

Opinion

THE *PRESTIGE* OIL SPILL IN SPAIN

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Camphuysen C.J., Heubeck M., Cox S.L., Bao R., Humple D., Abraham C. & Sandoval A. 2002. The *Prestige* oil spill in Spain. *Atlantic Seabirds* 4(3): 131-140. *The oil tanker Prestige, carrying a cargo of 77,000 tonnes of heavy bunker oil, sank off the coast of Galicia (NW Spain) on 19 November 2002. Most of the Galician coast was severely polluted with oil and hundreds of oiled seabirds were retrieved from beaches in the first weeks of the incident. The decision taken by Spanish authorities to tow the damaged vessel to deeper offshore waters has been described as a criminal act and was the reason why such a large area was affected. Seabird distribution in the offshore waters of Galicia has not been studied well and as a result, the impact of this spill on vulnerable populations is difficult to predict. Preliminary observations during dissections suggest that the most numerous victims (in decreasing order of abundance) have been: juvenile Razorbills (winter visitors), adult Atlantic Puffins (winter visitors), adult European Shags (residents), adult Northern Gannets (passage migrants), and juvenile Common Guillemots (winter visitors). By 23/24th November 2002 it was estimated that over 80% of Yellow-legged Gulls seen in coastal Galicia were oil-fouled, but relatively few of these were found dead or were received in rehabilitation centres. Proper impact assessments of oil spills have often been neglected in the past and would have been neglected here again. It is concluded that we need to be better prepared for dealing with the seabird casualties of the next major oil spill in Europe and that there is an urgent need for a contingency plan for Europe to establish such procedures.*

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INTRODUCTION

The Bahamas-flagged oil tanker *Prestige*, carrying 77,000 tonnes of heavy bunker oil, ran into trouble off the Spanish north west coast on 13 November

Table 1. Large oil tanker spills along the European west coast (after Clark 2001, modified).

Tabel 1. Belangrijke tankerongelukken langs de Europese westkust (naar Clark 2001, aangepast).

| Shipname | (oil spilled) | Date | Location (N→S) |
|----------------------|---------------|---------------|------------------------|
| <i>Braer</i> | (84,000t) | January 1993 | Shetland Islands, U.K. |
| <i>Sea Empress</i> | (72,000t) | December 1996 | Wales, U.K. |
| <i>Torry Canyon</i> | (120,000t) | March 1967 | Scilly Isles, U.K. |
| <i>Amoco Cadiz</i> | (223,000t) | March 1978 | Brittany, France |
| <i>Gino</i> | (32,000t) | April 1979 | Brittany, France |
| <i>Erika</i> | (20,000t) | December 1999 | Brittany, France |
| <i>Aegean Sea</i> | (73,000t) | December 1992 | Galicia, Spain |
| <i>Andros Patria</i> | (50,000t) | December 1978 | Galicia, Spain |
| <i>Prestige</i> | (77,000t) | November 2002 | Galicia, Spain |
| <i>Urquiola</i> | (100,000t) | May 1976 | Galicia, Spain |
| <i>Jacob Maersk</i> | (88,000t) | January 1975 | Leixoes, Portugal |
| <i>Khark 5</i> | (80,000t) | December 1989 | off Morocco, Atlantic |

2002. The ship appeared to have a long crack in one of its oil tanks amidships and leaked oil. Helicopter teams rescued the crew and the ship was towed to deep waters in gale-force winds. On 19 November 2002, the ship broke in two and sank quickly, in 3500m deep waters off the coast of Galicia. By late November 2002, much of the Galician coast had become heavily oiled, while the wreck was still releasing oil and very large oil slicks were drifting towards the Spanish coast.

The *Prestige* oil spill, yet another spill along Europe's west coast (Table 1), had already caused considerable damage and the situation was still deteriorating further when this report was written. Long stretches of coast have been covered in heavy bunker fuel oil, thousands of seabirds have been killed and the effects on sub-littoral fauna and flora can only be guessed at. Have the most appropriate measures been taken to minimise the ecological damage? We believe not. Furthermore, while the Spanish authorities proudly presented the arrest and custody of the captain of the *Prestige*, the most criminal act was the decision of that same authority to tow a severely damaged tanker into the open ocean "so that it would pose less of a threat to the Galician coastline, an important fishing area." So why have important lessons from the past not been learnt?

THE *PRESTIGE* INCIDENT

When the *Prestige* got into trouble on 13 November 2002, it moved towards the Galician coast between 43°05'N, 10°W (15:00h) and 42°55'N, 9°35'W (19:00h), just off Cabo Fisterra (Cape Finisterre). Early next day, the ship was very close to the shore, at 43°03'N, 09°25'W (off Cabo Touriñán) and it was decided to tug it away in a north-westerly direction. Early morning 15 November the ship was positioned at approx. 43°50'N, 10°15'W (c. 60 nautical miles offshore). Bad weather hindered salvage operations and the oil proved to be too viscous to be pumped into other vessels. Decision making was chaotic, but it was finally decided to drag the vessel further away from the coast, in a south-westerly direction. No harbours were found prepared to receive the leaking ship. On 19 November, at 42°12'N, 12°05'W, c. 130 nm WSW of Cabo Fisterra, the ship broke in two and sank.

When the ship reported trouble, it had already leaked oil from tanks amidships that were severely damaged. Aerial photographs revealed serious damage over at least 40-50 m of the 250m long vessel, so that the risk of breaking was obvious. From the type of oil, heavy bunker fuel oil, it was all too obvious that as with the *Erika* off Brittany in 1999 (Table 1), it would not respond to spraying by dispersants and any natural dispersion would be very slow. A substantial spill offshore would simply mean that in the prevailing westerly winds of winter, large amounts of oil would come ashore sooner or later, most likely in Spain, but with Portugal and France also at risk. The decision to tow the tanker out into the open ocean, instead of escorting her to a sheltered anchorage or port where she could have been boomed off and unloaded of her cargo with limited or controlled coastal pollution, was an exceptionally stupid decision. The west coast of Spain in winter, as most of the Bay of Biscay further to the north, is a stormy area where depressions from the west arrive one after the other. Short spells of calm weather are followed by periods with violent (westerly) storms. To decide and tow a severely damaged tanker into such seas was, at best, an extremely badly calculated risk against the ship breaking up and causing pollution on a regional if not an international scale (oil washing ashore in Portugal and France, slicks in the Bay of Biscay).

The Galician coast is rocky and heavily indented, with numerous sandy beaches and estuarine areas. The most threatened, coastal important bird areas in Galicia include the Cíes and Ons Islands, the estuary of Ria de Arousa, the Costa da Morte, the Ferrolterra-Valdoviño coast, and Cape Candelaria to Cape Estaca de Bares, including the Ortigueira estuary (Viada 2000). Resident seabirds at risk are European Shag *Stictocarbo aristotelis*, Yellow-legged Gull *Larus michahellis*, Lesser Black-backed Gull *Larus graellsii*, Black-legged Kittiwake *Rissa tridactyla* and the rare Iberian race of the Common Guillemot

Uria aalge. The decision to tow the tanker out into the open ocean meant spreading the risk of oiling from a small, localised area to a very large and unpredictable one. Most ecological damage and the most widespread oiling of coasts by stricken tankers such as the *Torrey Canyon* (1967) and the *Amoco Cadiz* (1978) have come from oil spilled in the open sea, with much less and more localised damage being caused by the oil spilled when such vessels finally wrecked ashore. The *Erika* incident was a clear example of how a badly damaged tanker should *not* have been treated! She eventually sank in water too deep for her cargo to be salvaged or sealed in, and oil subsequently came ashore in bouts lasting several months. Major oil spills from tankers have occurred repeatedly in Galicia in the past decades (Table 1), but the Spanish authorities have been particularly lax and inept at not learning lessons from the *Erika* sinking, just three years ago and only at the northern end of the Bay of Biscay, but instead embarking on a course of action that virtually replicated that disaster.

SEABIRDS AT RISK

So, the Spanish authorities can be blamed for being not prepared, but how well did we know the area and what would have been the quality of advice given on seabirds with respect to this incident? In fact we know alarmingly little of this potentially important seabird area. Only after the *Erika* sank was it realised that it had gone down in a part of the Bay of Biscay that was unsurveyed for offshore, wintering seabirds. The enormous number of casualties (some 77,000 oiled seabirds were actually recorded; Cadiou *et al.* 2002) was largely unexpected, because we had little idea about wintering seabirds in that area. The same appears to be true for offshore waters of NW Spain. While resident Galician seabird populations are fairly well-known (Paterson 1997; Purroy 1997; Viada 2000), and while careful recording of passage migrants from headlands has revealed information on the timing and abundance of migratory species (Antonio Sandoval Rey/GIAM), we have very little data on wintering seabirds out at sea.

Great Northern Divers *Gavia immer*, Northern Gannets *Morus bassanus*, Great Cormorants *Phalacrocorax carbo*, Common Scoters *Melanitta nigra*, Mediterranean Gulls *Larus melanocephalus*, Black-headed Gulls *Larus ridibundus*, Lesser Black-backed Gulls, Black-legged Kittiwakes, Common Guillemots, Razorbills *Alca torda*, and Atlantic Puffins *Fratercula arctica* are examples of species that are known to migrate through these waters in late autumn or are known to winter in numbers. Where are these birds and which are the most vulnerable areas in Galician waters? Balearic Shearwaters *Puffinus mauretanus*

Table 2. Seabirds potentially at risk along the Galician coast in November/December (after Paterson 1997; Purroy 1997; Antonio Sandoval Rey, unpubl. data.).

Tabel 2. Zeevogels in het vervuilde gebied voor de kust van Galicië in november/december (naar Paterson 1997; Purroy 1997; Antonio Sandoval Rey, ongepubl.).

| Species | Breed | Winter visitors/passage migrants | | Notes |
|---------------------------------|--------|----------------------------------|-------------|---------------------------|
| | | inshore | offshore | |
| <i>Gavia immer</i> | | scarce | | still arriving |
| <i>Gavia arctica</i> | | very scarce | | arrival Nov/Dec |
| <i>Gavia stellata</i> | | very scarce | | arrival Nov/Dec |
| <i>Podiceps nigricollis</i> | | very scarce | | might be present |
| <i>Fulmarus glacialis</i> | | | very scarce | might be present |
| <i>Calonectris borealis</i> | | scarce | | scarce from mid-Nov. |
| <i>Puffinus gravis</i> | | | v. common | passage migrant |
| <i>Puffinus griseus</i> | | | common | passage migrant |
| <i>Puffinus puffinus</i> | | | common | passage migrant |
| <i>Puffinus mauretanicus</i> | | common | | |
| <i>Hydrobates pelagicus</i> | ++ | | common | |
| <i>Oceanodroma leucorhoa</i> | | | common | |
| <i>Morus bassanus</i> | | v. common | v. common | |
| <i>Phalacrocorax carbo</i> | | v. common | | |
| <i>Stictocarbo aristotelis</i> | ++ | v. common | | |
| <i>Melanitta nigra</i> | | common | | |
| <i>Phalaropus fulicaria</i> | | | v. common | on passage |
| <i>Stercorarius pomarinus</i> | | | v. common | on passage |
| <i>Stercorarius parasiticus</i> | | | v. common | on passage |
| <i>Stercorarius skua</i> | | | v. common | on passage & wintering |
| <i>Larus melanocephalus</i> | | common | common | |
| <i>Larus minutes</i> | | | common | mainly passage migrant |
| <i>Larus sabini</i> | | | common | mainly passage migrant |
| <i>Larus ridibundus</i> | | v. common | | |
| <i>Larus graellsii</i> | ++ | v. common | v. common | |
| <i>Larus michahellis</i> | ++ | v. common | v. common | |
| <i>Larus marinus</i> | | common | | |
| <i>Rissa tridactyla</i> | 2 cols | | v. common | the only Spanish colonies |
| <i>Sterna sandvicensis</i> | | scarce | | some wintering birds |
| <i>Sterna hirundo</i> | | scarce | | most of passage finished |
| <i>Sterna paradisaea</i> | | scarce | | most of passage finished |
| <i>Uria aalge</i> | 2 cols | | v. common | the only Spanish colonies |
| <i>Alca torda</i> | | common | v. common | |
| <i>Fratercula arctica</i> | | | common | |
| <i>Alle alle</i> | | | scarce | |

icus, currently listed as "Lower risk/Near threatened" (Stattersfield & Capper 2000), but seriously declining and restricted as breeding birds to the Balearic Islands, are known to move into the southern Bay of Biscay in autumn (Paterson 1997). Could this rare species be at risk from this spill?

Our knowledge of the Galician offshore waters is, at best, incomplete, particularly so with respect to the winter situation. Indications as "common offshore" (Table 2) are often derived from the fact that relatively few are seen from the coast, while the species should be an abundant migrant in the general area. Great Northern Divers and European Shags will be restricted to inshore waters, but the marine distribution of wintering Atlantic Puffins and Razorbills is something we have little concrete information about. Dedicated (ship-based) surveys off the Galician coast are urgently required to obtain the essential information on species and age-composition of seabirds in the southern Bay of Biscay and beyond. Such a programme will be too late for the victims of the *Prestige* oil spill, but we must learn our own lessons! There are more tanker accidents to come, considering the fact that (old) single hull tankers are still used and will be used until 2020.

DAMAGE OBSERVED

It is far too soon to properly evaluate the damage done by the *Prestige* oil spill. There is some preliminary information, however, worth presenting: numbers of birds examined during systematic dissections (autopsies) at A Coruña University between 20 November and 3 December 2002. These birds were collected by volunteers along most of the Galician coast and brought to the Centro de Recuperación de Fauna Salvaje de Santa Cruz (Oleiros, A Coruña), together with the casualties that were still alive. The latter were kept at the rescue centre in an attempt to rehabilitate them, the corpses were labelled and kept until the authors could retrieve them and transport them to the university for identification and dissection. From these dissected birds, the worst affected species in terms of numbers of casualties are the Razorbill, the Atlantic Puffin, the European Shag and the Northern Gannet (Table 3). Nearly half the corpses examined during the first days of the spill were Razorbills and almost all were first winter birds. Atlantic Puffins predominated early December and most these birds were mature. Most of the European Shags and Northern Gannets were adults. The former were almost certainly local breeding birds and the fact that most examined specimens were mature birds, often in breeding condition, suggests that damage to the Galician breeding population will be considerable. Common Guillemots were next most numerous. Most of these were juveniles, but four adult birds showed characteristics of the Iberian population (very small

Table 3. Seabirds collected in Galicia via Santa Cruz rescue Centre, 20 Nov-3 Dec 2002, as they were identified at A Coruña University by the authors.

Tabel 3. Verzamelde zeevogels, door de auteurs op de Universiteit van A Coruña gedetermineerd tussen 20 november en 3 december 2002.

| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | Total |
|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|
| <i>Gavia immer</i> | 3 | | | | | 1 | | | 1 | | | | | | 5 |
| <i>Tachybaptus ruficollis</i> | | | | | | 1 | | | | | | | | | 1 |
| <i>Calonectris sp.</i> | | | | | | | | | | | | 1 | | | 1 |
| <i>Puffinus gravis</i> | | | | | 2 | | | | | | | 1 | 1 | | 4 |
| <i>Puffinus assimilis</i> | | | | | | | | | | | 1 | | | | 1 |
| <i>Hydrobates pelagicus</i> | | | | | | | | | | 1 | | | | | 1 |
| <i>Morus bassanus</i> | 2 | 6 | 8 | 13 | 9 | 1 | 4 | 10 | 2 | 4 | 2 | 2 | 2 | 1 | 64 |
| <i>Phalacrocorax carbo</i> | | | | 2 | 1 | | 2 | | 1 | 1 | 1 | 1 | | | 9 |
| <i>Stictocorax aristotelis</i> | 1 | 3 | 5 | 9 | 5 | 3 | 6 | 3 | 5 | 9 | 5 | 11 | 2 | | 67 |
| <i>Ardea cinerea</i> | 1 | | | | | | | | | | | | 1 | | 2 |
| <i>Anas platyrhynchos</i> | 1 | | | | | | | | | | | | | | 1 |
| <i>Melanitta nigra</i> | | 1 | | 2 | 3 | 2 | 2 | | | | 2 | | 1 | | 13 |
| <i>Accipiter nisus</i> | | | | | | | 1 | | | | | | | | 1 |
| <i>Limosa lapponica</i> | | | | | | | | | 1 | | | | | | 1 |
| <i>Stercorarius skua</i> | | | | | 1 | | | | | | | | | | 1 |
| <i>Stercorarius spec.</i> | | | | | | | | | | | 1 | | | | 1 |
| <i>Larus ridibundus</i> | | | | | | | 1 | 1 | 1 | | | | | | 3 |
| <i>Larus graellsii</i> | | | | | | | 2 | | 2 | 1 | | | | | 5 |
| <i>Larus argentatus</i> | | | | | | | | 2 | | | | | | | 2 |
| <i>Larus michahellis</i> | | | 3 | 2 | 3 | 1 | 1 | 5 | 2 | 3 | 1 | 1 | 2 | 2 | 26 |
| <i>Larus spec.</i> | | | | | | | | | 2 | 1 | 4 | 3 | 1 | 1 | 12 |
| <i>Rissa tridactyla</i> | | | | 1 | 1 | 2 | | | | 1 | 4 | 1 | 1 | 1 | 12 |
| <i>Larus spec.</i> | 1 | | | | 3 | | | | 1 | 8 | | 2 | 2 | | 17 |
| <i>Uria aalge</i> | 4 | | 3 | 2 | 3 | 3 | 1 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 34 |
| <i>Alca torda</i> | 16 | 4 | 14 | 37 | 29 | 22 | 7 | 7 | 16 | 16 | 11 | 7 | 7 | 3 | 196 |
| <i>Alle alle</i> | | 1 | | 1 | 1 | | | 1 | | 1 | 1 | | | | 6 |
| <i>Fratercula arctica</i> | 3 | | 3 | 8 | 11 | 5 | 4 | 3 | 2 | 11 | 14 | 31 | 38 | 27 | 160 |
| <i>Columba livia</i> | | | | | | | | | | | 1 | | | | 1 |
| <i>Alcedo atthis</i> | | | | | | | | | | | | 1 | | | 1 |
| unidentified bird | | | | | | | 1 | 1 | | | 1 | | 1 | 1 | 5 |
| unidentified passerine | | | | | | | | | | | | 1 | | | 1 |
| | 32 | 6 | 32 | 68 | 80 | 51 | 26 | 33 | 44 | 54 | 57 | 59 | 71 | 41 | 654 |

size). The overlap in size between Iberian Common Guillemots and birds from France and southern Britain is considerable, however, and there is currently no accurate means of assessing breeding origin of these auks with certainty except through ringing (Hope Jones 1984).

Visits to coastal areas of Galicia in late November 2002 revealed that this is only part of the picture. Some 2000 Yellow-legged Gulls were seen in roosts between Cabo Fisterra and Camariñas, 80% of which were at least slightly oil-fouled. Relatively few gulls were retrieved dead from beaches and few were received alive at rescue centres. As in other major spills, large gulls that are seen oiled but alive in the immediate coastal area seem to 'disappear', perhaps to die unrecorded inland, or to survive after preening thoroughly.

The number of corpses and live birds retrieved oiled in the first two weeks of the spill were hundreds rather than thousands, but the threat posed by the oil is not over yet. Subsequent observations suggest that the Atlantic Puffin outnumbered all other species in the first month of the incident (A. Sandoval, *unpubl. data*). Estimates of total numbers of casualties will undoubtedly become several thousands in the weeks to follow. More winter visitors will arrive from more northerly waters during December, while new oil slicks will form from the sunken wreck out in the ocean. The oil that has not washed ashore yet, from its characteristics, will pose a great danger for as long as it stays at sea. The ledges of the few pairs of Iberian Common Guillemots remaining before this disaster, as could be seen from the air, had become heavily oiled and the prospects for this dwindling population are bleak. With a high proportion of adults found oiled so far, systematic counts of Galician colonies of European Shags will be required next summer to document their undoubted decline. Most affected Razorbills, on the other hand, were juveniles, so that little if any measurable effect in colonies may be expected in the next four years.

IMPACT ASSESSMENT

Visiting Galicia in an attempt to assist in the establishment of a proper impact assessment of the oil spill made us realise that this aspect has so often been neglected in the past and would have been neglected here again. Field surveys producing numbers of observed oiled and unoiled birds by species are a necessary part of oil spill response in order to determine wildlife effects. Very important information is for example lost during attempts by volunteers to clean beaches if instructions are not given to separate oil from oiled birds and to collect the latter for further inspection. We certainly need to be better prepared for dealing with the seabird casualties of the next major oil spill in Europe.

There are a number of operations required in a response that are generic to any major spill: co-ordination of intensive searches of beaches, collection and transport of live and dead birds to respective processing centres, establishing the specific identity, likely breeding origin (via biometrics and rings) and age structure (via both external and internal examination) of the mortality, and establishing procedures for the disposal of the biological material

accumulated, and for the release of birds successfully cleaned and restored to health. There is an urgent need for a contingency plan for Europe to establish such procedures, to ensure that individual countries and regions pre-identify organisations and locations that should be utilised in such a response and what their roles would be, and to ensure that there is a clear understanding that the reasonable (and relatively minor) costs involved in such a response should be recoverable from the insurers of the offending vessel - under the principle that the polluter pays.

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DE OLIERAMP MET DE *PRESTIGE* IN SPANJE

De olietanker *Prestige*, geladen met 77.000 ton zware stookolie, raakte half november 2002 voor de Spaanse noordwestkust in de problemen. Toen de kapitein dit voor het eerst wereldkundig maakte, bevond het schip zich op korte afstand van de kust ter hoogte van Kaap Finisterre. Aan de zijkant van het 250 meter lange schip bevond zich een 40-50 meter lange scheur en uit de beschadigde tank verloor het schip grote hoeveelheden olie. De Spaanse autoriteiten meenden van het probleem af te kunnen komen door het schip naar open zee weg te slepen en nadat de meeste bemanningsleden van boord gehaald waren werd het wrak naar een positie op ongeveer 60 zeemijl ten noordwesten van de kust gebracht. Eenmaal daar aangekomen bleek dat het schip niet lang meer drijvend gehouden kon worden en na een chaotische reeks van tegenstrijdige beslissingen werd het schip in zuidwestelijke richting naar Portugese wateren getrokken. Op 19 november brak het schip in twee stukken en zonk in 3500 meter diep water op 42°12'N, 12°05'W, ongeveer 130 zeemijl westzuidwestelijk van Kaap Finisterre.

De beslissing om het schip naar zee te slepen is de grootste blunder die men had kunnen begaan. In plaats van het schip naar een beschutte baai of haven te slepen, waar de onvermijdelijke vervuiling beter te controleren en op te ruimen zou zijn geweest, werd getracht de kust te vrijwaren door het schip op afstand te houden. Het gevolg is dat de olie een veel groter deel van de Spaanse

kust heeft besmeurd, terwijl het zo goed als onbereikbare wrak nog steeds olie lekt, waardoor het incident zeker nog vele maanden zal duren. Van een lokaal probleem is het incident verworden tot een regionaal en zelfs een internationaal probleem (olie in Portugal en Frankrijk, olievelden in de Golf van Biskaje). Van eerdere olie-incidenten hadden de autoriteiten kunnen leren hoe het *niet* moet en het wrange is, dat alle fouten die gemaakt werden bij de *Prestige* ervoor gezorgd hebben dat we hier een kopie zien van de ramp met de *Erika*, nog maar drie jaar geleden, in het noorden van de Golf van Biskaje!

Net als de *Erika*, zonk ook de *Prestige* in een gebied waarvan we weinig weten wat betreft het voorkomen van zeevogels op zee. Langs de kust worden veel trekwaarnemingen verricht en de broedvogelbevolking is redelijk bekend, maar er worden hier in elk geval 's winters geen systematische tellingen uitgevoerd op grond waarvan de offshore zeevogelrijkdom geschat kan worden. De eerste auteurs zijn naar Spanje vertrokken om in elk geval te zorgen dat er een goede inschatting gemaakt kan worden van de schade van de ramp. Zij hebben een systeem opgezet waarbij de vogels door vrijwilligers worden opgeraapt, verzameld in een vogelopvangcentrum om vervolgens door deskundigen te kunnen worden gedetermineerd, op leeftijd gebracht en inwendig worden onderzocht. Van de eerste 654 dode vogels is de soortsaamenstelling in tabel 3 weergegeven. Op basis van deze gegevens, niet meer dan een eerste indruk, kon worden vastgesteld dat tot de meest talrijke slachtoffers behoren (in afnemende volgorde): hoofdzakelijk juveniele Alken (wintergasten), adulte Papegaaiduikers (wintergasten), adulte Kuifaalscholvers (locale populatie), adulte Jan van Genten (doortrekkers), en juveniele Zeekoeten (wintergasten, wellicht ook de eigen broedvogels). Rond 23/24 november 2002 werd geschat dat 80% van de Geelpootmeeuwen in het kustgebied van Galicië met olie besmeurd was. Relatief weinig meeuwen werden tot dusverre dood aangetroffen of nog levend naar de opvangcentra gebracht. Geconcludeerd wordt dat het belang van een goed systeem van "impact assessment" bij olierampen vaak te laat wordt ingezien. De opvang van levende slachtoffers geldt doorgaans als een eerste prioriteit, waardoor waardevolle gegevens over al omgekomen slachtoffers verloren gaan. Dit was in Spanje niet anders. Het is zaak om beter voorbereid te zijn bij toekomstige olie-incidenten, en daarom wordt een plan van aanpak aanbevolen waarbij één of enkele teams deskundigen op afroep beschikbaar zijn om het werk ter plaatse op te zetten en zo lang als nodig is uit te voeren.

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Scientific names used in this paper follow recommendations of the Dutch committee for avian systematics (*Ardea* 87: 139-165); *Puffinus mauretanicus* = *Puffinus puffinus mauretanicus* or *P. yelkouan mauretanicus*, *Calonectris* sp. = *Calonectris diomedea* subsp., *Stictocarbo aristotelis* = *Phalacrocorax aristotelis*, *Phalaropus fulicaria* = *Phalaropus fulicarius*, *Stercorarius skua* = *Catharacta skua*, *Larus graellsii* = *Larus fuscus graellsii*, *Larus michahellis* = *Larus cachinnans michahellis*, *Larus sabini* = *Xema sabini*