HANDBOOK ON OIL IMPACT ASSESSMENT

4.0 SPILL RESPONSE

4.2 Biological advice

Introduction

Under the assumption that an oil spill occurs in a well-studied part of Europe (see 3.0 Preparedness and issues regarding the evaluation of area sensitivity), detailed information is about spatial and temporal patterns in the sensitivity to oil pollution of the affected sea areas should be readily available. This information shall then be mobilised and used to help protect the most sensitive areas and where advice need be provided when oil clean-up operations are to be organised (focusing on the most sensitive areas at the expense of areas of less concern whenever possible). While area assessments include aspects of preparedness (recent knowledge of areas prior to spills ready at hand, for example as 'vulnerability atlases'), it also includes aspects of immediate action. It is very likely that the material at hand is outdated, and quick updates with more recent data, including unpublished material collected by local experts, are important.

For oil spills that occur in areas that are either data deficient, or where the appropriate analyses have not been conducted on data collected in the recent past, immediate action is required to inform the technical responders with the best possible information regarding spatial patterns in area sensitivity.

Figure 4.2.1 Concentrations of auks at sea, such as Common Guillemots and Razorbills as shown here, are highly vulnerable to oil pollution. The biological advice provided during an oil spill should allow oil spill responders to distinguish highly sensitive sea areas from areas of less concern. © CJ Camphuysen

In both cases, to help minimize further damage caused by the oil spill, expert biological advice must be called in immediately: either to interpret the material at hand or to provide any further information that could be useful to evaluate the affected area. Because the information on the area sensitivity collected beforehand is likely to be outdated, updates must be prepared as soon as possible, using all possible sources of data. The experts attracted to the oil spill response should be either holding all such data sets, or they should have the relevant contacts needed to produce updated information at short notice.

An important and often overlooked aspect is high-quality advice, not only regarding the sensitivity of the affected area exactly *during* the spill, or when the oil is released, but also of the affected area and surrounding waters in weeks and months to come given migration patterns and seasonal shifts in wildlife abundance. Clean-up operations may be prioritised using this information, and dangerous operations may either be postponed, skipped entirely, or hastened, when expected temporal variations in the sensitivity of the affected area would call for such measures.

Three issues are discussed under this chapter:

- How to evaluate a sea area in terms of sensitivity to oil pollution
- How to provide updated advice to help minimise further oiling of wildlife
- How to provide updated advice on near-future, worst case scenarios and best practice

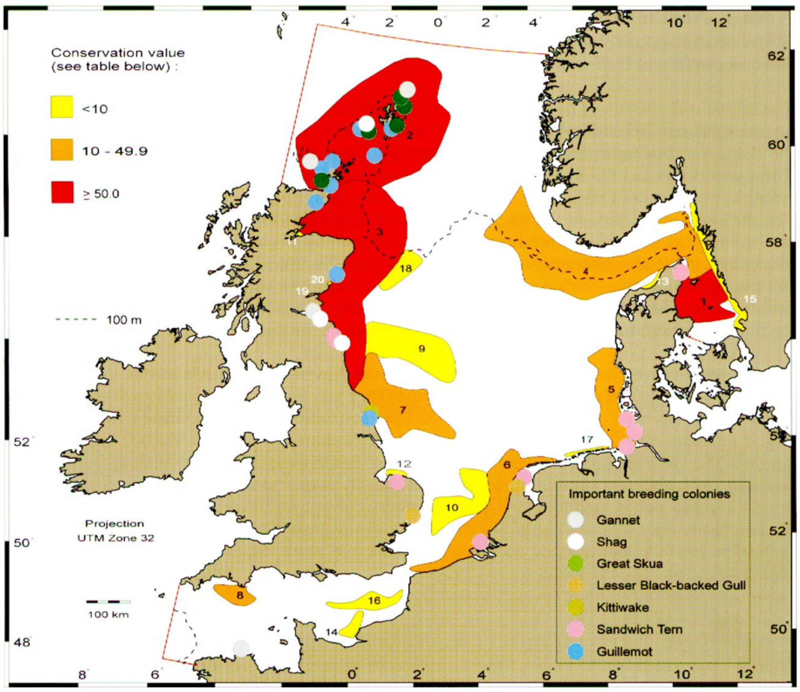

Figure 4.2.2 Previous studies within the North Sea have resulted in seabirds at sea distribution atlases, which were in turn used to draft maps highlighting areas of international importance for seabirds. The illustrated case is a summary of results produced in the late 20th century, showing the location and extent of 20 selected areas and breeding colonies of international importance for seabirds in the North Sea, the Channel and the Kattegat (from Skov *et al.* 1995).

Although highly valuable in itself, the scale of this information is insufficiently small to be of much use for oil spill responders. Moreover, seasonal aspects make that the sensitivity of sea areas for oil pollution will vary through the year.

4.2.1 Area sensitivity

There are spatial and temporal patterns in the sensitivity of sea areas for oil pollution, for as far as marine wildlife such as seabirds and marine mammals is concerned (Chapter 3.0 Preparedness). If seabird species with a high OVI score (see Chapter 3.0 Preparedness) occur in high densities in a particular sea area, that area would naturally classify as being sensitive to oil pollution and immediate conservation actions would be required in case of a spill. Data on area specific differences in the sensitivity must be promptly checked and updated *during* the spill, by contacting the persons, institutions or organisations that collected the data beforehand as their part in oil spill preparedness or otherwise. Common sense is needed to swiftly answer the most pressing question during an oil incident:

Where are the highest densities of vulnerable seabird species located today?

As a short cut, in most European seas, the most vulnerable seabirds, likely to be affected in large numbers, would be (not necessarily in this order) auks (Alcidae), divers (Gaviidae), cormorants and shags (Phalacrocoracidae), gannets and boobies (Sulidae), and seaduck (Anatidae) (Camphuysen 1989, Chapter 3.0 Preparedness, Table 3.1). Auks and seaduck are particularly important, given the often large numbers affected by spills.

Generally speaking, some of these are inshore species (Gaviidae, Phalacrocoracidae, Anatidae), while others are offshore species (Alcidae, Sulidae). Since technical oil spill responders have a tendency to prioritise oil clean up such that shorelines are protected to become oil-contaminated, the importance of offshore areas should be evaluated first. Nearshore and offshore bird concentrations should be evaluated in nearly every spill, and the data required for a proper evaluation are rather different. Seabird populations are studied and monitored in very different ways.

Seabird colonies are usually fixed, their locations don't change much, and even if population censuses themselves may be outdated, the breeding locations are probably well known (e.g. Lloyd *et al.* 1991, Thibault 1993, Mitchell *et al.* 2004, Anker Nilssen *et al.* 2006). Wildfowl winter counts are organised in well known roosting/feeding areas and the characteristics of these areas are also rather fixed, even if numbers may widely fluctuate between years, seasons or even days (Meltofte *et al.* 1994, Gilissen *et al.* 2002). The locations of high tide roosts are usually fairly well known and again, the locations of the most sensitive roosts will not change much over time (Butler *et al.* 2001). The 'offshore' distribution of seabirds and waterfowl at sea or in large estuaries and lakes is subject to much more variation, and even if rather robust distribution patterns may have been found during monitoring, these patterns are subject to change (e.g. Arcos & Oro 1996, Vaitkus 1999, Speckman *et al.* 2000, Pelagic Working Group 2002, Schwemmer & Garthe 2006). Yet, (tidal) fronts, gulf stream eddies, river mouths, sand banks and other shallows may have been identified as important bird areas during previous studies (e.g. Bourne 1981, Richner 1988, Harrison *et al.* 1990, Schneider 1990, Haney 1991, Hunt *et al.* 1999, Daunt *et al.* 2006) and in the absence of other (better) data, such areas may need to be highlighted first during an oil spill response.

While the monitoring of seabird colonies and wintering wildfowl concentrations is usually organised on a regional or national scale (irrespective aspects of international co-operation), the distribution of pelagic seabirds at sea is not normally assessed within the framework of national boundaries. Even where countries focus on waters under their jurisdiction, an early initiative to conduct the work according to standard protocols using ships of opportunity led to the foundation of the European Seabirds at Sea database (ESAS database), a partnership of institutions and organisations from countries around the North Sea. It is sensible to contact the database manager of ESAS during a spill to obtain an updated overview of seabird distribution in the affected area. The group has recently been expanded to include institutions and organisations working off NW Africa, in Macaronesia, and within the Mediterranean. Even if data may not yet have been submitted to ESAS, the database manager should be able to redirect a data request to the most appropriate organisation(s) within the affected area[1].

Figure 4.2.2 Examples of recently published distribution atlases of waterfowl and seabirds in Europe based on waterbird counts (left Gilissen *et al.* 2002) and seabirds at sea surveys (second left to far right Stone *et al.* 1995, Skov *et al.* 1995, and Pollock *et al.* 2000). These studies are essential baseline data providing high quality information of spatial patterns in seabird and waterbird distribution. Note however that published (printed) reports are soon ageing and in need of updates with more recent material. Do contact Wetlands International and European At Sea database for contact addresses in case of a spill to update any published material listed in this handbook.

4.2.2 Providing a data update

Prioritising clean-up operations in the most sensitive areas can greatly reduce the number of casualties during a spill. To update existing data, or to provide information in areas that have been identified as data deficient:

(1) Contact the European Seabirds at Sea database manager to provide data updates

(2) Contact national/regional offshore surveyors (if available) to provide data updates

(3) Contact Wetlands International or local wildfowl surveyors to provide data updates

(4) Contact anyone, any organisation that is likely to be able to provide recent counts of waterfowl in the area; consult recent publications and reports

(5) Swiftly re-survey/inspect the area to confirm that the available data is correct

A swift survey (using an aircraft or a ship) may not always be possible, either because of bad weather, or because there is simply no observation platform available. Do realise, however, that even the most recently collected data may not predict the most sensitive concentrations precisely. The data update should be done by an ornithological expert. However, a data update is fully pointless and a waste of time if the material is not translated into concrete advice for the oil spill responders. A data format that is to be understood by a more general audience (i.e. non-ornithologists) is similar to the formats used in vulnerability atlases (Carter *et al.* 1993, Webb *et al.* 1995ab):

- generalised distribution patterns of highly sensitive groups (not on species level)
- emphasis on the top three most sensitive areas
- clear suggestions for an oil clean-up strategy from the wildlife point of view

Produce maps (or clear indications on existing maps) rather than tables and texts, and make the report as short and to the point as possible. Be prepared to produce the data in a powerpoint presentation, so that oil spill responders can pick up the data and discuss the advice with you.

Figure 4.2.3 Estonian oil spill, February 2006. Oil Mute Swans *Cygnus olor* on ice near Tallinn. The oil released during the spill disappeared under ice and the situation in terms of area sensitivity in spring needed consideration. © CJ Camphuysen

4.2.3 Producing worst case scenarios on the spot

Migratory movements between areas in winter, spring, summer, and autumn lead to shifts in the seabird community within areas and, hence, in the occurrence of species with high OVI scores. Oil spill responders should take the seasonality of these patterns into account and realise that the situation might chance *during* an event. An essential part of the biological advice to be provided to oil spill responders is the drafting of a (worst) case scenario, while forecasting shifts in abundance on the basis of local knowledge of migration routes, timing of migration, and stop-over sites.

Common sense is needed to consider the next most pressing question during an oil incident:

Given the highest densities of vulnerable seabird species located today, how about the near future?

If the area is swiftly and completely cleaned from oil, forecasting future scenarios may not be needed. However, given that oil spill can take many months or even years before the area can be considered clean, shifts in distribution patterns of sensitive wildlife need to be considered. Areas that rank as fairly unimportant during the spill may in fact be very important as staging areas or stopover sites for vulnerable species at other times of the year.

A classic example is the recent spill in Estonia (generally referred to as 'the mystery spill'), that took place in winter in an area very rich in waterfowl near Tallinn. With the spilled oil disappearing under ice, the scenario needed to be broadcasted that a re-appearance in spring could potentially lead to a much worse effect on waterfowl, given the knowledge that literally millions of migratory waterfowl would use certain Estonian waters as stop-over sites. Even although there was substantial damage caused immediately following the spill, the risk for further mortality several months after the event was considerable.

It depends on the type of spill and the amount of oil released what forecasters should take into account. In large incidents, such as the accidents with tankers as the *Prestige* and the *Erika*, oil continuous to be released from the wrecks in many months following the incident. It is therefore important to forecast major changes in the wildlife community in the near future, so that certain potentially risky activities during the oil spill response (possibly causing further outflows of oil) can be planned in accordance with wildlife interests.

Important sources of data could be: offshore surveys, seawatching results and other systematic counts of waterbird migration, and waterfowl censuses through the year. The timing of breeding seasons will have to be considered while forecasting for example the likely return of breeding populations in winter or spring. Do evaluate the affected area in terms of the utilisation as a stop-over site or temporary foraging ground for migratory waterfowl wintering to the south or west and breeding to the north or east of the affected area.

Figure 4.2.4 Ship-based offshore surveys are an important technique to map the distribution of seabirds at sea. Standard protocols have been introduced in the late 1970s in the North Sea, following the example of workers in Canadian waters. The data have been stored into a joint database, the European Seabirds At Sea database, available for consultation during oil spills from the central address in Aberdeen © M. Schaap (left) and CJ Camphuysen (right)

4.2.4 Participation in the oil response team

To be of use, the biological advice provided should at least be considered and hopefully used by oil spill responders during an emergency. Do realise, however, that oil spill responders may have other priorities such as safeguarding human life during an incident. In many cases, however, carefully drafted and presented biological advice could minimise (further) losses of vulnerable wildlife, if it would be given serious consideration during a response. If decisions must or can be made regarding the exact location of the sinking or grounding of a ship in trouble, clear cut biological advice regarding the differences in sensitivity to oil pollution of potential sites can be very useful. When potentially dangerous operations must be planned (risking for example further releases of oil into the sea), the exact timing of these may be considered with forecasted changes in wildlife abundance in the affected area in mind. When clean-up operations are scheduled, priority may be given to the most sensitive areas at the expense of areas of less concern.

The most useful suggestion would be to have the expert biologist participating in daily meetings of the response team, so that any biological advice can be modified according to direct demands, and so that the technical responders become fully aware of alternatives for any planned actions after being confronted with spatial and temporal patterns in vulnerable wildlife distribution. A fruitful dialogue is possible only on the basis of mutual respect, and the active participation in the crisis team is an important step in the process.

Figure 4.2.5 Seawatchers are seldom involved in oil spill reponses, but their data can be highly valuable to forecast temporal shifts in nearshore seabird abundance and to describe predictable migration patterns. In most countries, waterfowl and waders are counted at regular intervals in standard areas and often as national or international joint efforts, potentially providing high quality data on nearshore waterfowl concentrations including roosts and foraging grounds © CJ Camphuysen

Technical documents

European seabirds.DOC List of European seabirds and (current) OVI evaluation

Descriptions of current knowledge in 15 defined sea areas

- Greenland Sea and Icelandic waters
- Svalbard
- Barents Sea
- Norwegian Sea

- Faeroese waters
- North Sea
- Baltic Sea
- West of Britain, Ireland and Irish Sea
- Channel and Celtic Sea
- Bay of Biscay
- Portuguese and Spanish Atlantic coasts
- The Azores, Canaries, Madeira, Cape Verde Islands (Macaronesia)
- Western Mediterranean
- Eastern Mediterranean
- Black Sea

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Contact address: [1]C.J. Camphuysen, Royal Netherlands Institute for Sea Research, P.O. Box 59, 1790 AB Den Burg, Texel, The Netherlands, camphuys@nioz.nl

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