mutual assistance as part of the larger programme on emergency response coordination
- The *EU Community Framework for Cooperation in the Field of Accidental or Deliberate Marine Pollution* was terminated and the Management Committee for Marine Pollution (MCMP) dissolved.

As a result of this reorganisation, oiled wildlife response has fallen between two stools. Having been a priority field of interest ("Animal Welfare") in calls for proposals under the former *EU Community Framework for Cooperation in the Field of Accidental or Deliberate Marine Pollution*, the subject currently falls outwith the respective remits of EMSA and DG Environment.

### **Conclusions**

Most of the activities described above started from a motivated group of NGOs and scientists that became effective in working together and moving the issue forward. Increasingly European authorities are getting involved in the activities, a process that is actively enhanced by the participation of key officials in international workshops and conferences, national round table events and discussions at international governmental forums, especially the regional seas agreements. The need to be prepared for a response to oiled wildlife is increasingly recognised by oil spill authorities, as illustrated by the integrated response plans developed in different countries and the recent developments under the Helsinki Convention and the Bonn Agreement. As a result of a recent re-organisation of responsibilities between EU institutions, a dedicated financial programme at the EU level no longer exists.

## Identification of Actions – Research and Development needs

The most effective way to reduce the impact of an oil spill on wildlife is to be adequately prepared to respond to oiled wildlife as part of a national integrated oil spill response plan. Although Europe is moving towards increased awareness and preparedness, many issues still need to be resolved, and will need concerted actions at national, regional and EU levels. One of the areas that need serious attention is expanding and disseminating knowledge and expertise.

To be adequately prepared for oiled wildlife response one needs:

- Knowledge of the species that are vulnerable and where they are distributed at different times of the year.
- Knowledge of how to prevent threatened vulnerable animals of becoming oiled as a result of an incident.
- Knowledge of how best to treat casualties with regards to animal welfare and conservation considerations when they arrive live but oiled on the shoreline
- Knowledge of how to assess the total impact of an oil spill on the populations of the wildlife involved
- Knowledge of the lessons learnt in previous responses in order to optimise response strategies, response plans and levels of preparedness
- Knowledge of where skills and expertise can be sourced from and how these can best be mobilised and deployed in safe, timely, coordinated and effective way

The RIOS project has made an analysis of the needs in terms of scientific research and development and has identified actions that would significantly contribute to increasing the level of preparedness of European countries. The actions identified are presented in the subsequent chapters under the following headings:

- Actions to enhance the effectiveness of an oiled wildlife response
- Actions to identify species and areas that are vulnerable to oil pollution
- Actions to protect vulnerable species from oiling during a response
- Actions to enhance animal welfare and conservation issues
- Actions to enhance assessments of oil spill impact on wildlife populations

Under each heading, the main objectives for research and development are described, followed by the identified aims and actions that would contribute to their achievement.

## Actions to enhance the effectiveness of an oiled wildlife response

Whatever knowledge, techniques, equipment and facilities are available at national or international levels, it is of key importance that in the immediate aftermath of an oil spill incident, all such resources can be mobilised and integrated into an overall (oil spill) response as required and as fast and as smoothly as possible. The best way of doing this is by means of a pre-spill national or regional oiled wildlife response plan.

With regards to oiled wildlife response and planning a tremendous amount of experience is available in and outside Europe. Many activities have already taken place to make this available to the responsible authorities and key responders in European coastal states. So far however, the initiatives have been largely taken up by NGOs and organisations in the private sector and have been of an *ad hoc* character rather than that of a coordinated programme.

In 2007 a European Oiled Wildlife Response Plan was developed as a result of a European project. This Plan describes an international approach by means of which Europe as a whole could become better prepared for oiled wildlife contingencies. The main objectives in this approach were as follows:

1. An integrated oiled wildlife response plan is developed in each coastal country
2. A tiered response model is adopted as part of these response plans, allowing for a tier-3 response at a coordinated international level.
3. Existing international agreements that facilitate mutual assistance between countries adopt the integration of oiled wildlife response into national and international oil spill response plans and strategies
4. At the international level, countries cooperate to improve their national and international capacities by setting up international training and exercise programmes.

It has been identified that an overview of coordinated actions needs to be taken at national and international levels in order to implement them. Many of the actions could be carried out as part of an international research and development programme.

**Actions to enhance the effectiveness of a wildlife response**

<b>Objective</b>			<b>Wherever an oil spill threatens or affects marine wildlife in Europe, coastal countries are able to deal with the various challenges effectively as part of an integrated oiled wildlife response plan and the availability of international response resources</b>
	Aim		To make oiled wildlife response plans an integral part of a country's preparedness to oil spills
		Actions	<ol style="list-style-type: none"> <li>1. Initiate and support of planning processes at national levels</li> <li>2. Central resource from whence information on best practices with regards to oiled wildlife response planning can be obtained</li> </ol>
	Aim		<i>To include oiled wildlife planning and response in regional agreements on oil spill response and preparedness</i>
		Actions	<ol style="list-style-type: none"> <li>1. Develop and agree on a European tier-3 operation plan</li> <li>2. Lessons learnt in oiled wildlife incidents are exchanged between countries and new insights with regards to techniques, strategy, deployment tactics, etc. are studied as part of a routine follow-up procedure</li> <li>3. Call-in procedures for tier-3 assistance are integrated into national oiled wildlife response plans</li> </ol>
	Aim		<i>To ensure that international resources are identified and readily mobilised and integrated into a response at a national level</i>
		Actions	<ol style="list-style-type: none"> <li>1. A central European tier-3 centre for oiled wildlife response is installed and operational</li> <li>2. A central database listing all human and technical resources that can be mobilised as an international tier-3 response is developed</li> </ol>
	Aim		<i>To ensure that international training to an agreed standard is available for national wildlife responders and the mutual assistance between countries and international tier-3 response facilitated</i>
		Actions	<ol style="list-style-type: none"> <li>1. Training modules for oiled wildlife response coordinators are developed and provided as part of an international course</li> <li>2. Training modules for hands on oiled wildlife responders are developed and provided as part of an international course</li> <li>3. An accreditation system is developed by which qualified responders are more accurately identified</li> </ol>
<b>Objective</b>			<b>In the field of oiled wildlife response and preparedness, countries profit optimally from expertise, techniques and approaches that are available at a global level</b>
	Aim		<i>Existing structures for international cooperation and mutual assistance formally integrate oiled wildlife response as an important field of interest</i>
		Action	<ol style="list-style-type: none"> <li>1. Programs at the European and Regional Seas level adopt oiled wildlife response and preparedness as an integrated field of interest</li> <li>2. Financial resources are created to enable specific R&amp;D activities to the advance of professional oiled wildlife response and preparedness.</li> </ol>
	Aim		<i>North Atlantic exchange programmes are erected to enable a structural exchange of good practice and information between Canada, US and Europe and to work jointly on common issues of interest</i>
		Action	<ol style="list-style-type: none"> <li>1. Develop funding mechanisms that encourage cooperation between Canada, US and Europe</li> </ol>

## Actions to identify species and areas that are vulnerable to oil pollution

### Introduction

“Prevention is better than cure” as they say, and never more so than in relation to oiled animals: obviously it is far better to protect animals from pollution than have to treat them afterwards. Therefore it is crucial for the success of an oiled wildlife response to have accurate data available on the species and areas that are vulnerable to oil pollution and the spatial and temporal patterns that occur in that distribution. This information can be used to prioritize oil combat in certain areas to avoid the oiling of abundant or particularly vulnerable wildlife.

In the command post of an oil response, data on vulnerable areas for wildlife should be available in a straightforward format that allows the response management team to know the immediate priorities without any further interpretation of data. For each month or season, the areas of critical vulnerability must be indicated on a hard copy map and/or as a layer in a GIS application that is used in decision making. As a matter of pre-spill preparedness, every country should have these oil sensitivity maps available for the sea areas in their responsibility. Operational maps are produced by combining the seasonal and spatial distribution data with the oil vulnerability data of single species and in the end must be integrated into more general sensitivity maps that also include data on e.g. geomorphology, socio-economic location and other biological resources.

### Seabirds

Table 1 provides an accurate overview of the available data and main gaps on the offshore distribution of seabirds in Europe and their relative sensitivity to oil pollution. It demonstrates that for the majority of European waters, baseline data are lacking or, at best, only partly available. This makes it impossible for most European countries to develop adequate oil vulnerability maps that include reliable data on the offshore distribution of seabirds, creating the potential that at the time of a spill measures are not made in a timely manner, taken at the wrong time or place, or not taken at all.

European action should therefore prioritise filling these gaps and ensuring that adequate data are contained in the sensitivity maps of national oil spill response plans.

Area	Data for seabirds at sea	OVI's / area sensitivity	Data availability
Greenland/Iceland	<b>Anecdotal data, local surveys</b>	<b>Not analysed</b>	Data-deficient
Svalbard	<b>Surveys in southern part</b>	<b>Not analysed</b>	Partly covered
Barents Sea	<b>Summer surveys, some in spring</b>	<b>Not analysed</b>	Partly covered
Norwegian Sea	<b>Mainly nearshore surveys</b>	<b>Not analysed</b>	Partly covered
Faroeese waters	<b>Extensive year-round surveys</b>	<b>Vulnerability atlas</b>	Well covered, atlas
North Sea	<b>Extensive year-round surveys</b>	<b>Vulnerability atlas</b>	Well covered, atlas
Baltic	<b>Extensive year-round surveys</b>	<b>Not analysed</b>	Well covered, atlas
West of Britain, Irish Sea, Ireland	<b>Extensive year-round surveys</b>	<b>Vulnerability atlas</b>	Well covered, atlas
Channel, Celtic Sea	<b>Extensive year-round surveys (UK)</b>	<b>Vulnerability atlas (UK)</b>	Partly covered
Bay of Biscay	<b>Fragmented survey data</b>	<b>Not analysed</b>	Data-deficient
Atlantic off Portugal and Spain	<b>New studies just commenced</b>	<b>Not analysed</b>	Data-deficient
Macaronesia	<b>New studies just commenced</b>	<b>Not analysed</b>	Data-deficient
West Mediterranean	<b>New studies just commenced</b>	<b>Not analysed</b>	Data-deficient
East Mediterranean	<b>Not known</b>	<b>Not analysed</b>	Data-deficient
Black Sea	<b>Not known</b>	<b>Not analysed</b>	Data-deficient

Table 1: Overview of current knowledge regarding the distribution of seabirds at sea in Europe, and of the attempts to evaluate species-specific OVI's<sup>4</sup> and area vulnerability to oil pollution (from Camphuysen, 2007)

<sup>4</sup> OVI's (Oil vulnerability indices) are species-specific numerical indicators of relative sensitivity of seabirds to oil pollution. High indices are typical for mainly swimming, frequently exposed seabirds with low potential for population recovery; low indices are typical for mainly flying seabirds, with possibilities to roost on land, or with a lower general exposure in the marine environment and with a higher potential for population recovery. OVI's are specific for species but also for regions (OVI \* seabird abundance estimates), and therefore cannot be easily be copied from one region to another.



**Marine mammals and sea turtles**

In contrast to the general lack of information on the year-round distribution of offshore seabirds at sea, areas where seals and otters (haul-out sites, breeding areas, refuge sites, foraging sites) and sea turtles (nesting beaches) are at highest risk of being affected by oil, are often better studied and identified. There is however always a need to keep this information updated as the spatial and temporal patterns of habitat use may change over time. In some countries there are remote areas that are poorly studied and from which little is known about the distribution of marine mammals. In other cases the information tends to be associated with individuals or groups, and to date have largely not been incorporated into coastal sensitivity maps.

**Actions to identify species and areas that are vulnerable to oil pollution**

<b>Objective</b>			<b>Oil vulnerability maps are available for every month of the year for every regional sea in Europe identifying the critical areas for marine wildlife that should be protected from oil pollution with the highest priority</b>
	Aim		<i>European Oil vulnerability maps for seabirds are available for all European regional seas</i>
		Action	Carry out seabird distribution studies for European regional seas that are still data deficient and update those which are ageing
		Action	Analyse oil vulnerability Indices (OVI's <sup>5</sup> ) for seabirds for each European Regional Sea where these data are non existent
	Aim		<i>European oil vulnerability maps for marine mammals and sea turtles are available for all European regional seas</i>
		Action	Identify spatial and temporal patterns of marine mammals and sea turtles for each regional sea
		Action	Identify areas of of European importance vulnerable to oil spills
<b>Objective</b>			<b>Wildlife vulnerability maps have been integrated into national oil spill response plans</b>
		Action	Each country must translate the regional vulnerability maps into national sensitivity maps for wildlife

<sup>5</sup> See footnote 4 for a description of OVI's

## Actions to protect vulnerable species from oiling during a response

At the stage where oil has entered the marine environment and is drifting towards or into areas that are known to be critical to vulnerable species, the responder has basically two main strategies to protect wildlife from oiling:

- Preventing the oil reaching the vulnerable areas
- Scaring or removing the animals from the oil slick or threatened areas.

### ***Preventing the oil reaching the vulnerable areas***

Oil spill responders may look at a number of options when combating oil spills (see box) and normally, their approach is driven by factors like oil slick density, the location of the source or environmental windows of opportunities. Exact and updated information on the actual whereabouts of vulnerable wildlife in the affected area will reduce the impact on marine wildlife if clean-up operations are prioritised accordingly.

Apart from oil vulnerability maps (see 1.3), real time field data need to be provided from the area where the oil is or where it may be expected in due course given wind and drift models. Such data should then help steer the direction of the response, in order to reduce the impact of the spill by minimising the risk for unaffected wildlife in the area. This new information in fact updates the more static and perhaps outdated information from the vulnerability maps. The vulnerability maps act a red flag to ensure that the correct species are anticipated and looked for in the field. They do not replace field observations, but increase the likelihood that the field observers will look in the correct locations. The maps also help with pre-planning spill response activities.

Local wildlife experts should be available to provide updated information on request and/or to assist, where practical, with making field observations on the abundance of wildlife from aircraft or ships. Capable experts should be identified at both national and European levels and be trained so that they can perform effectively as part of an oil spill response management system. Experts who potentially could be called upon to assist the oil spill response should be aware of the particular circumstances of an oil spill response and the kind of information that is needed. The skills and techniques of on-the-spot area vulnerability assessment need to be evaluated and standardised. An international course or on-line tutorial is essential to train experts in different countries.

### ***Scaring or removing the animals away from the oil slick or threatened areas***

Working in conjunction with trajectory modellers will allow to predict whether drifting oil is moving towards colonies of seabirds, mammals or nesting sea turtles. If this is the case, technologies should be considered that enable the temporary relocation of the animals from the threatened area until the threat of oiling no longer exists. This might be achieved by hazing or deterrence (scaring the animals out of the area) or pre-emptive capture (capture un-oiled animals for release at a safe site). Although considerable experience with these techniques exists at some places in the world, in Europe there are no records of their use in past incidents. For future events in Europe it is important that these techniques are better known and are ready to be used where applicable and necessary. Actions should include the development or sourcing of handbooks on methods of hazing/deterrence techniques, pre-emptive capture, and an assessment of the applicability of these methods to European species. Research into new methodologies and techniques, especially for use in open sea, should be encouraged.

The use of pre-emptive capture techniques can only be considered for flightless animals and are not suitable for European seabirds. In the case of marine mammals or sea turtles, pre-emptive capture techniques could be applied under certain circumstances. When oil is approaching for instance haul out sites of seals, pre-emptive capture might be considered an option. More research is needed as to how and when these techniques could be applied.

In the case of sea turtles, plans should be prepared for the protection of nesting beaches and the removal of eggs in the case an oil spill takes place during the nesting season.

Actions to protect vulnerable species from oiling as part of an oil spill response

**Real time observation techniques**

<b>Objective</b>			<b>Optimised real-time observation techniques are used as a matter of routine to detect wildlife distributions in the areas that are threatened by an oil spill</b>
	Aim		<i>Guidelines on good practice are available at an international level and brought into practice through integrated planning at national levels</i>
		Actions	<ol style="list-style-type: none"> <li>1. Assess existing techniques for field observation and develop field guides, handbooks/job aids and standardised protocols accordingly</li> <li>2. Train scientists to use the techniques and report on observations as part of an oil spill response</li> <li>3. Integrate real-time wildlife field observations into oil spill response planning</li> </ol>

**Hazing, deterrence and pre-emptive capture**

<b>Objective</b>			<b>Hazing, deterrence and pre-emptive capture techniques are well assessed for their use in European oil spills and their potential contribution to the protection and saving of vulnerable marine wildlife are well known in each coastal country.</b>
	Aim		<i>Existing hazing and deterrence techniques for European seabird species have been assessed and have resulted in guidelines for best practice</i>
		Actions	<ol style="list-style-type: none"> <li>1. Source existing handbooks and assess their usefulness for European species and situations</li> <li>2. Encourage the development of effective new hazing/deterrence methods for use at open sea</li> </ol>
	Aim		<i>Existing hazing and deterrence techniques for European sea turtles and marine mammals have been assessed and have resulted in guidelines for best practice</i>
		Actions	<ol style="list-style-type: none"> <li>1. Source existing handbooks and assess their usefulness for European species and situations</li> <li>2. Encourage the development of effective new hazing/deterrence methods for use at open sea</li> </ol>
	Aim		<i>Existing pre-emptive capture techniques for sea-turtles and marine mammals have been assessed and have resulted in guidelines for best practice</i>
		Actions	<ol style="list-style-type: none"> <li>1. Study the usefulness of pre-emptive capture of marine mammals and sea turtles in the aftermath of oil spills</li> <li>2. Develop guidelines for pre-emptive capture in the case of European marine mammals and sea turtles</li> <li>3. Develop guidelines for the removal of sea turtle eggs from nesting beaches based on experiences elsewhere in the world</li> </ol>

## Actions to enhance animal welfare and conservation issues

The arrival ashore of oiled animals that are still alive but suffering from contamination has a strong emotional effect on the public and immediate effective response, as part of an overall oil spill response, is required for two reasons:

- To minimise the animals' suffering, as most animals are likely to die from the effects of the pollution if no human action is taken.
- To avoid that ill-informed and untrained members of the general public undertake well intended, but unprofessional actions outside the coordinated response when they assume that animals are not adequately cared for by the authorities.

From an animal welfare point of view, the response to oiled wildlife must be well prepared, immediately mobilised as part of the overall oil spill response, professionally carried out, and well communicated to the public. It should consist of two alternative strategies, euthanasia and rehabilitation.

Euthanasia should be considered the most effective way to end the suffering of an animal, but in terms of life or death has a drastic, irreversible effect, adding to the total mortality caused by the spill. It should be reserved for animals that are destined to die, and for which an alternative treatment is not available or is certain not to be effective. Euthanasia should also be considered when too many animals are recovered and there are insufficient facilities and personnel to deal efficiently with the incident

Rehabilitation can save animals from death. In contrast to euthanasia, an attempt to rehabilitate an oiled animal is for many intuitively the right thing to do, and a coordinated effort into this direction normally receives strong support from the general public. However hopeful it is, an attempt to clean and rehabilitate an oiled animal is also bound to lengthen and potentially increase the individual's suffering, especially if it is not professionally carried out using modern protocols. The animal could die during treatment, or shortly after released if it has been cleaned but not fully recovered from the toxic effects of the oil.

From a purely technical perspective an attempt to rehabilitate is only acceptable if at the end the animal will regain its former quality of life, as if it had never become oiled. A responsible approach should mean that the probability of long-term survival is assessed on an animal's condition, prior to it being admitted to the rehabilitation process. It is good practice that every animal presented to a rehabilitation centre is subject to a strict triage procedure. Triage is the process of selecting casualties that have the highest chances of surviving treatment and full recovery, and undertaken by trained professionals, using recognised and accepted criteria. These criteria can only be developed from previous experiences in rehabilitation centres and health state data from healthy, un-oiled specimens of the same species.

Both Euthanasia and Rehabilitation should be part of a country's response package. Because of emotion and public perception of wildlife rehabilitation, the process of decision-making needed to decide which (group of) animals will be rehabilitated and which will be euthanized needs to be transparent. The decisions must be based on species-specific criteria and critical values, which need to be developed at the international level and agreed by scientists and key stakeholders.

A strong argument to invest in the professionalism of oiled wildlife rehabilitation is that a rehabilitation programme offers the opportunity to study the effects of oil on wildlife. A stronger involvement of scientists and veterinarians in the activities of permanent rehabilitation centres should lead to better documentation of rehabilitation activities and the development of improved methodologies resulting in consistently reviewed and current protocols.

A research and development programme should aim to advance the professionalism of this part of an oil spill response and should aim to:

- Improve current rehabilitation techniques by identifying and improving species specific methodologies. This would include comparative study of rehabilitation methodologies currently available in Europe and other parts of the world, and the selection of successful techniques and approaches
- Improve triage technologies. This would include the collection of health condition criteria per vulnerable species and make them available as an on-line resource. In addition, best practice field methods to measure the health state of animals taken into care should be widely communicated and further improved, e.g. by using new technologies that have become available.
- Identify or develop methods of humane euthanasia, especially for use in large incidents with many casualties
- Train wildlife rehabilitators to respond professionally as part of an integrated oil spill response
- Include euthanasia and rehabilitation as alternative methods in response planning and define adequate decision making criteria in terms of triage.

**Actions to enhance animal welfare and conservation issues**

**Rehabilitation**

<b>Objective</b>			<b>Professionalise the treatment of live oiled animals aiming at the development of species specific rehabilitation techniques and their use during oil spill incidents under various circumstances</b>
	Aim		<i>To research into and develop good practices to reduce stress and mortality due to animal handling</i>
		Actions	<ol style="list-style-type: none"> <li>1. Develop good practice methodologies for search and collection, transportation, stabilisation and animal handling within rehabilitation centres</li> </ol>
	Aim		<i>To assess and compare the various rehabilitation protocols currently used in oiled wildlife rehabilitation centres throughout Europe are to identify common factors for success and failure</i>
		Actions	<ol style="list-style-type: none"> <li>1. Identify different methodologies currently used in different rehabilitation centres and develop criteria that would allow their scientific comparison, especially with regards to rehabilitation success</li> <li>2. Collect success stories from different rehabilitation centres (long post release survival) and assess the factors that contributed to these successes</li> </ol>
	Aim		<i>To ensure that successful species specific rehabilitation protocols are adopted at a European level and applied successfully by cooperating rehabilitation centres</i>
		Actions	<ol style="list-style-type: none"> <li>1. Intensified standardised ringing of rehabilitated birds, preferably using coloured rings</li> <li>2. Intensified efforts at the breeding colonies to study the behaviour and successful breeding of rehabilitated birds</li> <li>3. Better and more direct reporting of observations from the breeding colonies so that they can be compared with the procedures that were followed in the rehabilitation centres</li> <li>4. Successful approaches are shared between rehabilitation centres and implemented</li> </ol>
	Aim		<i>To ensure that less labour intensive cleaning methods for birds become increasingly available</i>
		Actions	<ol style="list-style-type: none"> <li>1. Compare hand washing methods with machine washing methods</li> <li>2. Invest in technological programmes to improve the performance of washing machines if appropriate</li> <li>3. Encourage the development of promising new cleaning technologies, such as magnetic cleaning using iron powder or more effective detergents</li> </ol>
	Aim		<i>To ensure that scientific studies on the effects of oil on wildlife are carried out more structurally in Europe and significantly contribute to the international development of this scientific field</i>
		Actions	<ol style="list-style-type: none"> <li>1. Stimulate the more active involvement of research institutes and universities in the day to day practice of rehabilitation centres</li> <li>2. Encourage exchange programmes between European centres and those elsewhere in the world, in particular the United States</li> </ol>
	Aim		<i>To ensure that, for each oiled species, an accurate health status diagnosis can be made based on scientific research and the development of advanced technologies</i>
		Actions	<ol style="list-style-type: none"> <li>1. Health status criteria and critical values per species are collected at an international level, to the same criteria and presented on line</li> <li>2. The use of these criteria and values can increasingly be compared with post release survival studies</li> <li>3. Research in new technologies to improve diagnoses and the accuracy of criteria</li> </ol>

**Euthanasia**

<b>Objective</b>			<b>The most appropriate and acceptable (humane) ways of killing oiled animals are known, and these methodologies are described in relation to the scale (number of casualties), the equipment, facilities and logistics they need.</b>
	Aim		<i>Describe the best known and most efficient methods of humane killing for different species</i>
		Actions	1. Develop an international guide to best practices for the euthanasia of oiled wildlife at different scales, describing human and technical resources and logistics

**Address ethical dilemmas (rehabilitation vs. euthanasia)**

<b>Objective</b>			<b>Decisions on the treatment of live animals can be taken based on best available knowledge on health assessment and scientific predictions on post release survival</b>
	Aim		<i>To ensure that up to date triage criteria are available for individual species</i>
		Actions	1. Health criteria for different species are described and published as an online resource 2. A European guideline for triage is developed, published, and adopted for international use in European Member States
	Aim		<i>To assess the scale and impact of rehabilitation</i>
		Actions	1. Guidelines for the set up and operation of a rehabilitation facility with regards to numbers of casualties, available resources and critical local circumstances 2. Develop international standard protocols for the professional rehabilitation of incident casualties.
	Aim		<i>To ensure that decision support tools can be used to help address the ethical questions in wildlife response are available</i>
		Actions	1. Develop a European vision on the humane killing of large numbers of oiled wildlife casualties, providing ways to weigh arguments of animal welfare and conservation 2. Develop communication programs so that the larger public understands and supports the decisions that a responder needs to take.



## Actions to enhance assessments of oil spill impact on wildlife populations

Birds are amongst the animals most heavily impacted by oil pollution and in Europe, with seabirds (auks and divers) and waterfowl (sea ducks) being primarily the most affected species. Because most seabirds have very high annual survival rates but low annual productivity, oil spills can potentially have a large impact on populations. For each oil spill incident that affects marine animals, an impact assessment needs to be carried out. Data should be collected in a systematic and consistent way in order to be able to detect effects at the population level in a scientifically sound and reliable way.

Like the other components of a wildlife response, an impact assessment is dependent on relatively small windows of opportunity. Oil affected animals may wash ashore within hours or days after the start of the incident and this may continue for several weeks or months. During the incident response, a shift in the species composition of collected animals may be observed due to migration. Collecting, analysing and counting the corpses or live individuals should be well organised, so as to avoid double counting, to ensure adequate samples are taken as required (usually daily), to cope with the storage of corpses before they can be analysed and to avoid scavenging or disappearance of carcasses as a result of shoreline cleanup operations or predation. In addition, assessments need to be made of the numbers of oil-affected animals that are not found, e.g. by carrying out drift experiments and to correct for effort and coasts not visited.

An important tool for impact assessment is biometry, e.g. the use of geometrical data and molecular techniques to describe characteristics of specific (breeding) populations. The on-line availability of this baseline information is crucial to make sound assessments on population impacts.

The effective implementation depends on the inclusion of impact assessment activities with integrated oiled wildlife contingency plans, identifying expertise, manpower and resources and procedural details for their mobilisation and operations.

As part of an EU project a start has been made with providing a standard methodology and on-line information. The published handbook, protocols, forms and information sheets need further completion, refinement and evaluation. As part of this process, methodologies used elsewhere in the world need to be identified and evaluated for use in Europe. An important example is the development of protocols and planning instruments for drift experiments, which are carried out as a routine operation in North America, but are absent in European response plans. In general, seabird specialists from different European countries should cooperate in this field. Relatively inexperienced seabird scientists should be offered a two days course to become familiar with the essentials of coordinating a scientific impact assessment in the aftermath of an oil spill incident.



**Actions to enhance impact assessment**

<b>Objective</b>			<b>The impact of an oil spill on marine wildlife populations can be assessed with highest possible accuracy</b>
	Aim		<i>To make available on line agreed protocols for impact assessment from which forms and tutorials can be downloaded.</i>
		Actions	Complete and improve the published manual and standard forms, ideally by an international working group
	Aim		<i>To compare accurate assessments of total mortality in relation to measured mortality (carcass collection and analysis)</i>
		Actions	<ol style="list-style-type: none"> <li>1. Develop a European strategy for the use of real-time experiments (e.g. drift block experiments) in the immediate aftermath of an oil incident</li> <li>2. Study at sea behaviour of oiled animals to be able to make species specific predictions of the probability that they wash ashore after death</li> </ol>
	Aim		<i>A range of technologies is available and can be applied to assess mortality per breeding colony</i>
		Actions	<ol style="list-style-type: none"> <li>1. Intensify standardised ringing programmes for birds</li> <li>2. Develop an on-line necropsy and biometry handbook in which population specific characteristics are provided and continuously updated</li> <li>3. Develop and apply new biometry technologies such as genetic fingerprinting.</li> </ol>
	Aim		<i>To ensure that impact assessment is integrated into oil spill response plans and trained staff to lead these activities are available</i>
		Actions	<ol style="list-style-type: none"> <li>1. Integrate impact assessment into national oil spill response plans</li> <li>2. Courses are developed and available to train scientists and other responders to carry out this activity.</li> </ol>

## Priorities

This Action Plan has identified a large number of objectives, aims and actions that together would significantly improve Europe's preparedness to deal with oiled wildlife and to reduce the impacts of oil on wildlife. In reality, however, with the limited amounts of funding available at any time, priorities need to be identified.

Short and long-term priorities have been identified and also priority actions per species group, i.e. seabirds, marine mammals and sea turtles (see tables below).

Short term priorities are actions that can be carried out almost immediately, will lead quickly to measurable results with relatively small amounts of funding. Long-term priorities are actions that are considered absolutely necessary, but will take considerable time and funding to complete.

Overview of short term and long term priority actions

	Short term priorities	Long term priorities
Actions to enhance the effectiveness of an oiled wildlife response	<ul style="list-style-type: none"> <li>Integrate oiled wildlife response into national oil spill response planning                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Ensure the continuation of catalyst organisations such as Sea Alarm                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Encourage the development of international mutual assistance between countries in a tiered response system                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Enable training of oiled wildlife responders                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Generate sources of funding that enables research and development in the field of oiled wildlife response and preparedness</li> </ul>	<ul style="list-style-type: none"> <li>Integrate oiled wildlife response and preparedness into regional and EU programmes of cooperation</li> </ul>
Actions to enhance international cooperation	<ul style="list-style-type: none"> <li>Enable exchanges between European experts and experts from North America                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Create funding possibilities for transatlantic projects</li> </ul>	<ul style="list-style-type: none"> <li>Fully integrate oiled wildlife response and preparedness into international research and development programmes of oil spill response and preparedness</li> </ul>
Actions to identify species and areas that are vulnerable to oil pollution	-	<ul style="list-style-type: none"> <li>Funding sources should become available soon to start working on filling the gaps in knowledge on vulnerable species distribution in many regional seas, with a highest priority to seabirds</li> </ul>
Actions to protect vulnerable species from oiling during a response	<ul style="list-style-type: none"> <li>Include the various techniques into contingency planning                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Develop handbooks on hazing, deterrence and pre-emptive capture</li> </ul>	<ul style="list-style-type: none"> <li>Develop new remote sensing technologies</li> </ul>
Actions to enhance the treatment of live oiled animals	<ul style="list-style-type: none"> <li>Improve practices of banding rehabilitated birds by using standard colour banding and intensify post release monitoring                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Enable bird rehabilitation centres to work together and involve scientists in evaluating and improving existing protocols                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Enable the development of triage criteria                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Enable international training of wildlife rehabilitators in oiled wildlife rehabilitation as part of an oil spill incident</li> </ul>	<ul style="list-style-type: none"> <li>Professionalise oiled wildlife rehabilitation                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Develop and establish internationally accepted protocols for the rehabilitation of oiled wildlife in the aftermath of oil spill incidents</li> </ul>
Actions to enhance assessments of oil spill impact on wildlife populations	<ul style="list-style-type: none"> <li>Integrate impact assessment into oil spill response planning                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Develop European guidelines for the use of drift experiments and implement these techniques through contingency planning</li> </ul>	<ul style="list-style-type: none"> <li>Tissue banks for molecular analysis of origin and population structure</li> </ul>

Overview of priority actions per species

	Priorities seabirds	Priorities marine mammals	Priorities sea turtles
Actions to identify species and areas that are vulnerable to oil pollution	<ul style="list-style-type: none"> <li>Filling the gaps in knowledge on seabird distribution should receive highest priority</li> </ul>	<ul style="list-style-type: none"> <li>Updating of current knowledge on areas of high concentration</li> </ul>	<ul style="list-style-type: none"> <li>Updating of current knowledge on important nesting areas</li> </ul>
Actions to protect vulnerable species from oiling during a response	<ul style="list-style-type: none"> <li>Study hazing and deterrence techniques for European seabirds and prepare for implementation of promising techniques through response plans</li> </ul>	<ul style="list-style-type: none"> <li>Study pre-emptive capture techniques for different species and prepare for implementation through response plans</li> </ul>	<ul style="list-style-type: none"> <li>Develop best practice guidelines for the collection of eggs from threatened nesting beaches</li> </ul>
Actions to enhance the treatment of live oiled animals	(See short term priorities)	<ul style="list-style-type: none"> <li>Enable seal and otter rehabilitation centres and scientists to form networks, to exchange knowledge and develop good practice guidelines for the rehabilitation of oiled marine mammals in Europe                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Intensify cooperation between Europe and other parts of the world</li> </ul>	<ul style="list-style-type: none"> <li>Enable sea turtle rehabilitation centres and scientists to form networks, to exchange knowledge and develop good practice guidelines for the rehabilitation of oiled sea turtles in Europe                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Intensify cooperation between Europe and other parts of the world</li> </ul>
Actions to enhance assessments of oil spill impact on wildlife populations	<ul style="list-style-type: none"> <li>Integrate impact assessment into oil spill response planning</li> </ul>	<ul style="list-style-type: none"> <li>Integrate impact assessment into oil spill response planning</li> </ul>	<ul style="list-style-type: none"> <li>Integrate impact assessment into oil spill response planning</li> </ul>
Actions to enhance the effectiveness of an oiled wildlife response	<ul style="list-style-type: none"> <li>Prepare for worst case scenarios, e.g. oil spills in which hundreds to thousands of oiled birds arrive ashore for many days                             <ul style="list-style-type: none"> <li>o</li> </ul> </li> <li>Work towards international strategies for euthanasia and rehabilitation</li> <li>Develop a tiered response system</li> </ul>	<ul style="list-style-type: none"> <li>Enable the training and mobilisation of marine mammal experts in case of an oil spill involving seals or otters</li> </ul>	<ul style="list-style-type: none"> <li>Enable the training and mobilisation of sea turtle experts in case of an oil spill involving sea turtles</li> </ul>