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Chapter 4
Deleterious Effects of Litter on Marine Life

Susanne Kühn, Elisa L. Bravo Rebolledo and Jan A. van Franeker

Abstract In this review we report new findings concerning interaction between marine debris and wildlife. Deleterious effects and consequences of entanglement, consumption and smothering are highlighted and discussed. The number of species known to have been affected by either entanglement or ingestion of plastic debris has doubled since 1997, from 267 to 557 species among all groups of wildlife. For marine turtles the number of affected species increased from 86 to 100 % (now 7 of 7 species), for marine mammals from 43 to 66 % (now 81 of 123 species) and for seabirds from 44 to 50 % of species (now 203 of 406 species). Strong increases in records were also listed for fish and invertebrates, groups that were previously not considered in detail. In future records of interactions between marine debris and wildlife we recommend to focus on standardized data on frequency of occurrence and quantities of debris ingested. In combination with dedicated impact studies in the wild or experiments, this will allow more detailed assessments of the deleterious effects of marine debris on individuals and populations.

Keywords Marine debris · Plastic litter · Entanglement · Ingestion · Harm · Review

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4.1 Introduction

For several decades, it has been known that anthropogenic debris in the marine environment, in particular plastic, affects marine organisms (Shomura and Yoshida 1985; Laist 1997; Derraik 2002; Katsanevakis 2008). Plastic production grows at 5 % per year (Andrady and Neal 2009). Part of the material ends up as litter in the marine environment, to such an extent that the issue is considered to be of major global concern (UNEP 2011). Awareness has grown that plastics may become less visible but do not really disappear as they become fragmented into small persistent particles ('plastic soup') (Andrady 2015). Plastic fragmentation can be caused by abiotic factors (Andrady 2011) or through animal digestion processes (Van Franeker et al. 2011). The smaller the particle, the higher the availability to animals at the base of the food chain. The potential deleterious effects from ingestion, have heightened the urgency to evaluate the impact of plastics on the whole marine food chain and, ultimately, the consequences for humans as end consumers (Koch and Calafat 2009; UNEP 2011; Galloway 2015).

The most visible effect of plastic pollution on marine organisms concerns wildlife entanglement in marine debris, often in discarded or lost fishing gear and ropes (Laist 1997; Baulch and Perry 2014). Entangled biota are hindered in their ability to move, feed and breathe. In addition, many marine organisms mistake litter for food and ingest it (Day et al. 1985; Laist 1997). Indigestible debris such as plastics may accumulate in their stomachs and affect individual fitness, with consequences for reproduction and survival, even if not causing direct mortality (Van Franeker 1985; Bjorndal et al. 1994; McCauley and Bjorndal 1999). Marine birds, turtles and mammals have received most attention, but the consequences of entanglement and ingestion on other organism groups, e.g. fish and invertebrates, are becoming more evident. In addition to the issues of entanglement and ingestion, synthetic materials represent a long-lived substrate that may present the possibility of transporting hitch-hiking 'alien' species horizontally to ecosystems elsewhere (for more details see Kiessling et al. 2015) or vertically from the sea surface through the water column to the seafloor. Plastics may also smother water surfaces and sea bottoms where effects may range from suffocating organisms (e.g. Mordecai et al. 2011; Green et al. 2015) to offering new habitats for species that are otherwise unable to settle (e.g. Chapman and Clynick 2006).

Major reviews of the impacts of litter, in particular plastics, on marine life have been undertaken by Shomura and Yoshida (1985), Laist (1997), Derraik (2002) and Katsanevakis (2008). We used the species list of Laist (1997) as a basis for our work and conducted an extensive literature review to add not only birds and mammals, but also fish and invertebrates. Laist (1997) tabulated data on both entanglement and ingestion but focused discussions on the entanglement aspect. Therefore, we paid more attention to descriptions and discussion of the ingestion issue. This includes occurrence of smaller plastics in smaller organisms, including invertebrates but leaves the real microplastic issues to the dedicated chapter in this book (Lusher 2015). The table with species listings for ingestion and entanglement starts with marine birds and mammals because for these animal groups, literature coverage is far more complete than for lower taxonomic groups, and because this is directly comparable with Laist (1997). Further taxonomic groups are in traditional taxonomic sequence.

Tables 4.1, 4.2 and 4.3 summarise our findings on entanglement and ingestion for groups of species in comparison to the earlier review by Laist (1997). Table 4.4 gives a more specific overview of our findings, but all details for individual species and data sources are provided in our Online Supplement. Data in our tables only relate to observations on wild organisms. This excludes for example fisheries by-catch data for active fishing gear and laboratory experiments. Texts refer to these only where it does not overlap too much with the microplastics chapters in this book and the review by Cole et al. (2011). The main aim of our paper was to compile a factual overview of known records of interference of plastic debris with marine wildlife as a basis for current discussions and future work addressing the scale of impact and policies to be developed.

4.2 Entanglement

Entanglement of marine life occurs all over the world, from whales in the Arctic (Knowlton et al. 2012) and fur seals in the Southern Ocean (Waluda and Staniland 2013), to gannets in Spain (Rodríguez et al. 2013), octopuses in Japan (Matsuoka et al. 2005) and crabs in Virginia, USA (Bilkovic et al. 2014). One of the first entanglement records of marine debris was probably a shark, caught in a rubber automobile tyre in 1931 (Gudger and Hoffman 1931). Hundreds of thousands of marine birds and mammals are known to perish in active fishing gear (Read et al. 2006; Žydelis et al. 2013), but no estimates are available for the actual number of animals becoming entangled in synthetic fisheries debris and other litter. However, from species records in Table 4.1 and the Online Supplement, it appears that the problem is substantial. The percentage of species that have been recorded as entangled among various groups of marine organisms, is high: 100 % of marine turtles (7 of 7 species), 67 % of seals (22 of 33 species), 31 % of whales (25 of 80 species) and 25 % of seabirds (103 of 406). In comparison to the listings by Laist (1997) the number of bird + turtle + mammal species with known entanglement increased from 89 (21 %) to 161 (30 %) (Table 4.1). For other reptiles, fish and invertebrates the percentage of affected species is futile because there are many thousands of species which have not been properly investigated. Often it is considered less worthwhile to publish individual entanglement records for common fishes or invertebrates or inconspicuous small species, than, for example, for a large entangled whale washed ashore.

Temporal entanglement trends are difficult to establish, as they differ between species groups and population changes play an important role (Ryan et al. 2009). Fowler et al. (1992) found a decline in entanglement of northern fur seals (*Callorhinus ursinus*) from 1975 to 1992. In Antarctic fur seals (*Arctocephalus gazella*), Waluda and Staniland (2013) reported a peak in 1994 and then a decrease

Table 4.1 Number of species with documented records of entanglement in marine debris

Species group	Laist (1997)			This study		
	Spp. total	Entanglement		Spp. total	Entanglement	
	(n)	(n)	(%)	(n)	(n)	(%)
Seabirds	**312**	51	16	**406**	103	25.4
Anseriformes (marine ducks)	–	–	–	**13**	5	38.5
Gaviiformes (divers)	–	–	–	**5**	3	60.0
Sphenisciformes (penguins)	**16**	6	38	**18**	6	33.3
Procellariiformes (tubenoses)	**99**	10	10	**141**	24	17.0
Podicipediformes (grebes)	**19**	2	10	**23**	6	26.1
Pelecaniformes, suliformes, phaethontiformes (pelicans, gannets and boobies, tropicbirds)	**51**	11	22	**67**	20	29.9
Charadriiformes (gulls, skuas, terns and auks)	**122**	22	18	**139**	39	28.1
Marine mammals	**115**	32	28	**123**	51	41.5
Mysticeti (baleen whales)	**10**	6	60	**13**	9	69.2
Odontoceti (toothed whales)	**65**	5	8	**65**	16	24.6
Phocidae (true seals)	**19**	8	42	**19**	9	47.4
Otariidae (eared seals)	**14**	11	79	**13**	13	100.0
Sirenia (sea cows, dugongs)	**4**	1	25	**5**	2	40.0
Mustelidae (otters)	**1**	1	100	**2**	1	50.0
Ursidae (polar bears)	**0**	0	0	**1**	1	100.0
Turtles	**7**	6	86	**7**	7	100
Sea snakes	–	–	–	**62**	2	3.2
Fishes	–	34	–	**32,554**	89	0.27
Invertebrates	–	8	–	**159,000**	92	0.06
Marine birds, mammals and turtles	**434**	**89**	**20.5**	**536**	**161**	**30.0**
All species	–	**136**	–		**344**	

Comparative summary with the earlier major review by Laist (1997). Individual species and sources are documented in the Online Supplement. Observations only concern dead or living animals entangled in marine debris including derelict fishing gear. Between the two reviews, the number of species, in the groups considered, differ because of changes in accepted taxonomic status, and selection of which species groups should be considered to be 'marine'. For details see the Online Supplement

until 2012. In the same period of time (1978–2000), Cliff et al. (2002) found an increase in entanglement rates of dusky sharks (*Carcharhinus obscurus*).

4.2.1 Ways of Entanglement

The term "ghost fishing" has been established for lost or abandoned fishing gear (Breen 1990). Ghost nets may continue to trap and kill organisms and can damage benthic habitats (Pawson 2003; Good et al. 2010). Important factors, increasing the risks of entanglement, are the size and structure (Sancho et al. 2003) of the lost nets and their location. For example, nets that are stretched open by structures on the sea bed, tend to catch more organisms (Good et al. 2010). The estimated time, over which lost fishing gear continues to entangle and kill organisms varies substantially and is site and gear specific (Kaiser et al. 1996; Erzini 1997; Hébert et al. 2001; Humborstad et al. 2003; Revill and Dunlin 2003; Sancho et al. 2003; Tschernij and Larsson 2003; Matsuoka et al. 2005; Erzini et al. 2008; Newman et al. 2011). Matsuoka et al. (2005) estimated catch durations of derelict gill- and trammel-nets from different studies between 30 and 568 days. Ghost-fishing efficiency can sometimes decrease exponentially (Erzini 1997; Tschernij and Larsson 2003; Ayaz et al. 2006; Baeta et al. 2009). For example, Tschernij and Larsson (2003) found 80 % of the catch in bottom gill nets in the Baltic Sea during the first three months. Still, the nets continued fishing at a low rate until the end of the experiment after 27 months. Lost fishing gear can carry on trapping, until it is heavily colonised, altering weight, mesh size and visibility (Erzini 1997; Humborstad et al. 2003; Sancho et al. 2003). In deeper waters, ghost fishing seems to continue for longer periods of time, as fouling takes longer (Breen 1990; Humborstad et al. 2003; Large et al. 2009). A reduction of the duration of ghost fishing by using degradable materials unfortunately also affects the operational lifetime of equipment. However, easily replaced degradable escape cords in lobster traps may reduce ghost fishing of lost traps efficiently (Antonelis et al. 2011).

In addition to entanglement in derelict fishing gear, other anthropogenic material such as ropes, balloons, plastic bags, sheets and six-pack drink holders can cause entanglement (e.g. Plotkin and Amos 1990; Norman et al. 1995; Camphuysen 2001; Matsuoka et al. 2005; Gomerčić et al. 2009; Votier et al. 2011; Bond et al. 2012; Moore et al. 2009, 2013; Rodríguez et al. 2013).

Whales and dolphins tend to become entangled around their neck, flippers and flukes, often in several types of fishing gear (Moore et al. 2013; Van der Hoop et al. 2013). Seals become frequently entangled in synthetic fishing gear, packing straps or other loop-shaped items that encircle the neck at young age and create problems during growth (Fowler 1987; Lucas 1992; Allen et al. 2012) (see Fig. 4.2). Seabirds are well known to become entangled around the bill, wings and feet with rope-like materials, which constrains their ability to fly or forage properly (Camphuysen 2001; Rodríguez et al. 2013) (Fig. 4.1). In addition to entanglement in fishing gear and other debris (Bugoni et al. 2001) marine turtles face problems on beaches where hatchlings are prone to entanglement or entrapment in marine debris on their way to the sea (Kasparek 1995; Ozdilek et al. 2006; Triessing et al. 2012). Motile benthic organisms become primarily caught in derelict traps on the seafloor (Adey et al. 2008; Erzini et al. 2008; Antonelis et al. 2011; Anderson and Alford 2014; Bilkovic et al. 2014; Kim et al. 2014; Uhrin et al. 2014) (Fig. 4.3a) although sometimes escape has also been observed (Parrish and Kazama 1992; Godøy et al. 2003). If there is no possibility of escape, animals in these traps and pots die from starvation (Pecci et al. 1978) and serve as bait, which attracts new victims (Kaiser et al. 1996; Stevens et al. 2000; Hébert et al. 2001).

Fig. 4.1 Northern gannet entanglement. On a nest on Helgoland, Germany (*top*), on a beach on Texel, The Netherlands (*bottom left*) and with fishing nets wrapped around the neck (*bottom right*) (Photos: J.A. van Franeker (1, 2) and S. Kühn (3), IMARES)

Behavioural traits can be important factors in becoming entangled (Shaughnessy 1985; Woodley and Lavigne 1991). It has been suggested that sharks become entangled when investigating large floating items and when searching for food associated with clumps of lost fishing gear (Bird 1978). Prey fish, which use debris as a shelter, can increase entanglement risks for predators, such as sharks (Cliff et al. 2002) and fish (Tschernij and Larsson 2003). The 'playful' behaviour of marine mammals may increase the risk of entanglement (Mattlin and Cawthorn 1986; Laist 1987; Harcourt et al. 1994; Zavala-González and Mellink 1997; Hanni and Pyle 2000; Page et al. 2004). Zavala-González and Mellink (1997) and Hanni and Pyle (2000) explained a higher incidence of entanglement

Fig. 4.2 Marine Mammal entanglement and plastic ingestion. Stomach contents of Dutch harbour seals (*top*), entangled grey seal (*bottom left*) and harbor seal (Texel, The Netherlands, *bottom center*), Antarctic fur seal investigating a rope (Cape Shirreff, Antarctica, *bottom right*) (Photos: J.A. van Franeker (1, 2, 3) and E. Bravo Rebolledo (6) IMARES; S. de Wolf (4, 5), Ecomare)

in younger California sea lions (*Zalophus californianus*) by playful behaviour and curiosity in combination with lack of experience and a foraging habit closer to the water surface. Age plays a significant role in pinnipeds, as younger seals are more often entangled than adults (Lucas 1992; Henderson 2001; Hofmeyr et al. 2006).

Gannets and many other seabird species use seaweed to build their nests, but are known to frequently incorporate ropes, nets and other anthropogenic debris (Podolski and Kress 1989; Montevecchi 1991; Hartwig et al. 2007; Votier et al. 2011; Bond et al. 2012; Lavers et al. 2013; Verlis et al. 2014) (Fig. 4.1). Marine debris used in nest construction increases the risk of mortal entanglement for both adult birds and chicks (Fig. 4.1). In three of the six North American gannet populations, close to 75 % of the gannet nests contained fishing debris. Its frequency can be linked to the level of gillnet fishing effort in the waters around the colonies (Bond et al. 2012).

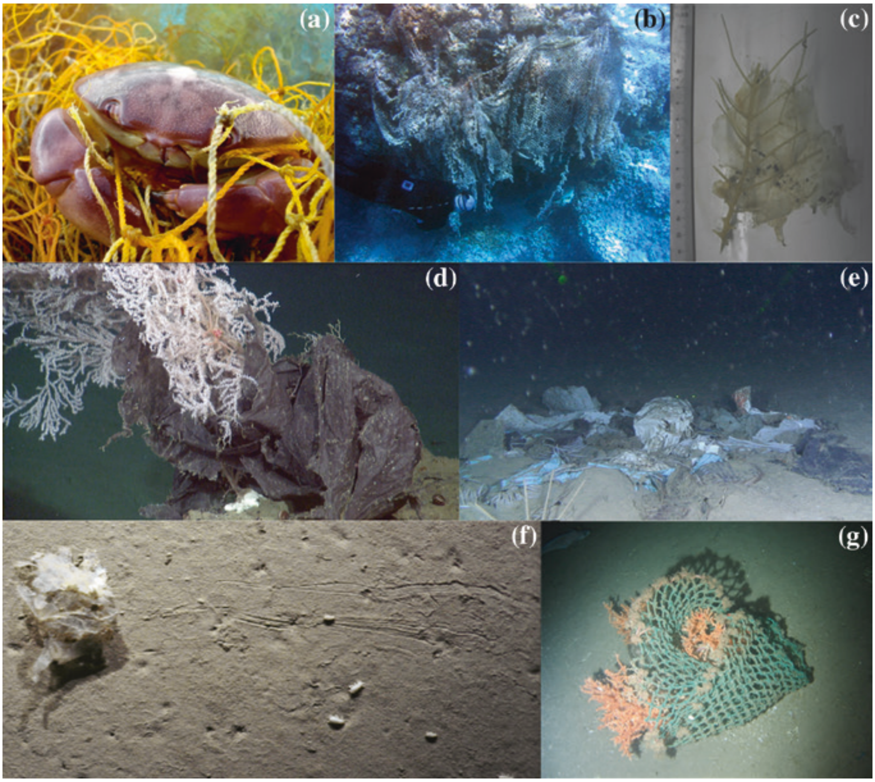

Fig. 4.3 Effects of litter on organisms on the seafloor. **a** Crab entangled in derelict net and **b** fishing net wrapped around coral, NW Hawaiian Islands (Photo: NOAA); **c** plastic fragment entangled in trawled sponge (*Cladorhiza gelida*) from HAUSGARTEN observatory (Arctic), 2,500 m depth (Photo: M. Bergmann, AWI); **d** rubbish bag wrapped around deep-sea gorgonian at 2,115 m depth in Astoria Canyon (Photo: © 2007, MBARI); **e** Mediterranean soft-sediment habitat at 450 m depth smothered with plastic litter (Photo: F. Galgani, AAMP); **f** evidence of plastic fragment causing disturbance and biogeochemical changes at the sediment-water interface by dragging along the seabed of the Molloy Deep, HAUSGARTEN IX, at 5,500 m depth (Photo: M. Bergmann, AWI); **g** cargo net entangled in a deep-water coral colony at 950 m in Darwin Mounds province with entrapped biota (Photo: V. Huvenne, National Oceanography Centre Southampton)

4.2.2 Effects of Entanglement

Entangled organisms may no longer be able to acquire food and avoid predators, or become so exhausted that they starve or drown (Laist 1997). Even if the organism does not die directly, wounds, restricted movements and reduced foraging ability will seriously affect the entangled animal (Arnould and Croxall 1995; Laist 1997; Moore et al. 2009; Allen et al. 2012). In turtles, entanglement is known to cause skin infections, amputations of legs and septic processes (Orós et al. 2005; Barreiros and Raykov 2014). Barreiros and Guerreiro (2014) reported a ring from a plastic bottle that became fixed around the operculum of a juvenile axillary sea bream (*Pagellus acarne*), which inflicted a deep cut in the anterior part of the fish and caused mortality. Discarded plastic lines and fishing gear, even if not directly drowning the animal, may cause complications in proper foraging or surfacing to breathe (Wabnitz and Nichols 2010). Illustrating the fact that such events may affect even unlikely species, the entanglement of a sea snake (*Hydrophis elegans*) in a ceramic ring caused starvation by restricting the passage of food (Udyawer et al. 2013).

In sharks, plastic entanglement reduced the mouth opening so as to impair foraging and gill ventilation (Sazima et al. 2002). A malformation of the backbone due to long-term entanglement of a shortfin mako shark (*Isurus oxyrinchus*) disturbed natural growth. In addition, biofouling on the rope probably reduced its swimming efficiency, maximum velocity and manoeuvrability (Wegner and Cartamil 2012). Lucas (1992) discovered a dead grey seal *(Halichoerus grypus*) with deformations. The size of the rubber trawl roller suggested that it had been entangled as a juvenile five years before.

Crabs, octopuses, fishes and a wide range of smaller marine biota are known to get caught in derelict traps on the seafloor and die from stress, injuries or starvation, as escape is difficult (Matsuoka 1999; Al-Masroori et al. 2004; Matsuoka et al. 2005; Erzini et al. 2008; Antonelis et al. 2011; Cho 2011). Derelict fishing lines and other gear are often covering structurally complex biota such as sponges, gorgonians (Fig. 4.3b) or (soft) corals (Pham et al. 2013; Smith and Edgar 2014) which suffer broken parts and may be more susceptible to infections and eventually die, as shown for shallow-water (soft) corals and gorgonians (Bavestrello et al. 1997; Schleyer and Tomalin 2000; Asoh et al. 2004; Yoshikawa and Asoh 2004; Chiappone et al. 2005). Contact with soft plastic litter also caused necrosis in the cold water coral *Lophelia pertusa* (Fabri et al. 2014).

Although examples of entanglement and various pathways of negative effects on individuals are abundant, it is rarely possible to assess the proportional damage to populations. However, Knowlton et al. (2012) reported that among a known number of 626 photo-identified individuals of the North Atlantic right whale (*Eubalaena glacialis*), 83 % showed evidence of entanglements in ropes and nets. On average, 26 % of adequately photographed animals acquired new wounds or scars every year. Allen et al. (2012) showed that entanglement reduces the longer-term survival of grey seals significantly. Studies like these, although not attributable with certainty to marine debris alone, do show that entanglement, although not directly obvious, can have a serious impact on wild populations.

4.3 Smothering

Marine debris on the seabed can have various effects on the resident flora and fauna that we do not consider to be 'entanglement' but rather describe as 'smothering'. Smith (2012) suggested that large quantities of litter may impede attempts to rehabilitate depleted mangrove forests in Papua New Guinea through smothering of seedlings. In the intertidal zone the weight and shading effects of debris may crush sensitive salt marsh vegetation or reduce light levels needed for growth, which can lead to denuded areas in these sensitive protected ecosystems (Uhrin and Schellinger 2011; Viehman et al. 2011). Two species of seagrass (*Thalassia testudinum*, *Syringodium filiforme*) had significantly decreased shoot densities after experimental deployment of traps on the sea bed (Uhrin et al. 2005). The weight of the traps caused blades to become abraded or crushed into the underlying *anoxic sediments*, likely suffocating the plants, reducing photosynthetic rates and leading to eventual senescence of above-ground biomass (Uhrin et al. 2005), which indicates long-lasting effects on ecosystem function and thus biodiversity of these vulnerable habitats.

Estimates on the impact of marine debris on local populations are available for corals: for example, Richards and Beger (2011) found that coral cover decreased significantly as macrodebris cover increased. Yoshikawa and Asoh (2004) reported that 65 % of coral colonies in Oahu, Hawaii were covered with fishing lines, and 80 % of colonies were either entirely or partially dead, which was, again, positively correlated with the percentage of colonies covered with fishing lines.

On one hand some debris may provide shelter for motile animals, and a habitat for sessile organisms, as was experimentally shown by Katsanevakis et al. (2007) and in the deep sea (Mordecai et al. 2011; Schlining et al. 2013). In the Majuro Lagoon, the coral *Porites rus* overgrew debris and appeared to thrive in locations of high debris cover (Richards and Beger 2011). On the other hand, derelict fishing gear, bags and large (agricultural) foils are known to cover parts of the seafloor at all depths (e.g. Galgani et al. 1996; Watters et al. 2010; Van Cauwenberghe et al. 2013; Pham et al. 2014) (Fig. 4.3e). Mordecai et al. (2011) reported anoxic sediments below a plastic bag on the deep seafloor of the Nazaré Canyon and suggested that this would alter the infaunal community underneath as it reduces the exchange of pore water with overlying water masses. Indeed, anoxic sediments, reduced primary productivity and organic matter and significantly lower abundances of infaunal invertebrates were recently recorded below plastic bags experimentally deployed on a beach.for 9 weeks (Green et al. 2015). Anoxic sediments below marine litter were also observed at two sites of a mangrove habitat from Papua New Guinea (Smith 2012). Dragged along the seafloor litter may cause further damage to fragile habitat engineers (coral, plants) and change biogeochemical seafloor properties (e.g. Fig. 4.3f). Macroplastics covering larger parts of corals, cannot only cause direct mechanical damage, but also diminish the capacity of phototrophic and heterotrophic nutrition (Richards and Beger 2011) (see also Fig. 4.3b, d). Also, a relationship between marine debris and coral diseases has been observed (Harrison et al. 2011). When corals die and release the debris, it moves on to a new spot and repeats the negative cycle (Donohue et al. 2001; Chiappone et al. 2005; Abu-Hilal and Al-Najjar 2009). In eastern Indonesian areas experimentally smothered by plastic, diatom densities were lower, probably due to the lack of light. However, meiofauna had a higher density beneath smothered test sites than on clean control sites, which was explained by the temporarily decomposing organic matter improving habitat quality for meiofauna (Uneputty and Evans 2009). Smothering may also limit the nutrition of filter feeders as it may restrict water circulation and thereby particles reaching the feeding apparatus (see Fig. 4.3b, c, d). In addition, marine debris on beaches can have negative effects on marine biota. Kasparek (1995) found marine turtle nesting sites on beaches in Syria, where the beaches were so polluted that females might not be able to dig a nest at an appropriate site. Litter may also lead to behavioural changes: for example, prolonged food searching time and increased self-burial in intertidal snails (*Nassarius pullus*) is strongly correlated with increased plastic cover, which was also reflected in low snail densities in areas of high litter cover (Aloy et al. 2011). Twenty-two taxa that are affected by smothering with litter are listed in Online Supplement 2 (provided by M. Bergmann) including four grasses, two types of sponges, 14 cnidarian species and one mollusc and crustacean.

4.4 Ingestion of Plastic

Ingestion of plastic by marine organisms is less visible than entanglement. Table 4.2 and Online Supplement 1 show that ingestion of plastic debris has currently been documented for 100 % of marine turtles (7 of 7 species), 59 % of whales (47 of 80), 36 % of seals (12 of 33), and 40 % of seabirds (164 of 406). In comparison to the review by Laist (1997) the number of bird + turtle + mammal species with known ingestion of plastics increased from 143 (33 %) to 233 (44 %). Studies on the ingestion of plastics by fish and invertebrates are largely a recent development. Currently, low proportions of fish and invertebrate species are presented in the tables, but a rapid increase in publications and species numbers are expected in this currently dynamic field of research. Records of plastic ingestion date back to the early days of plastic production in the 1960s. One of the first birds recorded to contain plastic was Leach's storm petrel *(Oceanodroma leucorhoa*) off New Foundland in 1962 (Rothstein 1973). The first report of a leatherback turtle (*Dermochelys coriacea*) with plastic dates back to 1968 (Mrosovsky et al. 2009). While the first record of anthropogenic debris in sperm whales (*Physeter macrocephalus*) was a fish hook found in a stomach in 1895, the first report of ingested plastic in sperm whales dates back to 1979 (de Stephanis et al. 2013). The first fish feeding on plastic was published in 1972 (Carpenter et al. 1972). The ingestion of plastics became a more commonly reported phenomenon from the 1970s onwards (Kenyon and Kridler 1969; Crockett and Reed 1976; Bourne and Imber 1982; Furness 1983; Day et al. 1985). A trend for birds ingesting plastic was probably first noted by Harper and Fowler (1987). Between 1958 and 1959 they found no plastic in prions (*Pachyptila* spp.) but from then on there was an upward trend in plastic consumption until 1977. A peak of plastic ingestion was detected in 1985 and 1995 in a number of long-term studies (Moser and Lee 1992; Robards et al. 1995; Spear et al. 1995; Mrosovsky et al. 2009; Van Franeker et al. 2011). In contrast to the continuing growth of global plastic use and increase in marine activities, the trend of plastic consumption decreased and stabilized from 2000 onwards approaching the 1980s level (Mrosovsky et al. 2009; Van Franeker et al.

Table 4.2 Number of species with documented records of ingestion of marine debris

Species group	Laist (1997)			This study		
	Spp. total	Ingestion		Spp. total	Ingestion	
	(n)	(n)	(%)	(n)	(n)	(%)
Seabirds	**312**	111	36	**406**	164	40.4
Anseriformes (marine ducks)	–	–	–	**13**	1	7.7
Gaviiformes (divers)	–	–	–	**5**	3	60.0
Sphenisciformes (penguins)	**16**	1	6	**18**	5	27.8
Procellariiformes (tubenoses)	**99**	62	63	**141**	84	59.6
Podicipediformes (grebes)	**19**	0	0	**23**	0	0.0
Pelecaniformes, suliformes, phaethontiformes (pelicans, gannets and boobies, tropicbirds)	**51**	8	16	**67**	16	23.9
Charadriiformes (gulls, skuas, terns and auks)	**122**	40	33	**139**	55	39.6
Marine mammals	**115**	26	23	**123**	62	50.4
Mysticeti (baleen whales)	**10**	2	20	**13**	7	53.8
Odontoceti (toothed whales)	**65**	21	32	**65**	40	61.5
Phocidae (true seals)	**19**	1	5	**19**	4	21.1
Otariidae (eared seals)	**14**	1	7	**13**	8	61.5
Sirenia (sea cows, dugongs)	**4**	1	25	**5**	3	60.0
Mustelidae (otters)	**1**	0	0	**2**	0	0.0
Ursidae (polar bears)	**0**	0	0	0	0	0.0
Turtles	**7**	6	86	**7**	7	100
Sea snakes	–	–	–	**62**	0	0.0
Fish	–	33	–	**32,554**	92	0.28
Invertebrates	–	1	–	**159,000**	6	0.004
Marine birds, mammals and turtles	**434**	**143**	**32.9**	**536**	**233**	**43.5**
All species		**177**			**331**	

Comparative summary with the earlier major review by Laist (1997). Individual species and sources are documented in Online Supplement. Observations only concern non-simulated dead or living wild animals found in their natural habitat. We thus exclude experimental studies showing the potential for ingestion by marine species. Between the two reviews, the number of species in the groups considered, differ because of changes in accepted taxonomic status, and selection of which species groups should be considered to be 'marine'. For details see the Online Supplement

2011; Bond et al. 2013). Figure 4.4 illustrates the ingestion of plastic by northern fulmars.

4.4.1 Ways of Plastic Ingestion

Plastics may be ingested intentionally or accidentally and both pathways deserve further discussion.

Fig. 4.4 Plastic ingestion by northern fulmars (*Fulmarus glacialis*). Unopened stomach with plastic inside (*top*), fulmars at sea chewing on a plastic fragment (*bottom left*), stomach content of a northern fulmar with fragments, foam, sheets and wood (*bottom right*) (Photos: J.A. van Franeker (1, 3) and S. Kühn (2), IMARES)

4.4.1.1 Intentional Ingestion

Why some animals intentionally ingest plastic debris may depend on a range of factors, and these may vary among different animal groups. Although many of these factors interact, it is useful to review at least some of them separately.

Foraging Strategy

In seabirds, plastic ingestion has been linked to foraging strategy by several authors (e.g. Day et al. 1985; Azzarello and Van Vleet 1987; Ryan 1987; Tourinho et al. 2010.) From their study on many different seabird species, Day et al. (1985)

concluded, that pursuit-diving birds have the highest frequency of plastic uptake, followed by surface-seizing and dipping seabirds. Provencher et al. (2010) reported that marine birds, feeding on crustaceans and cephalopods had ingested more plastic than piscivorous seabirds, and those omnivores are most likely to confuse prey and plastic. Seabirds with specialized diets are less likely to misidentify plastic, unless a particular type resembles their prey (Ryan 1987). Many gull species frequent rubbish bins and landfill areas, in addition to foraging in marine habitats and seem prone to ingest debris. However, ingested debris does not often show up in their stomachs during dissections because they clear them daily by regurgitating hard prey remains (Hays and Cormons 1974; Ryan and Fraser 1988; Lindborg et al. 2012). As regurgitation takes place regularly, plastics quantified from boluses reflect the ingestion of the very last period, rather than accumulated debris (Camphuysen et al. 2008; Ceccarelli 2009; Codina-García et al. 2013; Hong et al. 2013). Tubenosed seabirds mostly retain plastic and hard prey items (Mallory 2006) because they possess two stomachs with a constriction (*Isthmus gastris*) between the glandular proventriculus and the muscular gizzard (Furness 1985; Ryan and Jackson 1986). Even when spitting stomach oil to defend themselves or when feeding their chicks, only plastics from the proventriculus are regurgitated but items from the gizzard are retained (Rothstein 1973). Marine turtles frequently ingest plastic bags as they may mistake them for jellyfish, a common component of their diet (Carr 1987; Lutz 1990; Mrosovsky et al. 2009; Tourinho et al. 2010; Townsend 2011; Campani et al. 2013; Schuyler et al. 2014). While accidental plastic ingestion by filter-feeding baleen whales (Mysticeti) might be assumed to be common, Walker and Coe (1990) expected that toothed whales (Odontoceti) would have a low rate of plastic ingestion because they use echolocation or visual cues to locate their prey. However, Laist (1997), Simmonds (2012) and Baulch and Perry (2014) all made extensive descriptions of toothed whales that had ingested plastic. Indeed, our updated literature search showed that 54 and 62 % of the baleen and toothed whales, respectively, ingest plastics. It has also been suggested, that marine mammals could see plastic as a curiosity and while investigating it, they swallow it or become entrapped (Mattlin and Cawthorn 1986; Laist 1987). Large predatory fishes and birds are known to frequently inspect plastic debris and take bites out of larger plastic items. Cadée (2002) observed that 80 % of foamed plastic debris on the Dutch coast showed peckmarks of birds and suggested that the birds mistake polystyrene foam for cuttlebones or other food. Carson et al. (2013) observed bite marks of sharks or large predatory fishes on 16 % of plastic debris beached on Hawaii indicating 'testing' of materials. Choy and Drazen (2013) showed that among 595 individuals of seven such large predatory fish species, 19 % of individuals (range per species <1–58 %) had actually ingested plastic. Foraging strategies may vary under different conditions of food availability. Duguy et al. (2000) considered that decreased availability of jellyfish during winter could be the reason for the higher incidence of plastic bags during these months in the diet of turtles.

In conclusion it seems that although indiscriminate omnivorous predators or filter feeders appear most prone to plastic ingestion, there are many examples of ingestion among species with specialized foraging techniques and specific prey selection.

Color

One of the factors often considered to influence the consumption of marine debris is color as specific colors might attract predators when resembling the color of their prey. In seabirds, this has been suggested for e.g. greater shearwaters (*Puffinus gravis*) and red phalaropes *(Phalaropus fulicarius*) (Moser and Lee 1992). Parakeet auklets (*Aethia psittacula*) on the Alaskan coast, feeding naturally primarily on light-brown crustaceans, consumed mainly darker plastic granules, suggesting they were mistaken for food items (Day et al. 1985). In studies of marine turtles, the issue of color preference is controversial. Lutz (1990) indicated no preferential ingestion of different plastic colors; neither did Campani et al. (2013) in loggerhead turtles. However, others find light-colored and translucent plastics are most commonly ingested, suggesting similarity to their jellyfish prey (Bugoni et al. 2001; Tourinho et al. 2010). Schuyler et al. (2014) indicated such prey-similarity by the combination of translucency and flexibility of plastic bags and found that blue-colored items were less frequently eaten probably because of lower detection rates in open water. An additional visual factor could be shape as floating plastic bags resemble jellyfish. In fur seal scats, the colors of plastic were white, brown, blue, green and yellow (Eriksson and Burton 2003), however, no clear preference was evident.

White, clear, and blue plastics were primarily ingested by planktivorous fish from the North Pacific central gyre but similar color proportions were recorded from neuston samples (Boerger et al. 2010). By contrast, black particles were most prevalent in stomachs of fish from the English Channel but this study included both pelagic and demersal fish (Lusher et al. 2013). While two mesopelagic fish (*Lampris* spp.*)* species did not favour particular colors *Alepisaurus ferox* seemed to favour white and clear plastic pieces, which may resemble their gelatinous prey (Choy and Drazen 2013). The majority of strands reported from the intestines of Norway lobsters (*Nephrops norvegicus*) were also transparent (Murray and Cowie 2011).

Studies on the color-specific uptake often do not take into account that color may change in the gastrointestinal tract (e.g. Eriksson and Burton 2003). Also, there are rarely quantitative data on the abundance of various color categories in the foraging ranges of the species studied. In general, light colors seem to be most common in floating marine debris ranging from 94 % of the abundance in the Sargasso Sea (Carpenter et al. 1972) and 82–89 % in the South Atlantic (Ryan 1987) to 72 % in the North Pacific (Day et al. 1985). The frequently observed prevalence of translucent or brightly colored objects in stomachs may thus reflect the availability of such items the ambient environment rather than color selectivity.

Age

Among seabirds, it has been well-established that younger northern fulmars have more plastic in their stomachs than adults (Day et al. 1985; Van Franeker et al. 2011). The same has been shown for flesh-footed and short-tailed shearwater (*Puffinus carneipes* and *P. tenuirostris*, respectively, Hutton et al. 2008; Acampora et al. 2014). The chicks of Laysan albatrosses (*Phoebastria immutabilis*) at colonies (Auman et al. 1997) have a much higher load of plastic than adults at sea (e.g. Gray et al. 2012). In marine turtles, Plotkin and Amos (1990) found a decreasing trend in plastic consumption with age and attributed this to the fact that young turtles linger along drift-lines, where plastic accumulates. However, in the Adriatic Sea no clear age or size-related differences were apparent in loggerhead sea turtles (*Caretta caretta*) (Lazar and Gracan 2011; Campani et al. 2013). Schuyler et al. (2013) concludes that turtles ingest most debris during their younger oceanic life stages. Significantly higher levels of plastics were recorded in younger franciscana dolphins (*Pontoporia blainvillei)* off the Argentinian coast (Denuncio et al. 2011). Younger harbour seals (*Phoca vitulina*) in the Netherlands had significantly more plastic in their stomach than older ones (Bravo Rebolledo et al. 2013) (illustrated by Fig. 4.2). There were no differences in the plastic consumption of different age classes of cat fishes (Ariidae) from a Brazilian estuary (Possatto et al. 2011). Similarly, there was no relationship between ingested litter mass and sex, maturity and body length in deep-water blackmouth catsharks (*Galeus melastomus*, Anastasopoulou et al. 2013). By contrast, the mean number of plastic items ingested by planktivorous fish from the North Pacific gyre increased as the size of fish increased, reaching a maximum of seven pieces per fish for the 7-cm size class (Boerger et al. 2010). However, this may also be explained by higher plastic uptake of larger individuals during the capture process in the codend (Davison and Asch 2011). Larger individuals of the Norway lobster had fewer plastic threads in their intestines indicating higher ingestion rates of smaller/younger animals (Murray and Cowie 2011) that also have higher incidence of infaunal prey such as polychaetes (Wieczorek et al. 1999).

In summary, it seems that where age differences were shown, younger animals are most affected. The reasons for this are not clear. In seabirds, this could partly be explained by parental delivery of food by regurgitation to chicks at the nest. In such chicks, elevated loads of plastic could be the consequence of being fed by two parents, each transferring much of its own plastic load, which has accumulated in the proventricular stomach over an extended period of time before breeding. In addition, a less developed grinding action in the gizzards of young birds could slow the mechanical break-down of plastic and removal through the intestines. Some species of albatross and shearwater chicks may lose an excess load of plastic by regurgitating proventricular stomach contents prior to fledging (Auman et al. 1997; Hutton et al. 2008). However, in fulmars the high level of plastic persists in immature birds and only gradually disappears after several years (Jensen 2012) and thus cannot be completely explained by parental feeding and stomach functioning. Perhaps, young animals are less efficient at foraging, and therefore less specific in their prey selection (Day et al. 1985; Baird and Hooker 2000; Denuncio et al. 2011). One important open question therefore is whether higher loads of plastic in younger animals reflect a learning process or mortality of those individuals that ingested too much plastic. Both explanations are speculative, but the latter suggests serious deleterious effects at the population level.

Sex

To date, there is no evidence that sex affects plastic ingestion. Studies that specifically evaluated male and female ingestion, found no significant differences in the plastic load (e.g. Day et al. 1985; Van Franeker and Meijboom 2002; Lazar and Gracan 2011; Murray and Cowie 2011; Anastasopoulou et al. 2013; Bravo Rebolledo et al. 2013). However, species showing strong sexual dimorphy or sex-dependent foraging ranges or winter distributions may show sex-specific uptake rates.

4.4.1.2 Accidental and Secondary Ingestion

Filter-feeding marine organisms, ranging in size from small crustaceans, to shellfish, fish, some seabirds (prions, *Pachyptila* spp.) and ultimately large baleen whales may be prone to plastic ingestion. These species obtain their nutrition by filtering large volumes of water, which may contain debris in addition to the targeted food source. Although non-food items can be ejected before passage into the digestive system, this is not always the case. In their natural habitat, ingested plastics have been found in filter-feeding crustaceans such as goose barnacles (*Lepas* spp.; Goldstein and Goodwin 2013) and mussels (*Mytilus edulis*, Van Cauwenberghe et al. 2012; Leslie et al. 2013; Van Cauwenberghe and Janssen 2014). Large baleen whales have been long known to occasionally ingest debris (Laist 1997; Baulch and Perry 2014). In France, a young minke whale (*Balaenoptera acutorostrata*) beached with various plastic bags completely filling its stomachs (De Pierrepont et al. 2005). Curiously, we have found no record of plastic ingestion by obligate filter-feeding large fish such as basking shark (*Cetorhinus maximus*) or manta ray (*Manta birostris*). Some bony fish species partially use filter-feeding, but also directional feeding making it difficult to assign the pathway of debris ingestion. Uptake of plastic by filter-feeding fish has been reported for herring (*Clupea harengus*) and horse mackerel (*Trachurus trachurus*) from the North Sea and English Channel (Foekema et al. 2013; Lusher et al. 2013).

Accidental ingestion of a mixture of food and debris is not restricted to filter feeders. In the Clyde Sea, 83 % of Norway lobsters (*Nephrops norvegicus)* had plastic in their stomach, which was attributed either to passive ingestion of sediment while feeding or to secondary ingestion (Murray and Cowie 2011), although it could be argued that the fibres ingested may resemble benthic polychaete prey. Plastics and other non-food items found in stomachs of harbour seals in the Netherlands were considered to have been accidentally ingested when catching prey fishes (Bravo Rebolledo et al. 2013). A similar route for plastic ingestion was proposed by Di Beneditto and Ramos (2014), who showed that plastic in franciscana dolphins was related to benthic feeding habits, in which disturbance of sediment probably induced accidental intake of plastic debris. Florida manatees (*Trichechus manatus latirostris*) may take up plastic accidentally during foraging on plants (Beck and Barros 1991). Pelagic loggerhead sea turtles may ingest plastic because they feed indiscriminately or graze on organisms settled on floating plastic (McCauley and Bjorndal 1999; Tomas et al. 2002). A special case of such accidental ingestion is known for the Laysan albatross who take up plastic particles in combination with eggs strings of flying fish. The fishes attach their eggs to floating items: previously seaweed, bits of wood or pumice, but nowadays often plastic objects (Pettit et al. 1981). This phenomenon has also been observed in loggerhead turtles. The plastic in their stomachs was sometimes covered by the eggs of the insect *Halobates micans* (Frick et al. 2009).

A final case of unintentional plastic ingestion is that of secondary ingestion, which occurs when animals feed on prey, which had already ingested debris. This may concern both prey swallowed as a whole or scavenging. In seabirds, skuas are known to forage on smaller seabirds that consume plastic (Ryan 1987). Great skuas (*Stercorarius skua*) from the South Atlantic Ocean predate several seabird species, and their regurgitated boluses showed a link with the amount of secondarily ingested plastic and their main prey species (Bourne and Imber 1982; Ryan and Fraser 1988). In the monitoring study on northern fulmars (*Fulmarus glacialis*) in the North Sea intact stomachs from scavenged fulmars or black-legged kittiwakes (*Rissa tridactyla*) were occasionally found, which contained plastic (Van Franeker et al. 2011). A spectacular example of secondary ingestions was provided by Perry et al. (2013) who reported a ball of nylon fishing line in the stomach of a little auk (*Alle alle*), that was found in the stomach of a goose fish (*Lophius americanus*). The presence of small plastic particles in the faeces of fur seals on Macquarie Island was attributed to secondary ingestion through the consumption of myctophid fishes (Eriksson and Burton 2003). High abundance of small plastics in myctophid fishes (Boerger et al. 2010; Davison and Asch 2011), in combination with the fact that this type of fish is a common prey for many larger marine predators, suggest that secondary ingestion may be more common than reported.

4.4.2 Impacts of Plastic Ingestion

Plastic ingestion may directly cause mortality or can affect animals by slower sublethal physical and chemical effects which are best considered separately.

4.4.2.1 Direct Mortality Caused by Plastic Ingestion

When the gastrointestinal tract becomes completely blocked or severely damaged ingested plastic may lead to rapid death. Even small pieces can cause the blockage of the intestines of animals, if orientated in the wrong way (Bjorndal et al. 1994). An ingested straw led to the death of a Magellanic penguin (*Spheniscus magellanicus*) by perforation of the stomach wall (Brandao et al. 2011). Other examples of lethal impacts in seabirds were provided, for example, by Kenyon and Kridler (1969), Pettit et al. (1981) and Colabuono et al. (2009). Cases of mortality among marine turtles have been reported by e.g. Bjorndal et al. (1994), Bugoni et al. (2001), Mrosovsky et al. (2009) and Tourinho et al. (2010). Unlike most birds, turtles seem to pass plastic debris easily into the gut, and therefore most plastics have been found in the intestines rather than the stomach (e.g. Bjorndal et al. 1994; Bugoni et al. 2001; Tourinho et al. 2010, Campani et al. 2013). As a consequence, physical impact in turtles may often be related to gut functioning or damage. In the Mediterranean Sea, the death of a sperm whale of 4.5 t, was attributed to 7.6 kg of plastic debris in its stomach, which was ruptured probably due to the large plastic load (de Stephanis et al. 2013). Often, it is difficult to produce evidence for causal links between ingested debris and mortality, and as a consequence, documented cases of death through plastic ingestion are rare (Sievert and Sileo 1993; Colabuono et al. 2009). A direct lethal result from ingestion probably does not occur at a frequency relevant at the population level. Indirect, sub-lethal effects are probably more relevant.

4.4.3 Indirect Physical Effects of Plastic Ingestion

Impacts that are deleterious for the individual but not directly lethal become relevant to populations if many individuals are affected. Partial blockage or moderate damage of the digestive tract in Laysan albatross chicks was not a major cause of direct mortality, but may contribute to poor nutrition or dehydration (Auman et al. 1997). Since virtually every chick in this population (frequency of occurrence: 97.6 %) had a considerable quantity of plastic in the stomach, debris ingestion must be considered a relevant factor in overall fledging success of the population. Major proportions of tubenosed seabird species and marine turtles ingest plastic on a very regular basis. This raises urgent questions concerning the cumulative physical and chemical impacts at the population level. Sub-lethal physical impacts may have various consequences.

Firstly, stomach volume occupied by debris may limit optimal food intake. For example, tubenosed seabirds have large proventricular stomachs because they depend on irregular patchy food availability. Reduced storage capacity affects optimal foraging at times when this should be possible. Partial blockage of food passage through the digestive tract may cause gradual deterioration of body condition of fish (Hoss and Settle 1990). Efficiency of digestive processes may be reduced when sheet-like plastics or fragments cover parts of the intestinal wall. Sometimes ulcerations are found on stomach walls of organisms that ingested plastic (Pettit et al. 1981; Hoss and Settle 1990). A potentially important physical impact from ingested plastics may be a feeling of satiation as receptors signal satiety to the brain and reduce the feeling of hunger (Day et al. 1985), which may reduce the drive to search for food (Hoss and Settle 1990). High volumes of plastic can reduce proventricular contraction, responsible for the stimulation of appetite (Sturkie 1976).

All these factors may lead to a deterioration of the body condition of animals. In young loggerhead turtles, McCauley and Bjorndal (1999) found experimental evidence, that volume reduction in stomachs by non-food material caused lower nutrient and energy uptake. Similarly Lutz (1990) found a negative correlation between plastic consumption and nutritional condition in experiments with green turtles (*Chelonia mydas*) and loggerhead turtles. Ryan (1988) provided evidence for a negative effect on uptake of food and growth rate among chickens (*Gallus gallus domesticus*) that had been fed plastic pellets under controlled laboratory conditions, compared to control chickens.

In many non-experimental studies, researchers have looked for correlations between plastic loads and body condition. Some seabird studies indicate negative correlations between ingested plastics and body condition (e.g. Connors and Smith 1982; Harper and Fowler 1987; Donnely-Greenan et al. 2014; Lavers et al. 2014). However, no such correlation was found by Day et al. (1985), Furness (1985), Sileo et al. (1990), Moser and Lee (1992), Van Franeker and Meijboom (2002) and Vliestra and Parga (2002). In these non-experimental studies, it is always problematic to distinguish cause and consequence: do animals increase ingestion of abnormal items such as plastics when in poor condition, or do they loose condition because of the plastic debris in their stomach? This is even more complicated because many studies are based on corpses of beached animals that often starved before being washed ashore with potentially aberrant foraging activity.

We conclude that the estimated impact from plastic ingestion on body condition is difficult to document in wild populations. However, as mentioned above, experimental studies clearly indicate that eating plastic reduces an individual's body condition. This may not be directly lethal but will translate into negative effects on average survival and reproductive success in populations in which plastic ingestion is a common phenomenon.

4.4.3.1 Chemical Effects from Plastic Ingestion

The chemical substances added during manufacture or adsorbed to plastics at sea are an additional source of concern in terms of sublethal effects. Potential chemical impacts from the ingestion of plastic are not exhaustively discussed in this chapter, as chemical transfer and impacts are discussed in more detail in the contributions by Koelmans (2015) and Rochman (2015). We would like to stress, however, that in larger organisms, plastics often have a long residence time, during which objects may be fragmented to smaller sizes due to mechanical or enzymatic digestive processes. In such conditions, the chemical additives may play a more prominent role than chemicals adsorbed to the surface. We conclude that although research to quantify body burden and consequences of plastic-derived chemicals in marine organisms is still in its infancy, there is a risk to species frequently ingesting synthetic debris. This will remain a complicated issue due to the widespread presence of many chemicals and their accumulation in marine foodwebs along routes other than plastics alone.

4.4.3.2 Chain of Impacts Related to Plastic Ingestion

By ingesting plastics, marine biota, and in particular seabirds, accidentally facilitate and catalyse the global distribution of plastic through bio-transportation. Studies of polar tubenosed seabirds returning to clean breeding areas after overwintering in more polluted regions are a good example. Similarly, Van Franeker and Bell (1988) found that cape petrels (*Daption capense*) process and excrete some 75 % of their initial plastic load by grinding particles in the gizzard during one month in Antarctica. Plastics are thus excreted as smaller particles in other places than where they were taken up and become available to other trophic levels in marine and terrestrial habitats. Similar data were obtained for northern fulmars and thick-billed murres (*Uria lomvia*) in the Canadian high Arctic (Mallory 2008; Provencher et al. 2010, Van Franeker et al. 2011). In the Antarctic, Van Franeker and Bell (1988) also found that 75 % of Wilsons storm petrel (*Oceanites oceanicus*) chicks that died before fledging had plastics in their stomachs, fed to them by their parents and now permanently deposited around Antarctic breeding colonies. Transport of materials may be considerable. Van Franeker (2011) calculated that northern fulmars in the North Sea area (plastic incidence 95 %, average number 35 plastic items, average mass 0.31 g per bird) annually reshape and redistribute ca. 630 million pieces or 6 t of plastic. As fulmars range over large areas, widespread secondary distribution of plastics will occur. Chemicals may be brought to other environments by seabirds (Blais et al. 2005)—potentially partly linked to plastics. From an average plastic mass of 10 g in healthy Laysan albatross chicks on Midway Atoll to about 20 g in chicks that died (Auman et al. 1997) it may be conservatively estimated, that this species with locally ca. 600,000 breeding pairs, annually brings ashore some 6 t of marine plastic debris. Also, some crustaceans reshape and redistribute plastics: Davidson (2012) showed that boring crustacean *Sphaeroma* sp. could release into the environment thousands of small particles per burrow. One of the open questions is how plastic items reach the deep sea despite their low density and therefore low sinking rates. Along with increased density by fouling processes (Ye and Andrady 1991) plastic may also be transported to the deep sea either through sinking of carcasses containing plastics, in marine snow (Van Cauwenberghe et al. 2013) or repackaged in the faeces of zooplankton (Cole et al. 2013) or other pelagic organisms. Vertical export may also be facilitated by migratory behaviour of mesopelagic fish in the water column, which had fed on plastic items (Choy and Drazen 2013). Thus, marine life is as a significant factor in the environmental production and redistribution of secondary microplastics.

4.4.4 Impacts from Species Dispersal

One of the potentially deleterious effects of marine debris is that it offers opportunities for the dispersal, or 'hitch hiking' of species around the world. Organisms can colonise non-degradable material and be transported by the currents and winds. Once settled in a new habitat, this can lead to massive population growth of 'alien species' that can outcompete original ecosystem components (Kiessling et al. 2015). Oceanic plastics can also provide new or increased habitat opportunities for specialized species such as ocean skaters (Goldstein et al. 2012; Majer et al. 2012) or whole pelagic or benthic communities (Goldberg 1997; Bauer et al. 2008; Zettler et al. 2013; Goldstein et al. 2014). For more details on hitch-hiking species see Kiessling et al. (2015).

4.5 Discussion

The total number of marine species with documented records of either entanglement and/or ingestion has doubled with an increase from 267 species in Laist (1997) to 557 species in this new review (Table 4.3 and Online Supplements). The increase in number of affected species is substantial in all groups. The documented impact for marine turtles increased from 86 to 100 % of species (now 7 of 7 species), for marine mammals from 43 to 66 % of species (now 81 of 123 species) and for seabirds from 44 to 50 % of species (now 203 of 406 species). Among marine mammals the percentage of affected whales increased from 37 to 68 % of species (now 54 of 80 species) and seals from 58 to 67 % of species (now 22 of 32 species) (see Table 4.3).

Laist (1997) addressed groups such as fish and invertebrates only marginally, so comparative figures in such groups (Tables 4.1, 4.2, 4.3) are currently of less use. We may have missed sources, and recently publications have been published at such high frequency that we cannot guarantee completeness as given in full in the online supplement, with derived data in Table 4.4.

We have stopped our additions to the online supplement and thus to derived tables on the 9th of December 2014. We welcome documentation on missed or new records of entanglement or ingestion for future updates. It remains important to continue such documentation of species affected by marine debris. However, given sufficient time and research effort, all species of marine organisms will get documented examples of interaction with marine debris. Any species can become the victim of entanglement. Furthermore, the filter-feeding habits of many lower trophic levels, and secondary ingestion by higher trophic levels, make it almost unavoidable that any species in the marine food web will at some stage pass at least some plastic debris through the intestinal tract.

As a consequence, to improve on current knowledge, future assessments of deleterious effects of debris on marine life require comparable standardized data on frequency of occurrence, ingestion quantification and categorisation of ingested debris. It is only through study of the various impacts (including frequency and quantity) on

Table 4.3 Number of species with documented records of entanglement in, and/or ingestion of marine debris

Species group	Laist (1997)			This study		
	Spp. total	Species affected		Spp. total	Species affected	
	(n)	(n)	(%)	(n)	(n)	(%)
Seabirds	314	138	43.9	406	203	50.0
Anseriformes (marine ducks)	–	1	–	**13**	5	38.5
Gaviiformes (divers)	–	–	–	**5**	4	80.0
Sphenisciformes (penguins)	**16**	6	38.0	**18**	9	50.0
Procellariiformes (tubenoses)	**99**	63	64.0	**141**	85	60.3
Podicipediformes (grebes)	**19**	2	10.0	**23**	6	26.1
Pelecaniformes, suliformes, phaethontiformes (pelicans, gannets and boobies, tropicbirds)	**51**	17	33.3	**67**	27	40.3
Charadriiformes (gulls, skuas, terns, auks)	**122**	50	41.0	**139**	67	48.2
Marine mammals	115	49	43	123	81	65.9
Mysticeti (baleen whales)	**10**	**6**	**60.0**	**13**	10	76.9
Odontoceti (toothed whales)	**65**	**22**	**34.0**	**65**	44	66.2
Phocidae (true seals)	19	8	42.0	**19**	9	42.1
Otariidae (eared seals)	14	11	79.0	**13**	13	100.0
Sirenia (sea cows, dugongs)	**4**	**1**	**25.0**	**5**	3	60.0
Mustelidae (otters)	**1**	**1**	**100.0**	**2**	1	50.0
Ursidae (polar bears)	–	–	–	**1**	1	100.0
Turtles	**7**	**6**	**85.7**	**7**	7	100.0
Sea snakes	–	**0**	–	**62**	2	3.2
Fish	–	60	–	**32,554**	166	0.6
Invertebrates	–	**9**	–	**159,000**	98	0.1
All species	–	**267**	–	–	**557**	–
Marine birds, mammals and turtles	436	193	44.3	**536**	291	54.3
Species associated with smothering	–	–	–	–	22	–

Comparative summary with the earlier major review by Laist (1997). See notes in captions of Tables 4.1 and 4.2. Numbers of species affected and group percentages are not a simple sum of Tables 4.1 and 4.2 because many species suffer from entanglement as well as ingestion. For details, see the Online Supplement

different species and their interactions, combined with dedicated observational or experimental studies, that we can ultimately gain areal understanding of the many deleterious impacts of marine plastic debris on wild populations. A number of recommendations can be made to assist collection of comparable high-quality data sets:

- Accurate data on frequency of occurrence of entanglement or ingestion of debris require a proper a priori protocol, staff that has experience with identifying (symptoms of) marine debris and adequate samples sizes.
- Concerning frequency of entanglement in debris, protocols for assessment are complicated by the distinction between interaction with active fishing gear and

Table 4.4 Number of species of major groups of marine organisms with documented records of marine debris impacts in natural habitats, separately for entanglement or ingestion and in combination (search closed 9th December 2014)

Species group	Species (n)	Entanglement (n)	Entanglement (%)	Ingestion (n)	Ingestion (%)	Total species affected (n)	Total species affected (%)
Seabirds	**406**	**103**	**25.4**	**164**	**40.4**	**203**	**50.0**
Anseriformes	**13**	**5**	**38.5**	**1**	**7.7**	**5**	**38.5**
Anatidae (marine ducks)	13	5	38.5	1	7.7	5	38.5
Gaviiformes	**5**	**3**	**60.0**	**3**	**60.0**	**4**	**80.0**
Gaviidae (divers, loons)	5	3	60.0	3	60.0	4	80.0
Sphenisciformes	**18**	**6**	**33.3**	**5**	**27.8**	**9**	**50.0**
Spheniscidae (penguins)	18	6	33.3	5	27.8	9	50.0
Procellariiformes	**141**	**24**	**17.0**	**84**	**59.6**	**85**	**60.3**
Diomedeidae (albatrosses)	21	12	57.1	17	81.0	17	81.0
Procellariidae (petrels, shear-waters, prions)	92	10	10.9	55	59.8	56	60.9
Hydrobatidae (storm petrels)	24	2	8.3	10	41.7	10	41.7
Pelecanoididae (diving petrels)	4	0	0.0	2	50.0	2	50.0
Podicipediformes	**23**	**6**	**26.1**	**0**	**0.0**	**6**	**26.1**
Podicipedidae (grebes)	23	6	26.1	0	0.0	6	26.1
Phaethontiformes	**3**	**0**	**0.0**	**2**	**66.7**	**2**	**66.7**
Phaethontidae (tropicbirds)	3	0	0.0	2	66.7	2	66.7
Pelecaniformes	**8**	**4**	**50.0**	**2**	**25.0**	**5**	**62.5**
Pelecanidae (pelicans)	8	4	50.0	2	25.0	5	62.5
Suliformes	**56**	**16**	**28.6**	**12**	**21.4**	**20**	**35.7**
Fregatidae (frigatebirds)	5	0	0.0	1	20.0	1	20.0
Sulidae (gannets, boobies)	10	6	60.0	5	50.0	8	80.0

(continued)

Table 4.4 (continued)

Species group	Species (n)	Entanglement (n)	Entanglement (%)	Ingestion (n)	Ingestion (%)	Total species affected (n)	Total species affected (%)
Phalacrocoracidae (cormorants, shags)	41	10	24.4	6	14.6	11	26.8
Charadriiformes	**139**	**39**	**28.1**	**55**	**39.6**	**67**	**48.2**
Chionidae (sheathbills)	2	0	0.0	1	50.0	1	50.0
Scolopacidae (phalaropes)	3	0	0.0	2	66.7	2	66.7
Laridae (gulls, noddies, skimmers, terns)	102	28	27.5	32	31.4	42	41.2
Stercorariidae (skuas)	7	2	28.6	6	85.7	6	85.7
Alcidae (murres, guillemots, murrelets, auks, auklets, puffins)	25	9	36.0	14	56.0	16	64.0
Marine mammals	**123**	**51**	**41.5**	**62**	**50.4**	**81**	**65.9**
Mysticeti	**13**	**9**	**69.2**	**7**	**53.8**	**10**	**76.9**
Balaenidae (right whales)	4	3	75	2	50	3	75.0
Neobalaenidae (pygmy right whales)	1	1	100	1	100	1	100.0
Eschrichtiidae (gray whales)	1	1	100	0	0	1	100.0
Balaenopteridae (rorquals)	7	4	57.1	4	57.1	5	71.4
Odontoceti	**67**	**16**	**23.9**	**40**	**59.7**	**44**	**65.7**
Physeteridae (sperm whales)	1	1	100	1	100	1	100.0
Kogiidae (dwarf and pygmy sperm whales)	2	1	50	2	100	2	100.0
Pontoporiidae (La Plata river dolphins)	1	0	0	1	100	1	100.0
Monodontidae (narwhals, belugas)	2	1	50	0	0	1	50.0

(continued)

Table 4.4 (continued)

Species group	Species (n)	Entanglement (n)	Entanglement (%)	Ingestion (n)	Ingestion (%)	Total species affected (n)	Total species affected (%)
Phocoenidae (porpoises)	6	2	33.3	4	66.7	4	66.7
Delphinidae (oceanic dolphins)	34	10	29.4	19	55.9	**22**	**64.7**
Ziphiidae (beaked whales)	21	1	4.8	13	61.9	13	61.9
Pinniped	**33**	**22**	**66.7**	**12**	**36.4**	22	66.7
Phocidae (true seals)	19	9	47.4	4	21.1	9	47.4
Otariidae (eared seals)	13	13	100	8	61.5	13	100.0
Sirenia	**5**	**2**	**40**	**3**	**60**	**3**	**60.0**
Trichechidae (manatees)	2	1	50.0	2	100.0	2	100.0
Dugongidae (dugongs)	2	1	50	1	50	1	50.0
Carnivora	**3**	**2**	**66.7**	**0**	**0.0**	**2**	**66.7**
Mustelidae (otters)	2	1	50	0	0	1	50.0
Ursidae (polar bears)	1	1	100	0	0	1	100.0
Turtles	**7**	**7**	**100.0**	**7**	**100.0**	**7**	**100.0**
Carettinae	3	3	100.0	3	3.0	3	100.0
Cheloniidae	3	3	100.0	3	3.0	3	100.0
Dermochelyidae	1	1	100.0	1	1.0	1	100.0
Sea snakes	**62**	**2**	**3.2**	**0**	**0.0**	**2**	**3.2**
Hydrophiidae (sea snakes)	62	2	3.2	0	0.0	2	3.2
Fish	**32,554**	**89**	**0.27**	**92**	**0.28**	**166**	**0.51**
Elasmobranchii	**692**	**21**	**3.03**	**18**	**2.60**	**30**	**4.34**
Hexanchiformes (frill and cow sharks)	6	1	16.67	0	0.00	1	16.67
Orectolobiformes (carpet sharks)	44	0	0.00	1	2.27	1	2.27

(continued)

Table 4.4 (continued)

Species group	Species (n)	Entanglement (n)	Entanglement (%)	Ingestion (n)	Ingestion (%)	Total species affected (n)	Total species affected (%)
Lamniformes (mackerel sharks)	16	6	37.50	5	31.25	7	43.75
Charcharhiniformes (ground sharks)	282	11	3.90	8	2.84	14	4.96
Squaliformes (bramble, sleeper, dogfish sharks)	129	1	0.78	3	2.33	4	3.10
Myliobatiformes (stingrays)	215	2	0.93	1	0.47	3	1.40
Holocephali	**50**	**1**	**2.00**	**0**	**0.00**	**1**	**2.0**
Chimaeriformes (chimaeras)	50	1	2.00	0	0.00	1	2.0
Actinopterygii	**22,916**	**67**	**0.29**	**74**	**0.32**	**135**	**0.6**
Amiiformes (bowfins)	1	1	100.00	0	0.00	1	100.0
Anguilliformes (eels, morays)	906	1	0.11	0	0.00	1	0.11
Clupeiformes (herrings)	390	2	0.51	2	0.51	3	0.77
Siluriformes (cat fish)	3589	2	0.06	3	0.08	4	0.11
Osmeriformes (smelts)	319	1	0.31	0	0.00	1	0.31
Salmoniformes (salmons)	215	4	1.86	1	0.47	5	2.33
Stomiiformes (light fish, dragon fish)	413	0	0.00	3	0.73	3	0.73
Aulopiformes (grinners)	255	0	0.00	1	0.39	1	0.39
Myctophiformes (lantern fish)	215	0	0.00	12	5.58	12	5.58
Lampriformes (velifers, tube-eyes, ribbon fish)	24	0	0.00	3	12.50	3	12.50
Gadiformes (cod-like)	614	2	0.33	7	1.14	8	1.30
Batrachoidiformes (toad fish)	82	2	2.44	0	0.00	2	2.44
Lophiiformes (angler fish)	353	0	0.00	1	0.28	1	0.28

(continued)

Table 4.4 (continued)

Species group	Species (n)	Entanglement (n)	Entanglement (%)	Ingestion (n)	Ingestion (%)	Total species affected (n)	Total species affected (%)
Atheriniformes (silversides)	338	0	0.00	1	0.30	1	0.30
Cyprinodontiformes (rivulines, killi fish, live bearers)	1249	1	0.08	0	0.00	1	0.08
Beloniformes (needle fish)	254	0	0.00	1	0.39	1	0.39
Zeiformes (dories)	33	0	0.00	1	3.03	1	3.03
Scorpaeniformes (scorpion fish, flatheads)	1622	18	1.11	5	0.31	23	1.42
Perciformes (perch-like)	10,837	20	0.18	29	0.27	47	0.43
Pleuronectiformes (flatfish)	778	11	1.41	4	0.51	14	1.80
Tetraodontiformes (puffers, file fish)	429	2	0.47	0	0.00	2	0.47
Invertebrates	**159,000**	**92**	**0.06**	**6**	**0.004**	**99**	**0.06**
Crustacea	67,000	46	0.07	3	0.00	49	0.07
Echinodermata	7000	21	0.30	0	0.00	21	0.30
Mollusca	85,000	25	0.03	3	0.00	29	0.03
*All species**		**344**		**331**		**557**	

*Exclusive 22 species associated with smothering, see online supplement 2 interaction with marine debris. For example, even for experts using standard protocols, it is difficult to distinguish whether wounds are caused by entanglement in active or derelict fishing gear, even when remains of nets or similar are found on the body. Some suggestions are being developed concerning entanglement rates in ghost nets or for bird entanglement in synthetic materials used for nest construction (MSFD-TSGML 2013).

- For ingestion, in addition to frequency of occurrence ('incidence') it is recommended to collect data on quantities of ingested debris not only on the basis of numbers of items but also by mass of categories.
- In such ingestion records, as a minimum it is recommended to separate industrial plastics (pellets) from consumer-waste plastics (see Table 4.5). The latter if possible can be further specified following the categorisation recommended for ingestion by birds, mammals and fishes according to the EU Marine Strategy Directive (MSFD-TSGML 2013), that is into categories of sheetlike, threadlike, foamed, hard fragmented, and other synthetic items, plus categories of non-plastic rubbish.
- For averaged data, information should be provided as 'population averages' with standard error of the mean. Population averages are calculated with the inclusion of individuals without ingested plastics. Additional data can be maximum levels observed, or proportions of animals exceeding a particular limit [such as the 0.1-g critical limit in the Ecological Quality Objective for plastic ingestion by northern fulmars (Van Franeker et al. 2011)] (see Table 4.5). We emphasize this explicit use of population averages because in quite a few of the publications checked for this review averages had been calculated just over those individuals that had plastic, often not specifying that zero values had been omitted.
- Negative species results (e.g. Avery-Gomm et al. 2013; Provencher et al. 2014) are also relevant but again should be based on an adequate sample size of animals studied according to a proper protocol. Thus, records of absence of debris for an individual sample should be as firm as those on presence. From experience in our own research group, we know of claims on absence or near absence of plastics in stomachs or guts of several species of which diets were studied, but without dedicated methods or data recording for marine debris (including zeros). Once proper methods were established for laboratory procedures and data recording, each of those species was found to contain debris regularly (e.g. Bravo-Rebolledo et al. 2013).
- Examples of protocols for ingested debris in intestinal tracts of larger organisms can be found in e.g. MSFD-TSGML (2013), with further information for ingestion by marine birds in Van Franeker et al. (2011) and marine turtles in Camedda et al. (2014). Standard protocols for marine mammals, invertebrates have not yet been established in detail but may largely follow those for seabirds and turtles. In general, these studies consider debris of $\geq$1 mm by using sieves with such mesh size.
- Only when using the above approaches on frequency of occurrence (proportion of animals in populations affected) and gravity of interaction (quantity of ingested material; damage level from entanglement), it becomes possible to design experimental or other dedicated studies that allow estimates of the true impact of plastic ingestion on wildlife populations. This relates to both the physical and chemical types of impacts, and will ultimately require model predictions using demographic characteristics of the species involved (Criddle et al. 2009).

Table 4.5 Recommended mode of data presentation for ingested plastic debris, using the example of plastics ingested by northern fulmars in different sub-regions of the North Sea (modified from Van Franeker and the 'Save the North Sea Fulmar' study group, 2013)

Regions		Industrial granules			User plastics			Total plastics				
2007–2011 period	Sample (n)	Incidence (%)	Average number n ± se	Average mass g ± se	Incidence (%)	Average number n ± se	Average mass g ± se	Incidence (%)	Average number n ± se	Average mass g ± se	Geome tric mean mass	EcoQO (%) (over 0.1 g)
Scottish Islands	121	47	1.3 ± 0.2	0.03 ± 0.00	90	21.2 ± 3.0	0.32 ± 0.06	90	22.5 ± 3.0	0.35 ± 0.06	0.091	58
East England	51	75	4.2 ± 0.9	0.09 ± 0.02	98	42.2 ± 6.2	0.26 ± 0.06	98	46.4 ± 6.7	0.35 ± 0.07	0.154	76
Channel area	72	82	7.1 ± 1.6	0.15 ± 0.03	99	44.6 ± 8.0	0.39 ± 0.06	99	51.7 ± 9.3	0.54 ± 0.08	0.278	86
SE North Sea	493	57	3.1 ± 0.6	0.07 ± 0.01	94	24.9 ± 1.8	0.29 ± 0.04	95	28.0 ± 2.1	0.36 ± 0.04	0.105	60
Skagerrak	79	53	3.4 ± 0.8	0.07 ± 0.02	94	49.2 ± 14.9	0.24 ± 0.04	94	52.6 ± 15.5	0.31 ± 0.05	0.105	56
North Sea total	816	58	3.3 ± 0.4	0.07 ± 0.01	94	29.5 ± 2.0	0.30 ± 0.03	95	32.8 ± 2.2	0.37 ± 0.03	0.115	62

Given are sample size, percentage of individuals with ingested material (incidence or frequency of occurrence), and population averages (including zero values) with standard error (se) for both number of items (n) and mass. These are specified for industrial plastics and consumer waste separately, and in total. Added to total plastics in this example are geometric mean mass and EcoQO performance that is the percentage of fulmars that had more than the critical level of 0.1 g of total plastic in the stomach

It will take considerable time and effort to collect these data and conduct dedicated studies before firm conclusions can be drawn on the level of detrimental impact of marine plastic debris on wildlife. However, in our opinion the suffering and death of individuals, in combination with the likelihood of higher-level population effects, indicates the need for a rapid reduction of input of plastic debris into the marine environment. If wildlife problems are not convincing: recent studies show that chemical and physical impacts are likely to occur in marine food webs (e.g. Van Cauwenberghe and Janssen 2014; Rochman et al. 2013, 2014), which implies potential impacts on human end consumers (Galloway 2015).

Long-term studies on seabirds have shown that measures to reduce loss of plastics to the environment do have relatively rapid effects. After considerable attention to the massive loss of industrial pellets to the marine environment in the early 1980s, improvements in production and transport methods were reflected in a visible result in the marine environment within one to two decades: several studies from around the globe showed that by the early 2000s the number of industrial granules in seabird stomachs had approximately halved from levels observed in the 1980s (Van Franeker and Meijboom 2002; Vlietstra and Parga 2002; Ryan 2008; Van Franeker et al. 2011; Van Franeker and Law 2015). These examples indicate that it is possible to reduce deleterious impacts from marine plastic debris on marine wildlife in shorter time frames than the longevity of the material might suggest.

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References

Abu-Hilal, A., & Al-Najjar, T. (2009). Marine litter in coral reef areas along the Jordan Gulf of Aqaba, Red Sea. *Journal of Environmental Management, 90*, 1043–1049.

Acampora, H., Schuyler, Q. A., Townsend, K. A., & Hardesty, B. D. (2014). Comparing plastic ingestion in juvenile and adult stranded short-tailed shearwaters (*Puffinus tenuirostris*) in eastern Australia. *Marine Pollution Bulletin, 78*, 63–68.

Adey, J., Smith, I., Atkinson, R. J. A., Tuck, I., & Taylor, A. (2008). Ghost fishing' of target and non-target species by Norway lobster, *Nephrops norvegicus*, creels. *Marine Ecology Progress Series, 366*, 119–127.

Allen, R., Jarvis, D., Sayer, S., & Mills, C. (2012). Entanglement of grey seals, *Halichoerus grypus*, at a haul out site in Cornwall, UK. *Marine Pollution Bulletin, 64*, 2815–2819.

Al-Masroori, H., Al-Oufi, H., McIlwain, J., & McLean, E. (2004). Catches of lost fish traps (ghost fishing) from fishing grounds near Muscat, Sultanate of Oman. *Fisheries Research, 69*, 407–414.

Aloy, A. B., Vallejo, B. M, Jr, & Juinio-Meñez, M. A. (2011). Increased plastic litter cover affects the foraging activity of the sandy intertidal gastropod *Nassarius pullus*. *Marine Pollution Bulletin, 62*, 1772–1779.

Anastasopoulou, A., Mytilineou, C., Smith, C. J., & Papadopoulou, K. N. (2013). Plastic debris ingested by deep-water fish of the Ionian Sea (eastern Mediterranean). *Deep-Sea Research I*, *74*, 11–13.

Anderson, J. A., & Alford, A. B. (2014). Ghost fishing activity in derelict blue crab traps in Louisiana. *Marine Pollution Bulletin, 79*, 261–267.

Andrady, A. L. (2015). Persistence of plastic litter in the oceans. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter* (pp. 57–72). Berlin: Springer.

Andrady, A. L. (2011). Microplastics in the marine environment. *Marine Pollution Bulletin, 62*, 1596–1605.

Andrady, A. L., & Neal, M. A. (2009). Applications and societal benefits of plastics. Philosophical transactions of the Royal Society of London *B*, *364*, 1977–1984.

Antonelis, K., Huppert, D., Velasquez, D., & June, J. (2011). Dungeness crab mortality due to lost traps and a cost-benefit analysis of trap removal in Washington state waters of the Salish Sea. *North American Journal of Fisheries Management, 31*, 880–893.

Arnould, J. P. Y., & Croxall, J. P. (1995). Trends in entanglement of Antarctic fur seals (*Arctocephalus gazella*) in man-made debris at South Georgia. *Marine Pollution Bulletin, 30*, 707–712.

Asoh, K., Yoshikawa, T., Kosaki, R., & Marschall, E. A. (2004). Damage to cauliflower coral by monofilament fishing lines in Hawaii. *Conservation Biology, 18*, 1645–1650.

Auman, H. J., Ludwig, J. P., Giesy, J. P., & Colborn, T. (1997). Plastic ingestion by Laysan Albatross chicks on Sand Island, midway atoll, in 1994 and 1995. In G. Robinson & R. Gales (Eds.), *Albatross biology and conservation*. Surrey Beatty and Sons: Chipping Norton.

Avery-Gomm, S., Provencher, J. F., Morgan, K. H., & Bertram, D. F. (2013). Plastic ingestion in marine-associated bird species from the eastern North Pacific. *Marine Pollution Bulletin, 72*, 257–259.

Ayaz, A., Acarli, D., Altinagac, U., Ozekinci, U., Kara, A., & Ozen, O. (2006). Ghost fishing by monofilament and multifilament gillnets in Izmir Bay, Turkey. *Fisheries Research, 79*, 267–271.

Azzarello, M. Y., & Van Vleet, E. S. (1987). Marine birds and plastic pollution. *Marine Ecology Progress Series, 37*, 295–303.

Baeta, F., Costa, M. J., & Cabral, H. (2009). Trammel nets' ghost fishing off the Portuguese central coast. *Fisheries Research, 98*, 33–39.

Baird, R. W., & Hooker, S. K. (2000). Ingestion of plastic and unusual prey by a juvenile harbour porpoise. *Marine Pollution Bulletin, 40*, 719–720.

Barreiros, J. P., & Guerreiro, O. (2014). Notes on a plastic debris collar on a juvenile *Pagellus acarne* (Perciformes: Sparidae) from Terceira Island, Azores, NE Atlantic. *Bothalia-Pretoria, 44*, 2–5.

Barreiros, J. P., & Raykov, V. S. (2014). Lethal lesions and amputation caused by plastic debris and fishing gear on the loggerhead turtle *Caretta caretta* (Linnaeus 1758). Three case reports from Terceira Island, Azores (NE Atlantic). *Marine Pollution Bulletin, 86*, 518–522.

Bauer, L. J., Kendall, M. S., & Jeffrey, C. F. (2008). Incidence of marine debris and its relationships with benthic features in Gray's Reef National Marine Sanctuary, Southeast USA. *Marine Pollution Bulletin, 56*, 402–413.

Baulch, S., & Perry, C. (2014). Evaluating the impacts of marine debris on cetaceans. *Marine Pollution Bulletin, 80*, 210–221.

Bavestrello, G., Cerrano, C., Zanzi, D., & Cattaneo-Vietti, R. (1997). Damage by fishing activities to the gorgonian coral *Paramuricea clavata* in the Ligurian Sea. *Aquatic Conservation: Marine and Freshwater Ecosystems, 7*, 253–262.

Beck, C. A., & Barros, N. B. (1991). The impact of debris on the Florida manatee. *Marine Pollution Bulletin, 22*, 508–510.

Bilkovic, D. M., Havens, K., Stanhope, D., & Angstadt, K. (2014). Derelict fishing gear in Chesapeake Bay, Virginia: Spatial patterns and implications for marine fauna. *Marine Pollution Bulletin, 80*, 114–123.

Bird, P. M. (1978). Tissue regeneration in three carcharhinid sharks encircled by embedded straps. *Copeia, 1978*, 345–349.
Bjorndal, K. A., Bolten, A. B., & Lagueux, C. J. (1994). Ingestion of marine debris by Juvenile Sea turtles in coastal Florida habitats. *Marine Pollution Bulletin, 28*, 154–158.
Blais, J. M., Kimpe, L. E., McMahon, D., Keatley, B. E., Mallory, M. L., Douglas, M. S., et al. (2005). Arctic seabirds transport marine-derived contaminants. *Science, 309*, 445–445.
Boerger, C. M., Lattin, G. L., Moore, S. L., & Moore, C. J. (2010). Plastic ingestion by planktivorous fishes in the North Pacific central gyre. *Marine Pollution Bulletin, 60*, 2275–2278.
Bond, A. L., Montevecchi, W. A., Guse, N., Regular, P. M., Garthe, S., & Rail, J. F. (2012). Prevalence and composition of fishing gear debris in the nests of northern gannets (*Morus bassanus*) are related to fishing effort. *Marine Pollution Bulletin, 64*, 907–911.
Bond, A. L., Provencher, J. F., Elliot, R. D., Ryan, P. C., Rowe, S., Jones, I. L., et al. (2013). Ingestion of plastic marine debris by common and thick-billed murres in the northwestern Atlantic from 1985 to 2012. *Marine Pollution Bulletin, 77*, 192–195.
Bourne, W. R. P., & Imber, M. J. (1982). Plastic pellets collected by a prion on Gough Island, Central South Atlantic Ocean. *Marine Pollution Bulletin, 13*, 20–21.
Brandao, M. L., Braga, K. M., & Luque, J. L. (2011). Marine debris ingestion by magellanic penguins, *Spheniscus magellanicus* (Aves: Sphenisciformes), from the Brazilian Coastal Zone. *Marine Pollution Bulletin, 62*, 2246–2249.
Bravo Rebolledo, E. L., Van Franeker, J. A., Jansen, O. E., & Brasseur, S. M. (2013). Plastic ingestion by harbour seals (*Phoca vitulina*) in the Netherlands. *Marine Pollution Bulletin, 67*, 200–202.
Breen, P. A. (1990). A review of ghost fishing by traps and gillnets. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 571–599). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.
Bugoni, L., Krause, L., & Petry, M. V. (2001). Marine debris and human impact on sea turtles in southern Brazil. *Marine Pollution Bulletin, 42*(12), 1330–1334.
Cadée, G. C. (2002). Seabirds and floating plastic debris. *Marine Pollution Bulletin, 44*, 1294–1295.
Camedda, A., Marra, S., Matiddi, M., Massaro, G., Coppa, S., Perilli, A., et al. (2014). Interaction between loggerhead sea turtles (*Caretta caretta*) and marine litter in Sardinia (western Mediterranean Sea). *Marine Environmental Research, 100*, 25–32.
Campani, T., Baini, M., Giannetti, M., Cancelli, F., Mancusi, C., Serena, F., et al. (2013). Presence of plastic debris in loggerhead turtle stranded along the tuscany coasts of the Pelagos Sanctuary for Mediterranean Marine Mammals (Italy). *Marine Pollution Bulletin, 74*, 225–230.
Camphuysen, C. J. (2001). Northern gannets morus bassanus found dead in the Netherlands 1970–2000. *Atlantic Seabirds, 3*, 15–30.
Camphuysen, C. J., Boekhout, S., Gronert, A., Hunt, V., Van Nus, T., & Ouwehand, J. (2008). Bizarre prey items: Odd food choices in herring gulls and lesser black-backed gulls at texel. *Sula, 21*, 29–61.
Carpenter, E. J., Anderson, S. J., Harvey, G. R., Miklas, H. P., & Peck, B. B. (1972). Polystyrene spherules in coastal waters. *Science, 178*, 749–750.
Carr, A. (1987). Impact of nondegradable marine debris on the ecology and survival outlook of sea turtles. *Marine Pollution Bulletin, 18*, 352–356.
Carson, H. S., Lamson, M. R., Nakashima, D., Toloumu, D., Hafner, J., Maximenko, N. et al. (2013). Tracking the sources and sinks of local marine debris in Hawai'i. *Marine Environmental Research, 84*, 76–83.
Ceccarelli, D. M. (2009). Impacts of plastic debris on Australian marine wildlife. C&R Consulting (Ed.), *Report by C&R consulting for the department of the environment, water, Heritage and the arts* (p. 83).
Chapman, M. G., & Clynick, B. G. (2006). Experiments testing the use of waste material in estuaries as habitat for subtidal organisms. *Journal of Experimental Marine Biology and Ecology, 338*, 164–178.

Chiappone, M., Dienes, H., Swanson, D. W., & Miller, S. L. (2005). Impacts of lost fishing gear on coral reef sessile invertebrates in the Florida Keys National Marine Sanctuary. *Biological Conservation, 121*, 221–230.

Cho, D. (2011). Removing derelict fishing gear from the deep seabed of the East Sea. *Marine Policy, 35*, 610–614.

Choy, C. A., & Drazen, J. C. (2013). Plastic for dinner? Observations of frequent debris ingestion by pelagic predatory fishes from the Central North Pacific. *Marine Ecology Progress Series, 485*, 155–163.

Cliff, G., Dudley, S. F. J., Ryan, P. G., & Singleton, N. (2002). Large sharks and plastic debris in Kwazulu-Natal, South Africa. *Marine and Freshwater Research, 53*, 575–581.

Codina-García, M., Militão, T., Moreno, J., & González-Solís, J. (2013). Plastic debris in mediterranean seabirds. *Marine Pollution Bulletin, 77*, 220–226.

Colabuono, F. I., Barquete, V., Domingues, B. S., & Montone, R. C. (2009). Plastic ingestion by procellariiformes in southern Brazil. *Marine Pollution Bulletin, 58*, 93–96.

Cole, M., Lindeque, P., Halsband, C., & Galloway, T. S. (2011). Microplastics as contaminants in the marine environment: A review. *Marine Pollution Bulletin, 62*, 2588–2597.

Cole, M., Lindeque, P., Fileman, E., Halsband, C., Goodhead, R., Moger, J. et al. (2013). Microplastic ingestion by zooplankton. *Environmental Science and Technology, 47*, 6646–6655.

Connors, P. G., & Smith, K. G. (1982). Oceanic plastic particle pollution: Suspected effect on fat deposition in Red Phalaropes. *Marine Pollution Bulletin, 13*, 18–20.

Criddle, K., Amos, A., Carroll, P., Coe, J., Donohue, M., Harris, J. et al. (2009). *Tackling marine debris in the 21st century* (206 p). Washington, DC, USA: The National Academies Press.

Crockett, D. E., & Reed, S. M. (1976). Phenomenal antarctic fulmar wreck. *Notornis, 23*, 250–262.

Davidson, T. M. (2012). Boring crustaceans damage polystyrene floats under docks polluting marine waters with microplastic. *Marine Pollution Bulletin, 64*, 1821–1828.

Davison, P., & Asch, R. G. (2011). Plastic ingestion by mesopelagic fishes in the North Pacific subtropical gyre. *Marine Ecology Progress Series, 432*, 173–180.

Day, R. H., Wehle, D. H. S., & Coleman, F. C. (1985). Ingestion of plastic pollutants by marine birds. In R. S. Shomura & H. O. Yoshida (Eds.), *Proceedings of the Workshop on the Fate and Impact of Marine Debris* (pp. 344–386). Honolulu, Hawaii: U.S. Dep. Commer., NOAA Tech. Memo. NMFS.

De Pierrepont, J. F., Dubois, B., Desormonts, S. M., Santos, B. O., & Robin, J. P. (2005). Stomach contents of english channel cetaceans stranded on the Coast of Normandy. *Journal of the Marine Biological Association of the U.K., 85*, 1539–1546.

De Stephanis, R., Gimenez, J., Carpinelli, E., Gutierrez-Exposito, C., & Canadas, A. (2013). As main meal for sperm whales: Plastics debris. *Marine Pollution Bulletin, 69*, 206–214.

Denuncio, P., Bastida, R., Dassis, M., Giardino, G., Gerpe, M., & Rodriguez, D. (2011). Plastic ingestion in franciscana dolphins, *Pontoporia blainvillei* (Gervais and D'Orbigny, 1844), from Argentina. *Marine Pollution Bulletin, 62*, 1836–1841.

Derraik, J. G. B. (2002). The pollution of the marine environment by plastic debris: A review. *Marine Pollution Bulletin, 44*, 842–852.

Di Beneditto, A. P. M., & Ramos, R. M. A. (2014). Marine debris ingestion by coastal dolphins: What drives differences between sympatric species? *Marine Pollution Bulletin, 83*, 298–301.

Donnelly-Greenan, E. L., Harvey, J. T., Nevins, H. M., Hester, M. M., & Walker, W. A. (2014). Prey and plastic ingestion of pacific northern fulmars (*Fulmarus glacialis rogersii*) from Monterey Bay. *California. Marine Pollution Bulletin, 85*(1), 214–224.

Donohue, M. J., Boland, R. C., Sramek, C. M., & Antonelis, G. A. (2001). Derelict fishing gear in the northwestern Hawaiian Islands: Diving surveys and debris removal in 1999 confirm threat to coral reef ecosystems. *Marine Pollution Bulletin, 42*, 1301–1312.

Duguy, R., Moriniere, P., & Meunier, A. (2000). L'ingestion Des Déchets Flottants Par La Tortue Luth *Dermochelys coriacea* (Vandelli, 1761) Dans Le Golfe De Gascogne. *Annales de la Société de Sciences Naturelles de la Charente-Maritimes, 8*, 1035–1038.

Eriksson, C., & Burton, H. (2003). Origins and biological accumulation of small plastic particles in fur seals from Macquarie Island. *AMBIO: A Journal of the Human Environment, 32*, 380–384.

Erzini, K. (1997). An experimental study of gill net and trammel net 'ghost fishing' off the algarve (southern Portugal). *Marine Ecology Progress Series, 158*, 257–265.

Erzini, K., Bentes, L., Coelho, R., Lino, P. G., Monteiro, P., Ribeiro, J., et al. (2008). Catches in ghost-fishing octopus and fish traps in the northeastern Atlantic Ocean (Algarve, Portugal). *Fishery Bulletin, 106*, 321–327.

Fabri, M. C., Pedel, L., Beuck, L., Galgani, F., Hebbeln, D., & Freiwald, A. (2014). Megafauna of vulnerable marine ecosystems in French mediterranean submarine canyons: Spatial distribution and anthropogenic impacts. *Deep-Sea Research II, 104*, 184–207.

Foekema, E. M., De Gruijter, C., Mergia, M. T., van Franeker, J. A., Murk, A. J., & Koelmans, A. A. (2013). Plastic in North Sea fish. *Environmental Science and Technology, 47*, 8818–8824.

Fowler, C. W. (1987). Marine debris and northern fur seals: A case study. *Marine Pollution Bulletin, 18*, 326–335.

Fowler, C. W., Ream, R., Robson, B., & Kiyota, M., (1992). *Entanglement studies on juvenile male northern fur seals, St. Paul Island, 1991* (p. 42). Seattle: U.S. Department of Commerce, Alaska Fisheries Science Center.

Frick, M. G., Williams, K. L., Bolten, A. B., Bjorndal, K. A., & Martins, H. R. (2009). Foraging ecology of oceanic-stage loggerhead turtles *Caretta caretta*. *Endangered Species Research, 9*, 91–97.

Furness, R. W. (1983). Ingestion of plastic particles by seabirds at Gough Island, South Atlantic Ocean. *Environmental Pollution, 38*, 261–272.

Furness, R. W. (1985). Plastic particle pollution: Accumulation by procellariiform seabirds at Scottish colonies. *Marine Pollution Bulletin, 16*, 103–106.

Galgani, F., Souplet, A., & Cadiou, Y. (1996). Accumulation of debris on the deep sea floor off the French mediterranean coast. *Marine Ecology Progress Series, 142*, 225–234.

Galloway T. S. (2015). Micro- and nano-plastics and human health. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter* (pp. 347–370). Berlin: Springer.

Gill, F., & Donsker, D. (2013). IOC world bird list (Version 3.3). Available at http://www.Worldbirdnames.Org. Accessed 5 Feb 2013.

Godøy, H., Furevik, D. M., & Stiansen, S. (2003). Unaccounted mortality of red king crab (*Paralithodes camtschaticus*) in deliberately lost pots off northern Norway. *Fisheries Research, 64*, 171–177.

Goldberg, E. (1997). Plasticizing the seafloor: An overview. *Environmental Technology, 18*, 195–201.

Goldstein, M. C., Rosenberg, M., & Cheng, L. (2012). Increased oceanic microplastic debris enhances oviposition in an endemic pelagic insect. *Royal Society Biology Letters, 8*, 817–820.

Goldstein, M. C., & Goodwin, D. S. (2013). Gooseneck barnacles (*Lepas* spp.) ingest microplastic debris in the North Pacific subtropical gyre. *PeerJ*, *1*(e184), 17.

Goldstein, M. C., Carson, H. S., & Eriksen, M. (2014). Relationship of diversity and habitat area in north pacific plastic-associated rafting communities. *Marine Biology*, *161*, 1–13.

Gomerčić, M. D., Galov, A., Gomerčić, T., Škrtić, D., Ćurković, S., Lucić, H., et al. (2009). Bottlenose dolphin (*Tursiops truncates*) depredation resulting in larynx strangulation with gill-net parts. *Marine Mammal Science, 25*, 392–401.

Good, T. P., June, J. A., Etnier, M. A., & Broadhurst, G. (2010). Derelict fishing nets in puget sound and the northwest straits: Patterns and threats to marine fauna. *Marine Pollution Bulletin, 60*, 39–50.

Gray, H., Lattin, G. L., & Moore, C. J. (2012). Incidence, mass and variety of plastics ingested by laysan (*Phoebastria immutabilis*) and black-footed albatrosses (*P. nigripes*) recovered as by-catch in the North Pacific Ocean. *Marine Pollution Bulletin, 64*, 2190–2192.

Green, D. S., Boots, B., Blockley, D. J., Rocha, C., & Thompson, R. C. (2015). Impacts of discarded plastic bags on marine assemblages and ecosystem functioning. *Environmental Science and Technology*, *49*, 5380–5389.

Gudger, E. W., & Hoffman, W. H. (1931). A shark encircled with a rubber automobile tire. *Scientific Monthly, 33*, 275–277.

Hanni, K. D., & Pyle, P. (2000). Entanglement of pinnipeds in synthetic materials at South-East Farallon Island, California, 1976–1998. *Marine Pollution Bulletin, 40*, 1076–1081.
Harcourt, R., Aurioles, D., & Sanchez, J. (1994). Entanglement of California sea lions at Los Islotes, Baja California Sur, Mexico. *Marine Mammal Science, 10*, 122–125.
Harper, P. C., & Fowler, J. A. (1987). Plastic pellets in New Zealand storm-killed prions. *Notornis, 34*, 65–70.
Harrison, J. P., Sapp, M., Schratzberger, M., & Osborn, A. M. (2011). Interactions between microorganisms and marine microplastics: A call for research. *Marine Technology Society Journal, 45*, 12–20.
Hartwig, E., Clemens, T., & Heckroth, M. (2007). Plastic debris as nesting material in a kittiwake (*Rissa tridactyla*) colony at the Jammerbugt, Northwest Denmark. *Marine Pollution Bulletin, 54*, 595–597.
Hays, H., & Cormons, G. (1974). Plastic particles found in tern pellets, on coastal beaches and at factory sites. *Marine Pollution Bulletin, 5*, 44–46.
Hébert, M., Miron, G., Moriyasu, M., Vienneau, R., & DeGrâce, P. (2001). Efficiency and ghost fishing of snow crab (*Chionoecetes opilio*) traps in the Gulf of St Lawrence. *Fisheries Research, 52*, 143–153.
Henderson, J. R. (2001). A pre-and post-marpol annex v summary of Hawaiian monk seal entanglements and marine debris accumulation in the Northwestern Hawaiian Islands, 1982–1998. *Marine Pollution Bulletin, 42*, 584–589.
Hofmeyr, G. J. G., Bester, M. N., Kirkman, S. P., Lydersen, C., & Kovacs, K. M. (2006). Entanglement of antarctic fur seals at Bouvetøya, Southern Ocean. *Marine Pollution Bulletin, 52*, 1077–1080.
Hong, S., Lee, J., Jang, Y. C., Kim, Y. J., Kim, H. J., Han, D., et al. (2013). Impacts of marine debris on wild animals in the coastal area of Korea. *Marine Pollution Bulletin, 66*, 117–124.
Hoss, D. E., & Settle, L. R. (1990). Ingestion of plastics by teleost fishes. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 693–709). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.
Humborstad, O.-B., Løkkeborg, S., Hareide, N.-R., & Furevik, D. M. (2003). Catches of greenland halibut (*Reinhardtius hippoglossoides*) in deepwater ghost-fishing gillnets on the norwegian continental slope. *Fisheries Research, 64*, 163–170.
Hutton, I., Carlile, N., & Priddel, D. (2008). Plastic ingestion by flesh-footed shearwaters, *Puffinus carneipes*, and wedge-tailed shearwaters, *Puffinus pacificus*. *Papers and Proceedings of the Royal Society of Tasmania, 142*, 67–72.
Jensen, J.-K. (2012). Mallemukken På Færøerne/the fulmar on the Faroe Islands, Nolsoy.
Kaiser, M. J., Bullimore, B., Newman, P., Lock, K., & Gilbert, S. (1996). Catches in 'ghost fishing' set nets. *Marine Ecology Progress Series, 145*, 11–16.
Kasparek, M. (1995). The nesting of marine turtles on the coast of Syria. *Zoology in the Middle East, 11*, 51–62.
Katsanevakis, S., Verriopoulos, G., Nicolaidou, A., & Thessalou-Legaki, M. (2007). Effect of marine litter on the benthic megafauna of coastal soft bottoms: A manipulative field experiment. *Marine Pollution Bulletin, 54*, 771–778.
Katsanevakis, S. (2008). *Marine debris, a growing problem: Sources, distribution, composition, and impacts. Marine pollution: New research* (pp. 53–100). New York: Nova Science Publishers.
Kenyon, K. W., & Kridler, E. (1969). Laysan albatrosses swallow indigestible matter. *The Auk, 86*, 339–343.
Kiessling T., Gutow L., & Thiel M. (2015). Marine litter as a habitat and dispersal vector. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter* (pp. 141–181). Berlin: Springer.
Kim, S.-G., Lee, W.-I. L., & Yuseok, M. (2014). The estimation of derelict fishing gear in the coastal waters of South Korea: Trap and gill-net fisheries. *Marine Policy, 46*, 119–122.
Knowlton, A. R., Hamilton, P. K., Marx, M. K., Pettis, H. M., & Kraus, S. D. (2012). Monitoring north Atlantic right whale *Eubalaena glacialis* entanglement rates: A 30 year retrospective. *Marine Ecology Progress Series, 466*, 293–302.

Koch, H. M., & Calafat, A. M. (2009). Human body burdens of chemicals used in plastic manufacture. *Philosophical transactions of the Royal Society of London B, 364*, 2063–2078.

Koelmans A. A. (2015). Modeling the role of microplastics in bioaccumulation of organic chemicals to marine aquatic organisms. Critical review. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter* (pp. 313–328). Berlin: Springer.

Laist, D. W. (1987). Overview of the biological effects of lost and discarded plastic debris in the marine environment. *Marine Pollution Bulletin, 18*, 319–326.

Laist, D. W. (1997). *Impacts of marine debris: Entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. Springer Series on Environmental Management*. New York: Springer.

Large, P. A., Graham, N. G., Hareide, N.-R., Misund, R., Rihan, D. J., Mulligan, M. C., et al. (2009). Lost and abandoned nets in deep-water gillnet fisheries in the Northeast Atlantic: Retrieval exercises and outcomes. *ICES Journal of Marine Science*, *66*, 323–333.

Lavers, J. L., Hodgson, J. C., & Clarke, R. H. (2013). Prevalence and composition of marine debris in brown booby (*Sula leucogaster*) nests at ashmore reef. *Marine Pollution Bulletin, 77*, 320–324.

Lavers, J. L., Bond, A. L., & Hutton, I. (2014). Plastic ingestion by flesh-footed shearwaters (*Puffinus carneipes*): Implications for fledgling body condition and the accumulation of plastic-derived chemicals. *Environmental Pollution, 187*, 124–129.

Lazar, B., & Gracan, R. (2011). Ingestion of marine debris by loggerhead sea turtles, *Caretta caretta*, in the Adriatic Sea. *Marine Pollution Bulletin, 62*, 43–47.

Leslie, H. A., Van Velzen, M. J. M., & Vethaak, A. D. (2013). Microplastic survey of the Dutch environment—Novel data set of microplastics in North Sea sediments, treated wastewater effluents and marine biota. *IVM Institute for Environmental Studies Final Report R-13/11*, Free University, Amsterdam.

Lindborg, V. A., Ledbetter, J. F., Walat, J. M., & Moffett, C. (2012). Plastic consumption and diet of glaucous-winged gulls (*Larus glaucescens*). *Marine Pollution Bulletin, 64*, 2351–2356.

Lucas, Z. (1992). Monitoring persistent litter in the marine environment on Sable Island, Nova Scotia. *Marine Pollution Bulletin, 24*, 192–199.

Lusher A. (2015). Microplastics in the marine environment: distribution, interactions and effects. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter*. Berlin: Springer.

Lusher, A. L., McHugh, M., & Thompson, R. C. (2013). Occurrence of microplastics in the gastrointestinal tract of pelagic and demersal fish from the English Channel. *Marine Pollution Bulletin, 67*, 94–99.

Lutz, P. L. (1990). Studies on ingestion of plastic and latex by sea turtles. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 719–735). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.

Majer, A. P., Vedolin, M. C., & Turra, A. (2012). Plastic pellets as oviposition site and means of dispersal for the ocean-skater insect *Halobates*. *Marine Pollution Bulletin, 64*, 1143–1147.

Mallory, M. L. (2006). The northern fulmar (*Fulmarus glacialis*) in Arctic Canada: Ecology, threats, and what it tells us about marine environmental conditions. *Environmental Reviews, 14*, 187–216.

Mallory, M. L. (2008). Marine plastic debris in northern fulmars from the Canadian high Arctic. *Marine Pollution Bulletin, 56*, 1501–1504.

Marine Mammal Commission. (2013). http://www.Mmc.Gov/Species/Speciesglobal2.Shtml. Accessed 25 Apr 2013.

Matsuoka, T. (1999). Ghost fishing by lost fish-traps in Azuma-cho water. *Mini Review Data File Fisheries Research, 8*, 64–69.

Matsuoka, K., Nakashima, T., & Nagasawa, N. (2005). A review of ghost fishing: Scientific approaches to evaluation and solutions. *Fisheries Science, 71*, 691–702.

Mattlin, R. H., & Cawthorn, M. W. (1986). Marine debris—an international problem. *New Zealand Environment, 51*, 3–6.

McCauley, S. J., & Bjorndal, K. A. (1999). Conservation implications of dietary dilution from debris ingestion: Sublethal effects in post-hatchling Loggerhead Sea turtles. *Conservation Biology: The Journal of the Society for Conservation Biology, 13*, 925–929.

Montevecchi, W. A. (1991). Incidence and types of plastic in gannet's nets in the Northwest Atlantic. *Canadian Journal of Zoology, 69*, 295–297.

Moore, E., Lyday, S., Roletto, J., Litle, K., Parrish, J. K., Nevins, H., et al. (2009). Entanglement of marine mammals and seabirds in Central California and the North–West coast of the United States 2001–2005. *Marine Pollution Bulletin, 58*, 1045–1051.

Moore, M., Andrews, R., Austin, T., Bailey, J., Costidis, A., George, C., et al. (2013). Rope trauma, sedation, disentanglement, and monitoring-tag associated lesions in a terminally entangled North Atlantic right whale (*Eubalaena glacialis*). *Marine Mammal Science, 29*, E98–E113.

Mordecai, G., Tyler, P. A., Masson, D. G., & Huvenne, V. A. I. (2011). Litter in submarine canyons off the west coast of Portugal. *Deep-Sea Research II, 58*, 2489–2496.

Moser, M. L., & Lee, D. S. (1992). A fourteen-year survey of plastic ingestion by western North Atlantic seabirds. *Colonial Waterbirds, 15*, 83–94.

Mrosovsky, N., Ryan, G. D., & James, M. C. (2009). Leatherback turtles: The menace of plastic. *Marine Pollution Bulletin, 58*, 287–289.

MSFD-TSGML (2013). *Guidance on monitoring of marine litter in European Seas—a guidance document within the common implementation strategy for the marine strategy framework directive. EUR-26113 EN*. JRC Scientific and Policy Reports JRC83985. 128 p. http://dx.doi.org/10.2788/99475.

Murray, F., & Cowie, P. R. (2011). Plastic Contamination in the Decapod Crustacean, *Nephrops norvegicus* (Linnaeus 1758). *Marine Pollution Bulletin, 62*, 1207–1217.

Newman, S. J., Skepper, C. L., Mitsopoulos, G. E. A., Wakefield, C. B., Meeuwig, J. J., & Harvey, E. S. (2011). Assessment of the potential impacts of trap usage and ghost fishing on the northern demersal scalefish fishery. *Reviews in Fisheries Science, 19*, 74–84.

Norman, F. I., Menkhorst, P. W., & Hurley, V. G. (1995). Plastics in nests of Australasian gannets, *Morus serrator*, in Victoria, Australia. *Emu, 95*, 129–133.

Orós, J., Torrent, A., Calabuig, P., & Déniz, S. (2005). Diseases and causes of mortality among sea turtles stranded in the Canary Islands, Spain (1998–2001). *Diseases of Aquatic Organisms, 63*, 13–24.

Ozdilek, H. G., Yalcin-Ozdilek, S., Ozaner, F. S., & Sonmez, B. (2006). Impact of accumulated beach litter on *Chelonia mydas* L. 1758 (green turtle) hatchlings of the Samandag Coast, Hatay, Turkey. *Fresenius Environmental Bulletin, 15*, 95–103.

Page, B., McKenzie, J., McIntosh, R., Baylis, A., Morrissey, A., Calvert, N., et al. (2004). Entanglement of Australian sea lions and New Zealand fur seals in lost fishing gear and other marine debris before and after government and industry attempts to reduce the problem. *Marine Pollution Bulletin, 49*, 33–42.

Parrish, F. A., & Kazama, T. (1992). Evaluation of ghost fishing in the Hawaiian lobster fishery. *Fishery Bulletin, 90*, 720–725.

Pawson, M. G. (2003). The catching capacity of lost static fishing gears: Introduction. *Fisheries Research, 64*, 101–105.

Pecci, K. J., Cooper, R. A., Newell, C. D., Clifford, R. A., & Smolowitz, R. J. (1978). Ghost fishing of vented and unvented lobster, *Homarus americanus*, traps. *Marine Fisheries Review, 40*, 9–43.

Perry, M. C., Olsen, G. H., Richards, R. A., & Osenton, P. C. (2013). Predation on dovekies by goosefish over deep water in the Northwest Atlantic Ocean. *Northeastern Naturalist, 20*, 148–154.

Pettit, T. N., Grant, G. S., & Whittow, G. C. (1981). Ingestion of plastics by Laysan albatross. *Auk, 98*, 839–841.

Pham, C. K., Gomes-Pereira, J. N., Isidro, E. J., Santos, R. S., & Morato, T. (2013). Abundance of litter in the condor seamount. *Deep-Sea Research II, 98*, 204–208.

Pham, C. K., Ramirez-Llodra, E., Alt, C. H., Amaro, T., Bergmann, M., Canals, M., et al. (2014). Marine litter distribution and density in European seas, from the shelves to deep basins. *PLoS ONE, 9*, e95839.

Plotkin, P., & Amos, A. F. (1990). Effects of anthropogenic debris on sea turtles in the northwestern Gulf of Mexico. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 736–743). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.
Podolski, R. H., & Kress, S. W. (1989). Plastic debris encorporated into double-crested cormorant nests in the Gulf of Maine. *Journal of Field Ornithology, 60*, 248–250.
Possatto, F. E., Barletta, M., Costa, M. F., Ivar do Sul, J. A., & Dantas, D. V. (2011). Plastic debris ingestion by marine catfish: An unexpected fisheries impact. *Marine Pollution Bulletin, 62*, 1098–1102.
Provencher, J. F., Gaston, A. J., Mallory, M. L., O'Hara, P. D., & Gilchrist, H. G. (2010). Ingested plastic in a diving seabird, the thick-billed murre (*Uria lomvia*), in the eastern Canadian Arctic. *Marine Pollution Bulletin, 60*, 1406–1411.
Provencher, J. F., Bond, A. L., Hedd, A., Montevecchi, W. A., Muzaffar, S. B., Courchesne, S. J., et al. (2014). Prevalence of marine debris in marine birds from the North Atlantic. *Marine Pollution Bulletin, 84*, 411–417.
Read, A. J., Drinker, P., & Northridge, S. (2006). Bycatch of marine mammals in U.S. and global fisheries. *Conservation Biology, 20*, 163–169.
Revill, A. S., & Dunlin, G. (2003). The fishing capacity of gillnets lost on wrecks and on open ground in UK coastal waters. *Fisheries Research, 64*, 107–113.
Richards, Z. T., & Beger, M. (2011). A quantification of the standing stock of macro-debris in majuro lagoon and its effect on hard coral communities. *Marine Pollution Bulletin, 62*, 1693–1701.
Robards, M. D., Piatt, J. F., & Wohl, K. D. (1995). Increasing frequency of plastic particles ingested by seabirds in the subarctic North Pacific. *Marine Pollution Bulletin, 30*, 151–157.
Rochman C. M. (2015). The complex mixture, fate and toxicity of chemicals associated with plastic debris in the marine environment. In M. Bergmann, L. Gutow & M. Klages (Eds.), *Marine anthropogenic litter* (pp. 117–140). Berlin: Springer.
Rochman, C. M., Hoh, E., Kurobe, T., & Teh, S. J. (2013). Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress. *Scientific Reports*, *3* (3263), 7.
Rochman, C. M., Kurobe, T., Flores, I., & Teh, S. J. (2014). Early warning signs of endocrine disruption in adult fish from the ingestion of polyethylene with and without sorbed chemical pollutants from the marine environment. *Science of the Total Environment, 493*, 656–661.
Rodríguez, B., Bécares, J., Rodríguez, A., & Arcos, J. M. (2013). Incidence of entanglement with marine debris by northern gannets (*Morus bassanus*) in the non-breeding grounds. *Marine Pollution Bulletin, 75*, 259–263.
Rothstein, S. I. (1973). Plastic particle pollution of the surface of the Atlantic Ocean: Evidence from a seabird. *Condor, 75*, 344–345.
Ryan, P. G. (1987). The incidence and characteristics of plastic particles ingested by seabirds. *Marine Environmental Research, 23*, 175–206.
Ryan, P. G. (1988). Effects of ingested plastic on seabird feeding: Evidence from chickens. *Marine Pollution Bulletin, 19*, 125–128.
Ryan, P. G. (2008). Seabirds indicate changes in the composition of plastic litter in the Atlantic and South-Western Indian Oceans. *Marine Pollution Bulletin, 56*, 1406–1409.
Ryan, P. G., & Jackson, S. (1986). Stomach pumping: Is killing birds necessary? *The Auk, 103*, 427–428.
Ryan, P. G., & Fraser, M. W. (1988). The use of great skua pellets as indicators of plastic pollution in seabirds. *Emu, 88*, 16–19.
Ryan, P. G., Moore, C. J., van Franeker, J. A., & Moloney, C. L. (2009). Monitoring the abundance of plastic debris in the marine environment. *Philosophical transactions of the Royal Society of London B*, *364*, 1999–2012.
Sancho, G., Puente, E., Bilbao, A., Gomez, E., & Arregi, L. (2003). Catch rates of monkfish (*Lophius* spp.) by lost tangle nets in the Cantabrian Sea (northern Spain). *Fisheries Research, 64*, 129–139.

Sazima, I., Gadig, O. B. F., Namora, R. C., & Motta, F. S. (2002). Plastic debris collars on juvenile carcharhinid sharks (*Rhizoprionodon lalandii*) in Southwest Atlantic. *Marine Pollution Bulletin, 44*, 1149–1151.

Schleyer, M. H., & Tomalin, B. J. (2000). Damage on South African coral reefs and an assessment of their sustainable diving capacity using a fisheries approach. *Bulletin of Marine Science, 67*, 1025–1042.

Schlining, K., von Thun, S., Kuhnz, L., Schlining, B., Lundsten, L., Jacobsen Stout, N., et al. (2013). Debris in the deep: Using a 22-year video annotation database to survey marine litter in Monterey Canyon, Central California, USA. *Deep-Sea Research I*, *79*, 96–105.

Schuyler, Q. A., Hardesty, B. D., Wilcox, C., & Townsend, K. (2013). Global analysis of anthropogenic debris ingestion by sea turtles. *Conservation Biology, 28*, 129–139.

Schuyler, Q. A., Wilcox, C., Townsend, K., Hardesty, B. D., & Marshall, N. (2014). Mistaken identity? Visual similarities of marine debris to natural prey items of sea turtles. *BMC Ecology*, *14*(14), 7.

Shaughnessy, P. D. (1985). Entanglement of grey seals *Halichoerus grypus* at a haul out site in Cornwall, UK. *Marine Pollution Bulletin, 64*, 2815–2819.

Shomura, R. S., & Yoshida, H. O. (1985). *Proceedings of the Workshop on the Fate and Impact of Marine Debris*. Honolulu, Hawaii.

Sievert, P. R., & Sileo, L. (1993). *The effects of ingested plastic on growth and survival of albatross chicks*. Otawa: Canadian Wildlife Service Special Publication.

Sileo, L., Sievert, P. R., Samuel, M. D., & Fefer, S. I. (1990). Prevalence and characteristics of plastic ingested by Hawaiian seabirds. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 665–681). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.

Simmonds, M. P. (2012). Cetaceans and marine debris: The great unknown. *Journal of Marine Biology, 2012*, 1–8.

Smith, S. D. A. (2012). Marine debris: A proximate threat to marine sustainability in Bootless Bay, Papua New Guinea. *Marine Pollution Bulletin, 64*, 1880–1883.

Smith, S. D. A., & Edgar, R. J. (2014). Documenting the density of subtidal marine debris across multiple marine and coastal habitats. *PLoS One, 9*, e94593.

Spear, L. B., Ainley, D. G., & Ribic, C. A. (1995). Incidence of plastic in seabirds from the tropical pacific 1984–91: Relation with distribution of species, sex, age, season, year and body weight. *Marine Environmental Research, 40*, 123–146.

Stevens, B. G., Vining, I., Byersdorfer, S., & Donaldson, W. (2000). Ghost fishing by tanner crab (*Chionoecetes bairdi*) pots off Kodiak, Alaska: Pot density and catch per trap as determined from sidescan sonar and pot recovery data. *Fisheries Bulletin, 98*, 389–399.

Sturkie, P. D. (1976). Avian Physiology. New York.

Tomas, J., Guitart, R., Mateo, R., & Raga, J. A. (2002). Marine debris ingestion in loggerhead sea turtles, *Caretta caretta*, from the western Mediterranean. *Marine Pollution Bulletin, 44*, 211–216.

Tourinho, P. S., Ivar do Sul, J. A., & Fillmann, G. (2010). Is Marine debris ingestion still a problem for the coastal marine biota of southern Brazil? *Marine Pollution Bulletin, 60*, 396–401.

Townsend, S.E. (2011). Impact of ingested marine debris on sea turtles of eastern Australia: Life history stage susceptibility, pathological implications and plastic bag preference. In *Fifth International Marine Debris Conference* (pp. 136–140). Honolulu, Hawaii.

Triessing, P., Roetzer, A., & Stachowitsch, M. (2012). Beach condition and marine debris: New hurdles for sea turtle hatchling survival. *Chelonian Conservation and Biology, 11*, 68–77.

Tschernij, V., & Larsson, P. O. (2003). Ghost fishing by lost cod gill nets in the Baltic Sea. *Fisheries Research, 64*, 151–162.

Udyawer, V., Read, M. A., Hamann, M., Simpfendorfer, C. A., & Heupel, M. R. (2013). First record of sea snake (*Hydrophis elegans*, Hydrophiinae) entrapped in marine debris. *Marine Pollution Bulletin, 73*, 336–338.

Uhrin, A. V., Fonseca, M. S., & DiDomenico, G. P. (2005). Effect of caribbean spiny lobster traps on seagrass beds of the Florida Keys National Marine Sanctuary: Damage assessment and evaluation of recovery. American Fisheries Society Symposium (pp. 579–588). American Fisheries Society.

Uhrin, A. V., & Schellinger, J. (2011). Marine debris impacts to a tidal fringing-marsh in North Carolina. *Marine Pollution Bulletin, 62*, 2605–2610.

Uhrin, A. V., Matthews, T., & Lewis, C. (2014). Lobster trap debris in the Florida Keys National Marine Sanctuary: Distribution, abundance, density and patterns of accumulation. *Management and Ecosystem Science, 6*, 20–32.

UNEP (2011). *UNEP year book: Emerging issues in our global environment* (79 p). Nairobi: United Nations Environmental Programme.

Uneputty, P., & Evans, S. M. (2009). The impact of platic debris on the biota of tidal flats in Ambon Bay (eastern Indonesia). *Marine Environmental Research, 44*, 233–242.

Van Cauwenberghe, L., & Janssen, C. R. (2014). Microplastics in bivalves cultured for human consumption. *Environmental Pollution, 193*, 65–70.

Van Cauwenberghe, L., Claessens, M., Vandegehuchte, M., & Janssen, C. R. (2012). Occurrence of microplastics in mussels (*Mytilus edulis*) and lugworms (*Arenicola marina*) collected along the French-Belgian-Dutch Coast. p. 88. In J. Mees & J. Seys (Eds.), *Book of Abstracts—VLIZ Young Scientists Day. Brugge, Belgium, 24 February 2012* (pp. xi + 150). Oostende, Belgium: VLIZ Special Publication 55. Flanders Marine Institute (VLIZ).

Van Cauwenberghe, L., Vanreusel, A., Mees, J., & Janssen, C. R. (2013). Microplastic pollution in deep-sea sediments. *Environmental Pollution, 182*, 495–499.

Van der Hoop, J., Moore, M., Fahlman, A., Bocconcelli, A., Gearge, C., et al. (2013). Behavioral impact of disentanglement of a right whale under sedation and the energetic costs of entanglement. *Marine Mammal Science, 30*, 282–307.

Van Franeker, J. A. (1985). Plastic ingestion in the North Atlantic fulmar. *Marine Pollution Bulletin, 16*, 367–369.

Van Franeker, J. A. (2011). Reshape and relocate: seabirds as transformers and transporters of microplastics. In *Fifth International Marine Debris Conference*, Honolulu, Hawaii.

Van Franeker, J. A., & Bell, P. J. (1988). Plastic ingestion by petrels breeding in Antarctica. *Marine Pollution Bulletin, 19*, 672–674.

Van Franeker, J. A., & Meijboom, A. (2002). Litter NSV—marine litter monitoring by northern fulmars. A pilot study, Alterra-rapport 401. Alterra, Wageningen.

Van Franeker, J.A. & Law, K.L. (2015). Seabirds, gyres and global trends in plastic pollution. *Environmental Pollution*, *203*, 89–96.

Van Franeker, J. A., Blaize, C., Danielsen, J., Fairclough, K., Gollan, J., Guse, N., et al. (2011). Monitoring plastic ingestion by the northern fulmar *Fulmarus glacialis* in the North Sea. *Environmental Pollution, 159*, 2609–2615.

Verlis, K. M., Campbell, M. L., & Wilson, S. P. (2014). Marine debris is selected as nesting material by the brown booby (*Sula leucogaster*) within the Swain Reefs, Great Barrier Reef, Australia. *Marine Pollution Bulletin*, *87*(1–2), 180–190.

Viehman, S., Vander Pluym, J. L., & Schellinger, J. (2011). Characterization of marine debris in North Carolina salt marshes. *Marine Pollution Bulletin, 62*, 2771–2779.

Vliestra, L. S., & Parga, J. A. (2002). Long-term changes in the type, but not amount, of ingested plastic particles in short-tailed shearwaters in the Southeastern Berin Sea. *Marine Pollution Bulletin, 44*, 945–955.

Votier, S. C., Archibald, K., Morgan, G., & Morgan, L. (2011). The use of plastic debris as nesting material by a colonial nesting seabird and associated entanglement mortality. *Marine Pollution Bulletin, 62*, 168–172.

Wabnitz, C., & Nichols, W. J. (2010). Plastic pollution: An ocean emergency. *Marine Turtle Newsletter, 129*, 1–4.

Walker, W. A., & Coe, J. M. (1990). Survey of marine debris ingestion by odontocete cetaceans. In R. S. Shomura & M. L. Godfrey (Eds.), *Proceedings of the Second International Conference of Marine Debris* (pp. 747–774). Honolulu, Hawaii: U.S. Department of Commerce, NOAA Tech Memo, NMFS.

Waluda, C. M., & Staniland, I. J. (2013). Entanglement of Antarctic fur seals at Bird Island, South Georgia. *Marine Pollution Bulletin, 74*, 244–252.

Watters, D. L., Yoklavich, M. M., Love, M. S., & Schroeder, D. M. (2010). Assessing marine debris in deep seafloor habitats off California. *Marine Pollution Bulletin, 60*, 131–138.

Wegner, N. C., & Cartamil, D. P. (2012). Effects of prolonged entanglement in discarded fishing gear with substantive biofouling on the health and behavior of an adult shortfin mako shark, *Isurus oxyrinchus*. *Marine Pollution Bulletin, 64*, 391–394.

Wieczorek, S. K., Campagnuolo, S., Moore, P. G., Froglia, C., Atkinson, R. J. A., Gramitto, E. M., et al. (1999). The composition and fate of discards from *Nephrops* trawling in Scottish and Italian waters. EC 96/092, Millport, U.K.

Woodley, T. H., & Lavigne, D. M. (1991). *Incidental capture of pinnipeds in commercial fishing gear*. ICS. International Marine Mammal Association (Ed.), Technical Report No. 91–01.

Ye, S., & Andrady, A. L. (1991). Fouling of floating plastic debris under Biscayne Bay exposure conditions. *Marine Pollution Bulletin, 22*, 608–613.

Yoshikawa, T., & Asoh, K. (2004). Entanglement of monofilament fishing lines and coral death. *Biological Conservation, 117*, 557–560.

Zavala-González, A., & Mellink, E. (1997). Entanglement of California sea lions, *Zalophus californianuscalifornianus*, in fishing gear in the central-northern part of the Gulf of California, Mexico. *Fishery Bulletin, 95*, 180–184.

Zettler, E. R., Mincer, T. J., & Amaral-Zettler, L. A. (2013). Life in the "plastisphere": Microbial communities on plastic marine debris. *Environmental Science and Technology, 47*, 7137–7146.

Žydelis, R., Small, C., & French, G. (2013). The incidental catch of seabirds in gillnet fisheries: A global review. *Biological Conservation, 162*, 76–88.

Online Supplement 1: Details on species including the plastic impacts (Entanglement/Ingestion), Region and Sources. (E) = Entanglement; (I) = Ingestion; (I/E) = Entanglement and Ingestion. Search closed December 2014.

Order		English name	Scientific name	Region	Entanglement	Ingestion	Sources
				Seabirds			
Anseriformes							
	marine ducks	Greater scaup	*Aythya marila*	North Pacific	1	0	Good et al. 2009, 2010 (E)
	marine ducks	Lesser scaup	*Aythya affinis*	North Pacific	1	0	Moore et al. 2009 (E)
	marine ducks	Common eider	*Somateria mollissima*	North Atlantic	1	1	Federal Republic of Germany 1985 (E); Harris et al. 2006 (E); Provencher et al. 2014 (I); Van Franeker, unpubl. data (I)
	marine ducks	Surf scoter	*Melanitta perspicillata*	North Pacific	1	0	Moore et al. 2009 (E); Good et al. 2009, 2010 (E)
	marine ducks	White-winged scoter	*Melanitta deglandi*	North Pacific	1	0	Harris et al. 2006 (E); Good et al. 2009, 2010 (E)
Gaviiformes							
	divers, loons	Red-throated loon	*Gavia stellata*	North Pacific, North Atlantic	1	1	Weir et al. 1997 (I); Camphuysen 2008 (E); Good et al. 2010 (E); Stienen and Van de walle 2010 (E); Kühn, unpubl. data (I)
	divers, loons	Black-throated loon	*Gavia arctica*	North Pacific	0	1	Good et al. 2009 (E); Hong et al. 2013 (I)
	divers, loons	Pacific loon	*Gavia pacifica*	North Pacific	1	1	Moore et al. 2009 (E); Good et al. 2009, 2010 (E); Hong et al. 2013 (I)
	divers, loons	Great northern loon	*Gavia immer*	North Pacific	1	0	Richardson et al. 2000 (E); Moore et al. 2009 (E); Good et al. 2009, 2010 (E); Gilardi et al. 2010 (E)
Spheniciformes							
	penguins	Gentoo penguin	*Pygoscelis papua*	Southern Ocean, South Pacific, Indian Ocean	1	1	Ryan 1987a (E); Ceccarelli 2009 (I)
	penguins	Adelie penguin	*Pygoscelis adeliae*	Southern Ocean, South Pacific, Indian Ocean	1	0	Slip 1990 (E); Ceccarelli 2009 (E)
	penguins	Chinstrap penguin	*Pygoscelis antarcticus*	Southern Ocean	1	0	United States of America 1991 (E)
	penguins	Southern rockhopper penguin	*Eudyptes chrysocome*	Southern Ocean	0	1	Ryan 1986 (I)
	penguins	Macaroni penguin	*Eudyptes chrysolophus*	Southern Ocean	1	0	Nel and Nel 1999 (E)
	penguins	Yellow-eyed penguin	*Megadyptes antipodes*	South Pacific	0	1	Hocken 2005 (I)
	penguins	Little penguin	*Eudyptula minor*	South Pacific, Indian Ocean	1	1	Harrigan 1992 (I/E); Slater 1992, 1994 (I/E); Ceccarelli 2009 (I/E)
	penguins	African penguin	*Spheniscus demersus*	Indian Ocean	1	0	Ryan 1990a (E)
	penguins	Magellanic penguin	*Spheniscus magellanicus*	North Atlantic, South Atlantic	0	1	Pinto et al. 2006 (I)
Procellariiformes							

albatrosses	Laysan albatross	*Phoebastria immutabilis*	North Pacific	1	1	Kenyon and Kridler 1969 (I); DeGange and Newby 1980 (E); Pettit et al. 1981 (I); Fry et al. 1987 (I); Sileo et al. 1990a,b (I); Auman et al. 1997 (I); Gould et al. 1997 (I); Robards et al. 1997 (I); Kinan and Cousins 2000 (I); Cooper et al. 2004 (I); Young et al. 2009 (I); Gray et al. 2012 (I)
	Black-footed albatross	*Phoebastria nigripes*	North Pacific	1	1	Conant 1984 (I); Fefer in: Henderson 1988 (I); Sileo et al. 1990b (E); Blight and Burger 1997 (I); Gould et al. 1997 (I); Kinan and Cousins 2000 (I); Cooper et al. 2004 (I); Moore et al. 2009 (E); Colabuono et al. 2009 (I); Gray et al. 2012 (I)
	Waved albatross	*Phoebastria irrorata*	South Pacific	0	1	Anderson et al. 2008 (I)
	Short-tailed albatross	*Phoebastria albatrus*	North Pacific	0	1	Environment Canada 2008 (I)
	Wandering albatross	*Diomedea exulans*	South Pacific, Indian Ocean, Southern Ocean	1	1	Furness 1983 (I); Day et al. 1985 (I); Ryan 1987b (I); Cooper 1995 (I); Huin and Croxall 1996 (I/E); Nel and Nel 1999 (I); Robertson et al. 2004 (I); Taylor 2004 (E); Australian Government 2009 (I/E); Ceccarelli 2009 (I); Philips et al. 2010 (I/E)
	Antipodean albatross	*Diomedea antipodensis*	South Pacific, Indian Ocean	1	1	Australian Government 2009 (I/E)
	Tristan albatross	*Diomedea dabbenena*	South Pacific, Indian Ocean	1	1	Australian Government 2009 (I/E)
	Southern royal albatross	*Diomedea epomophora*	South Pacific, Indian Ocean	1	1	Day et al. 1985 (I); Petry and Da Silva Fonseca 2002 (I); Australian Government 2009 (I/E)
	Northern royal albatross	*Diomedea sanfordi*	South Pacific, Indian Ocean	1	1	Australian Government 2009 (I/E)
	Sooty albatross	*Phoebetria fusca*	South Pacific, Southern Ocean	0	1	Ryan 1987b (I)
	Black-browed albatross	*Thalassarche melanophris*	Southern Ocean, North Atlantic, South Atlantic, South Pacific, Indian Ocean	1	1	Ryan 1987b (I); Cooper 1995 (I); Petry and Da Silva Fonseca 2002 (I); Colabuono and Vooren 2007 (I); Petry et al. 2007 (I); Barbieri 2009 (I); Ceccarelli 2009 (E); Colabuono et al. 2010 (I); Mäder et al. 2010 (I); Philips et al. 2010 (I/E); Tourinho et al. 2010 (I)
	Shy albatross	*Thalassarche cauta*	South Pacific, Indian Ocean	1	1	Hedd and Gales 2001 (I); Robertson et al. 2004 (I); Taylor 2004 (E); Ceccarelli 2009 (E)
	Salvin's albatross	*Thalassarche salvini*	South Pacific	0	1	Robertson and Bell 2002 (I); Robertson et al. 2004 (I)
	Grey-headed albatross	*Thalassarche chrysostoma*	South Pacific, Southern Ocean, Indian Ocean	1	1	Furness 1983 (I); Ryan 1987b (I); Australian Government 2009 (I/E); Philips et al. 2010 (I/E)
	Atlantic yellow-nosed albatross	*Thalassarche chlororhynchos*	Southern Ocean, South Pacific, South Atlantic	0	1	Ryan 1987b (I); Petry and Da Silva Fonseca 2002 (I); Colabuono and Vooren 2007 (I); Barbieri 2009 (I); Colabuono et al. 2009, 2010 (I); Mäder et al. 2010 (I)

	Indian yellow-nosed albatross	*Thalassarche carteri*	South Pacific, Indian Ocean	1	1	Australian Government 2009 (I/E)
	Buller's albatross	*Thalassarche bulleri*	South Pacific	1	1	West and Imber 1986 (I); Robertson and Bell 2002 (I); Robertson et al. 2004 (I); Taylor 2004 (E)
fulmars, petrels, prions	Southern giant petrel	*Macronectes giganteus*	Indian Ocean, South Pacific, South Atlantic	1	1	Ryan 1987a (E); Nel and Nel 1999 (I); Petry and Da Silva Fonseca 2002 (I); Copello and Quintana 2003 (I); Barbieri 2009 (I); Ceccarelli 2009 (I); Tourinho 2010 (I)
	Northern giant petrel	*Macronectes halli*	South Pacific, Indian Ocean	1	1	Ryan 1987a (I); Nel and Nel 1999 (E); Robertson and Bell 2002 (I); Robertson et al. 2004 (I); Australian government 2009 (I/E); Ceccarelli 2009 (E)
	Northern fulmar	*Fulmarus glacialis*	North Atlantic, North Pacific, Arctic Ocean	1	1	Day 1980 (I); DeGange and Newby 1980 (E); Van Franeker 1985 (I); Lydersen et al. 1989 (I); Moser and Lee 1992 (I); Blight and Burger 1997 (I); Robards et al. 1995, 1997 (I); Nevins et al. 2005 (I); Mallory et al. 2006 (I); Camphuysen 2008 (E); Mallory 2008 (I); Moore et al. 2009 (E); Provencher et al. 2009 (I); Stienen and Van de walle 2010 (E); Van Franeker et al. 2011 (I); Avery-Gomm et al. 2012 (I); Kühn and Van Franeker 2012 (I); Donnelly-Greenan et al. 2014 (I); Provencher et al. 2014 (I)
	Southern fulmar	*Fulmarus glacialoides*	South Pacific, Indian Ocean, South Atlantic	0	1	Crockett and Reed 1976 (I); Ryan 1987b (I); Van Franeker and Bell 1988 (I); Ainley et al. 1990a (I); Petry and Da Silva Fonseca 2002 (I); Barbieri 2009 (I); Colabuono et al. 2009 (I); Mäder et al. 2010 (I)
	Antarctic petrel	*Thalassoica antarctica*	Southern Hemisphere, Southern Ocean	0	1	Ryan 1987b (I); Ainley et al. 1990a (I)
	Cape petrel	*Daption capense*	Southern Hemisphere, Southern Ocean, South Atlantic	0	1	Ryan 1987b (I); Van Franeker and Bell 1988 (I); Ainley 1990a, b (I); Creet et al. 1994 (I); Barbieri 2009 (I); Fijn et al. 2012 (I)
	Snow petrel	*Pagodroma nivea*	South Pacific, Southern Ocean, South Atlantic	0	1	Ryan 1987b (I); Van Franeker and Bell 1988 (I); Ainley et al. 1990a (I); Petry and Da Silva Fonseca 2002 (I); Robertson and Bell 2002 (I)
	Blue petrel	*Halobaena caerulea*	Southern Ocean, Indian Ocean, South Pacific	1	1	Reed 1981 (I); Ryan 1987b (I); Ainley et al. 1990a (I); Australian Government 2009 (I/E); Ceccarelli 2009 (I)
	Broad-billed prion	*Pachyptila vittata*	Southern Ocean, South Pacific; South Atlantic	0	1	Furness 1985a (I); Harper and Fowler 1987 (I); Ryan 1987b (I); Ainley et al. 1990a (I)
	Salvin's prion	*Pachyptila salvini*	Southern Hemisphere, South Pacific	0	1	Harper and Fowler 1987 (I); Ryan 1987b (I)
	Antarctic prion	*Pachyptila desolata*	Southern Hemisphere, South Pacific	0	1	Harper and Fowler 1987 (I); Ryan 1987b (I); Petry and Da Silva Fonseca 2002 (I); Auman et al. 2004 (I)

Slender-billed prion	*Pachyptila belcheri*	Southern hemisphere, South Pacific	0	1	Bourne and Imber 1982 (I); Harper and Fowler 1987 (I); Ryan 1987b (I); Ainley et al. 1990a (I); Barbieri 2009 (I)
Fairy prion	*Pachyptila turtur*	South Pacific	0	1	Day et al. 1985 (I); Harper and Fowler 1987 (I)
Kerguelen petrel	*Aphrodroma brevirostris*	Southern Ocean, South Pacific	0	1	Reed 1981 (I); Furness 1985a (I); Ryan 1987b (I); Ainley et al. 1990a (I)
Great-winged petrel	*Pterodroma macroptera*	Southern hemishere, South Pacific	0	1	Day et al. 1985 (I); Furness 1985a (I); Ryan 1987b (I); Ainley et al. 1990a (I)
Atlantic petrel	*Pterodroma incerta*	Southern Ocean; South Atlantic	0	1	Furness 1985a (I); Ryan 1987b (I); Mäder et al. 2010 (I)
Providence petrel	*Pterodroma solandri*	North Pacific, South Pacific, Indian Ocean	0	1	Robards et al. 1997 (I); Bester et al. 2010 (I)
Murphy's petrel	*Pterodroma ultima*	South Pacific	0	1	Imber et al. 1995 (I); Spear et al. 1995 (I)
Soft-plumaged petrel	*Pterodroma mollis*	Southern Ocean, South Pacific	0	1	Furness 1985a (I); Ryan 1987b (I); Petry and Da Silva Fonseca 2002 (I)
Black-capped petrel	*Pterodroma hasitata*	North Atlantic	0	1	Moser and Lee 1992 (I)
Juan Fernandez petrel	*Pterodroma externa*	South Pacific	0	1	Ainley et al. 1990a (I); Spear et al. 1995 (I)
Kermadec petrel	*Pterodroma neglecta*	South Pacific	0	1	Imber et al. 1995 (I); Spear et al. 1995 (I)
Galapagos petrel	*Pterodroma phaeopygia*	South Pacific	0	1	Robards et al. 1997 (I)
Mottled petrel	*Pterodroma inexpectata*	North Pacific	0	1	Robards et al. 1997 (I)
White-necked petrel	*Pterodroma cervicalis*	South Pacific	0	1	Ainley et al. 1990a (I); Spear et al. 1995 (I)
Black-winged petrel	*Pterodroma nigripennis*	South Pacific	0	1	Spear et al. 1995 (I)
Bonin petrel	*Pterodroma hypoleuca*	North Pacific	0	1	Sileo et al. 1990 (I)
Gould's petrel	*Pterodroma leucoptera*	South Pacific, Indian Ocean	1	1	Ainley et al. 1990a (I); Spear et al. 1995 (I); Australian Government 2009 (I/E)
Collared petrel	*Pterodroma brevipes*	South Pacific	0	1	Spear et al. 1995 (I)
Cook's petrel	*Pterodroma cookii*	South Pacific	0	1	Day et al. 1985 (I); Ainley et al. 1990a (I); Imber 1996 (I)
Stejneger's petrel	*Pterodroma longirostris*	South Pacific, North Pacific	0	1	Ainley et al. 1990a (I); Spear et al. 1995 (I); Blight and Burger 1997 (I)
Pycroft's petrel	*Pterodroma pycrofti*	South Pacific	0	1	Ainley et al. 1990a (I); Spear et al. 1995 (I)
Tahiti petrel	*Pseudobulweria rostrata*	South Pacific	0	1	Ainley et al. 1990a (I); Spear et al. 1995 (I)
Grey petrel	*Procellaria cinerea*	South Pacific	0	1	Robertson et al. 2004 (I)
White-chinned petrel	*Procellaria aequinoctialis*	South Atlantic, South Pacific	0	1	Furness 1985a (I); Ryan 1987b (I); Nel and Nel 1999 (I); Petry and Da Silva Fonseca 2002 (I); Robertson and Bell 2002 (I); Robertson et al. 2004 (I); Colabuono and Vooren 2007 (I); Barbieri 2009 (I); Colabuono et al. 2009, 2010 (I); Mäder et al. 2010 (I); Tourinho et al. 2010 (I)
Spectacled petrel	*Procellaria conspicillata*	South Atlantic	0	1	Colabuono and Vooren 2007 (I); Colabuono et al. 2009, 2010 (I)
Black petrel	*Procellaria parkinsoni*	South Pacific	0	1	Day et al. 1985 (I); Robertson et al. 2004 (I)

shearwaters	Scopoli's shearwater	*Calonectris diomedea*	South Atlantic	0	1	Mäder et al. 2010 (I)
	Cory's shearwater	*Calonectris borealis*	South Atlantic, North Atlantic, Mediterranean Sea	0	1	Ryan 1987b (I); Moser and Lee 1992 (I); Petry and Da Silva Fonseca 2002 (I); Colabuono et al. 2009 (I); Petry et al. 2009 (I); Rodríguez et al. 2012 (I); Codina-García et al. 2013 (I)
	Cape Verde shearwater	*Calonectris edwardsii*	South Atlantic	0	1	Petry and Da Silva Fonseca 2002 (I)
	Wedge-tailed shearwater	*Puffinus pacificus*	South Pacific, North Pacific, South Atlantic	0	1	Fry et al. 1987 (I); Sileo et al. 1990b (I); Spear et al. 1995 (I); Hutton et al. 2008 (I)
	Buller's shearwater	*Puffinus bulleri*	South Pacific, North Pacific	0	1	Ainley 1990b (I); Spear et al. 1995 (I); Robards et al. 1997 (I)
	Sooty shearwater	*Puffinus griseus*	South Pacific, North Atlantic, North Pacific, South Atlantic	1	1	Bourne 1976 (I); Day 1980 (I); DeGange and Newby 1980 (E); Ryan 1987b (I); Ainley et al. 1990b (I); Manville 1990 (E); Ogi 1990 (I); Moser and Lee 1992 (I); Spear et al. 1995 (I); Blight and Burger 1997 (I); Petry and Da Silva Fonseca 2002 (I); Robertson and Bell 2002 (I); Robertson et al. 2004 (I); Taylor 2004 (E); Petry et al. 2008 (I); Barbieri 2009 (I); Moore et al. 2009 (E); Mäder et al. 2010 (I); Tourinho et al. 2010 (I); Avery-Gomm et al. 2013 (I)
	Short-tailed shearwater	*Puffinus tenuirostris*	North Pacific, South Pacific, Indian Ocean	1	1	Day 1980 (I); DeGange and Newby 1980 (E); Day et al. 1985 (I); Skira 1986 (I); Ainley et al. 1990b (I); Ogi 1990 (I); Robards et al. 1995 (I); Vliestra and Parga 2002 (I); Robertson et al. 2004 (I); Ceccarelli 2009 (E); Moore et al. 2009 (E); Carey 2011 (I); Yamashita et al. 2011 (I); Hong et al. 2013 (I/E); Acampora et al. 2014 (I)
	Pink-footed shearwater	*Puffinus creatopus*	North Pacific	0	1	Baltz and Morejohn 1976 (I); Robards et al. 1997 (I); Environment Canada 2008 (I)
	Flesh-footed shearwater	*Puffinus carneipes*	North Pacific, South Pacific, Indian Ocean	1	1	Robards et al. 1997 (I); Robertson and Bell 2002 (I); Taylor 2004 (E); Robertson et al. 2004 (I); Hutton et al. 2008 (I); Ceccarelli 2009 (I); Buxton et al. 2013 (I); Lavers et al. 2014 (I)
	Great shearwater	*Puffinus gravis*	North Atlantic, Southern hemisphere, South Atlantic	1	1	Bourne 1976 (I); Furness 1983 (I); Ryan 1987b (I), 1991 (E); Moser and Lee 1992 (I); Petry and Da Silva Fonseca 2002 (I); Pierce et al. 2004 (I); Petry et al. 2008 (I); Barbieri 2009 (I); Colabuono et al. 2009, 2010 (I); Mäder et al. 2010 (I); Provencher et al. 2014 (I)
	Christmas shearwater	*Puffinus nativitatis*	South Pacific, North Pacific	0	1	Sileo et al. 1990 (I); Spear et al. 1995 (I)
	Manx shearwater	*Puffinus puffinus*	North Atlantic, South Atlantic	0	1	Furness 1985a (I); Moser and Lee 1992 (I); Petry and Da Silva Fonseca 2002 (I); Petry et al. 2008 (I); Barbieri 2009 (I); Colabuono et al. 2009, 2010 (I); Tourinho et al. 2010 (I)
	Yelkouan shearwater	*Puffinus yelkouan*	Mediterranean Sea	0	1	Codina-Garcia et al. 2013 (I)
	Balearic shearwater	*Puffinus mauretanicus*	Mediterranean Sea	0	1	Codina-Garcia et al. 2013 (I)
	Newell's shearwater	*Puffinus newelli*	North Pacific	0	1	Sileo et al. 1990b (I)
	Fluttering shearwater	*Puffinus gavia*	South Pacific	1	0	Taylor 2004 (E)

	Audubon's shearwater	*Puffinus lherminieri*	North Atlantic	0	1	Moser and Lee 1992 (I)
	Little shearwater	*Puffinus assimilis*	North Atlantic, Southern Ocean	0	1	Furness 1985a (I); Ryan 1987b (I)
	Bulwer's petrel	*Bulweria bulwerii*	North Pacific	0	1	Harrison et al. 1983 (I); Spear et al. 1995 (I)
stormpetrels, diving petrels	Wilson's storm petrel	*Oceanites oceanicus*	Southern hemisphere, North Atlantic, Southern Ocean	0	1	Ryan 1987b (I); Van Franeker and Bell 1988 (I); Ainley et al. 1990a (I); Moser and Lee 1992 (I)
	Grey-backed storm petrel	*Garrodia nereis*	Southern hemisphere, Southern Ocean	0	1	Furness 1985a (I); Ryan 1987b (I)
	White-faced storm petrel	*Pelagodroma marina*	Southern hemisphere, South Pacific	1	1	Bourne and Imber 1982 (I); Furness 1985 (I); Ryan 1987b (I); Ainley et al. 1990b (E); Spear et al. 1995 (I)
	White-bellied storm petrel	*Fregetta grallaria*	Southern hemisphere, Southern Ocean, South Pacific	0	1	Bourne and Imber 1982 (I); Furness 1985 (I); Ryan 1987b (I); Ainley et al. 1990b (I); Spear et al. 1995 (I)
	European storm petrel	*Hydrobates pelagicus*	North Atlantic	0	1	Van Franeker 1983 (I)
	Wedge-rumped storm petrel	*Oceanodroma tethys*	South Pacific	0	1	Ainley et al. 1990b (I); Spear et al. 1995 (I)
	Leach's storm petrel	*Oceanodroma leucorhoa*	South Pacific, North Atlantic, North Pacific	1	1	Rothstein 1973 (I); Day et al. 1980 (I); Furness 1985b (I); Ainley et al. 1990b (I); Manville 1990 (E); Moser and Lee 1992 (I); Robards et al. 1995, 1997 (I); Spear et al. 1995 (I); Blight and Burger 1997 (I); Montevecchi in Laist 1997 (E); Provencher et al. 2014 (I)
	Markham's storm petrel	*Oceanodroma markhami*	South Pacific	0	1	Ainley et al. 1990b (I); Garcia-Godos et al 2002 (I)
	Tristram's storm petrel	*Oceanodroma tristrami*	North Pacific	0	1	Harrison et al. 1983 (I); Sileo et al. 1990b (I); Robards et al. 1997 (I)
	Fork-tailed storm petrel	*Oceanodroma furcata*	North Pacific	0	1	Day 1980 (I); Blight and Burger 1997 (I); Robards et al. 1995, 1997 (I)
	Peruvian diving petrel	*Pelecanoides garnotii*	South Pacific	0	1	Luna-Jorquera in: Thiel et al. 2011 (I)
	Common diving petrel	*Pelecanoides urinatrix*	South Atlantic	0	1	Norman and Brown 1987 (I); Ryan 1986, 1987b (I)
Podicipediformes						
grebes	Australasian grebe	*Tachybaptus novaehollandiae*	South Pacific, Indian Ocean	1	0	Ceccarelli 2009 (E)
	Pied-billed grebe	*Podilymbus podiceps*	North Pacific	1	0	Moore et al. 2009 (E)
	Red-necked grebe	*Podiceps grisegena*	North Pacific	1	0	Good et al. 2009 (E); Moore et al. 2009 (E)
	Great Crested grebe	*Podiceps cristatus*	North Pacific, North Atlantic	1	0	Federal Republic of Germany 1985 (E); Camphuysen 2008 (E); Stienen and Van de walle 2010 (E); Hong et al. 2013 (E)
	Western grebe	*Aechmophorus occidentalis*	North Pacific	1	0	Jameson 1986 (E); Moore et al. 2009 (E); Good et al. 2010 (E)
	Clark's grebe	*Aechmophorus clarkii*	North Pacific	1	0	Moore et al. 2010 (E)
Phaethontiformes						

		Red-tailed tropicbird	*Phaethon rubricauda*	North Pacific	0	1	Sileo et al. 1990b (I)
		White-tailed tropicbird	*Phaethon lepturus*	North Pacific	0	1	Hyrenbach et al. 2013 (I)
Pelecaniformes							
	pelicans	Great white pelican	*Pelecanus onocrotalus*	South Atlantic	0	1	Crawford et al. 1995 (I)
	pelicans	American white pelican	*Pelecanus erythrorhynchos*	North Atlantic, North Pacific	1	0	Heath in: Laist 1997 (E); Moore et al. 2009 (E)
	pelicans	Australian pelican	*Pelecanus conspicillatus*	South Pacific, Indian Ocean	1	0	Ceccarelli 2009 (E)
	pelicans	Brown pelican	*Pelecanus occidentalis*	North Atlantic, North Pacific	1	1	US Fish and Wildlife Service 1980 (E); Centaur Associates 1986 (E); Heath in: Laist 1997 (E); Vargo et al. 2006 (E); Gottdenker et al. 2008 (I); Dau et al. 2009 (I/E); Moore et al. 2009 (E)
	pelicans	Peruvian pelican	*Pelecanus thagus*	South Pacific	1	0	Thiel et al. 2011 (E)
Suliformes							
		Great frigatebird	*Fregata minor*	North Pacific	0	1	Sileo et al. 1990b (I)
	ganntes, boobies	Northern gannet	*Morus bassanus*	North Atlantic, Mediterranean Sea	1	1	Bourne 1976 (I); Schrey and Vauk 1987 (E); Lucas 1992 (E); Pierce et al. 2004 (I); Camphuysen 2008 (E); Stienen and Van de walle 2010 (E); Votier et al. 2011 (E); Bond et al. 2012 (E); Codina-Garcia et al. 2013 (I); Rodríguez et al. 2013 (E)
	ganntes, boobies	Cape gannet	*Morus capensis*	South Atlantic	1	0	Ryan in: Laist 1997 (E)
	ganntes, boobies	Australasian gannet	*Morus serrator*	South Pacific, Indian Ocean	1	1	Slater 1992 (E); Norman and Menkhorst 1995 (E); Taylor 2004 (E); Ceccarelli 2009 (I/E)
	ganntes, boobies	Blue-footed booby	*Sula nebouxii*	North Pacific	0	1	Anonymos in: Laist 1997 (I)
	ganntes, boobies	Peruvian booby	*Sula variegata*	South Pacific	1	0	Thiel et al. 2011 (E)
	ganntes, boobies	Masked booby	*Sula dactylatra*	North Pacific, South Atlantic	1	1	Conant 1984 (I/E); Sileo et al. 1990b (I); Dobbs 2005 (E); Mariano and Targino 2012 (I)
	ganntes, boobies	Red-footed booby	*Sula sula*	North Pacific	0	1	Sileo et al. 1990b (I)
	ganntes, boobies	Brown booby	*Sula leucogaster*	Indian Ocean	1	0	Dobbs 2005 (E); Lavers et al. 2013 (E)
	shags, cormorants	Little pied cormorant	*Microcarbo melanoleucos*	South Pacific, Indian Ocean	1	1	Ceccarelli 2009 (I/E)
	shags, cormorants	Bank cormorant	*Phalacrocorax neglectus*	Southern hemisphere	0	1	Ryan 1987b (I)
	shags, cormorants	Brandt's cormorant	*Phalacrocorax penicillatus*	North Pacific	1	0	Moore et al. 2009 (E); Good et al. 2009, 2010 (E)
	shags, cormorants	Pelagic cormorant	*Phalacrocorax pelagicus*	North Pacific	1	1	Robards et al. 1995 (I); Moore et al. 2009 (E); Good et al. 2009, 2010 (E)
	shags, cormorants	Neotropic cormorant	*Phalacrocorax brasilianus*	South Pacific	1	0	Thiel et al. 2011 (E)
	shags, cormorants	Double-crested cormorant	*Phalacrocorax auritus*	North Pacific, North Atlantic	1	0	Podolski and Kress 1989 (E); Moore et al. 2009 (E); Good et al. 2009, 2010 (E)
	shags, cormorants	European shag	*Phalacrocorax aristotelis*	North Atlantic	1	0	Onions and Rees 1992 (E); Stienen and Van de walle 2010 (E)
	shags, cormorants	Little black cormorant	*Phalacrocorax sulcirostris*	South Pacific, Indian Ocean	1	1	Ceccarelli 2009 (I/E)

	Australian pied Cormorant	*Phalacrocorax varius*	South Pacific, Indian Ocean	1	1	Taylor 2004 (E); Powlesland et al. 2008 (E); Ceccarelli 2009 (I/E)
	Great cormorant	*Phalacrocorax carbo*	South Pacific, Indian Ocean	1	1	Taylor 2004 (E); Camphuysen 2008 (E); Ceccarelli 2009 (I)
	Japanese cormorant	*Phalacrocorax capillatus*	South Pacific	1	0	Hong et al. 2013 (E)
Charadriiformes						
	Black-faced sheathbill	*Chionis minor*	Southern Ocean	0	1	Nel and Nel 1999 (I)
phalaropes	Red-necked phalarope	*Phalaropus lobatus*	North Pacific, North Atlantic	0	1	Day 1980 (I); Moser and Lee 1992 (I); Robards et al. 1997 (I)
	Red phalarope	*Phalaropus fulicarius*	Southern hemisphere, North Atlantic, North Pacific	0	1	Connors and Smith 1982 (I); Ryan 1987b (I); Moser and Lee 1992 (I); Robards et al. 1997 (I); Nevins et al. 2005 (I)
noddies, skimmers, gulls	Brown noddy	*Anous stolidus*	North Pacific	0	1	Sileo et al. 1990b (I)
	Black noddy	*Anous minutus*	North Pacific	0	1	Sileo et al. 1990b (I)
	Black skimmer	*Rynchops niger*	North Atlantic	1	0	Gochfeld 1973 (E)
	Black-legged kittiwake	*Rissa tridactyla*	North Atlantic, North Pacific, Mediterranean Sea	1	1	Baltz and Morejohn 1976 (I); Bourne 1976 (I); Lydersen et al 1989 (I); Moser and Lee 1992 (I); Onions and Rees 1992 (E); Robards et al. 1997 (I); Camphuysen 2008 (E); Stienen and Van de walle 2010 (E); Codina-Garcia 2013 (I)
	Red-legged kittiwake	*Rissa brevirostris*	North Pacific	0	1	Day 1980 (I); Robards 1995 (I)
	Sabine's gull	*Xema sabini*	North Atlantic	0	1	Moser and Lee 1992 (I)
	Bonaparte's gull	*Chroicocephalus philadelphia*	North Atlantic	0	1	Braune and Gaskin 1982 (I); Moser and Lee 1992 (I)
	Red-billed gull	*Chroicocephalus scopulinus*	South Pacific	1	0	Taylor 2004 (E)
	Silver gull	*Chroicocephalus novaehollandiae*	South Pacific, Indian Ocean	1	1	Ceccarelli 2009 (I/E)
	Black-billed gull	*Chroicocephalus bulleri*	South Pacific	1	0	Taylor 2004 (E)
	Black-headed gull	*Chroicocephalus ridibundus*	North Atlantic	1	1	Onion and Rees 1992 (E); Ferns and Mudge 2000 (I); Camphuysen 2008 (E); Hong et al. 2013 (E)
	Hartlaub's gull	*Chroicocephalus hartlaubii*	South Atlantic	1	1	Steele 1992 (I); Ryan in: Laist 1997 (E)
	Laughing gull	*Leucophaeus atricilla*	North Atlantic	1	1	Below 1979 (I/E); Moser and Lee 1992 (I)
	Audouin's gull	*Ichthyaetus audouinii*	Mediterranean Sea	0	1	Codina-Garcia 2013 (I)
	Mediterranean gull	*Ichthyaetus melanocephalus*	Mediterranean Sea	0	1	Codina-Garcia 2013 (I)
	Pacific gull	*Larus pacificus*	South Pacific, Indian Ocean	1	1	Coulson and Coulson 1992 (I); Lindsay and Meathrel 2008 (I); Ceccarelli 2009 (E)
	Olrog's gull	*Larus atlanticus*	South Atlantic	1	1	Berón and Favero 2009 (I/E)
	Black-tailed gull	*Larus crassirostris*	North Pacific	1	1	Hong et al. 2013 (I/E)
	Heermann's gull	*Larus heermanni*	North Pacific	0	1	Baltz and Morejohn 1976 (I); Moore et al. 2009 (I)

	Mew gull	*Larus canus*	North Pacific, North Atlantic	0	1	Baltz and Morejohn 1976 (I); Robards et al. 1995 (I)
	Ring-billed gull	*Larus delawarensis*	North Pacific	1	0	Moore et al. 2009 (E)
	California gull	*Larus californicus*	North Pacific	1	1	Moore et al. 2009 (E); Zorich et al. 2010 (I)
	Great black-backed gull	*Larus marinus*	North Atlantic	1	1	Day 1980 (I); Lucas 1992 (E); Montevecchi in: Laist 1997 (E); Gilliland et al. 2004 (I); Camphuysen 2008 (E); Stienen and Van de walle 2010 (E)
	Kelp gull	*Larus dominicanus*	South Atlantic, South Pacific, Indian Ocean	1	1	Ryan 1987b, 1990b (I); Coulson and Coulson 1992 (I); Steele 1992 (I); Petracci et al. 2004 (I); Taylor 2004 (E); Ceccarelli 2009 (E); Thiel et al. 2011 (E); Yorio et al. 2014 (I/E)
	Glaucous-winged gull	*Larus glaucescens*	North Pacific	1	1	Baltz and Morejohn 1976 (I); Moore et al. 2009 (E); Lindborg et al. 2012 (I); Avery-Gomm et al. 2013 (I)
	Western gull	*Larus occidentalis*	North Pacific	1	1	Day et al. 1985 (I); Jameson 1986 (E); Moore et al. 2009 (E)
	Glaucous gull	*Larus hyperboreus*	North Pacific	0	1	Day 1980 (I); Weiser and Powell 2011 (I)
	European herring gull	*Larus argentatus*	North Atlantic	1	1	Vauk-Hentzelt 1982 (I); Day et al. 1985 (I); Onion and Rees 1992 (E); Camphuysen 2008 (E); Stienen and Van de walle 2010 (E); Camphuysen et al. 2008, 2010 (I); Camphuysen 2013 (I)
	American herring gull	*Larus smithsonianus*	North Atlantic	1	1	Threlfall 1968 (I); Harris et al. 2006 (E)
	Vega gull	*Larus vegae*	North Pacific	1	0	Hong et al. 2013 (E)
	Yellow-legged gull	*Larus michahellis*	Mediterranean Sea	0	1	Codina-García 2013 (I)
	Slaty-backed gull	*Larus schistisagus*	North Pacific	1	0	Hong et al. 2013 (E)
	Lesser black-backed gull	*Larus fuscus*	North Atlantic	1	1	Onion and Rees 1992 (E); Stienen and Van de walle 2010 (E); Camphuysen et al. 2008, 2010 (I)
terns	Caspian tern	*Hydroprogne caspia*	North Pacific, Indian Ocean, Pacific Ocean	1	0	Ceccarelli 2009 (E); Moore et al. 2009 (E)
	Greater crested tern	*Thalasseus bergii*	South Atlantic, Indian Ocean, Pacific Ocean	1	0	Ryan 1990a (E); Ceccarelli 2009 (E)
	Sandwich tern	*Thalasseus sandvicensis*	North Atlantic	1	0	Onion and Rees 1992 (E)
	Little tern	*Sternula albifrons*	Indian Ocean, Pacific Ocean	1	1	Ceccarelli 2009 (I/E)
	Peruvian tern	*Sternula lorata*	South Pacific	1	0	Thiel et al. 2011 (E)
	Bridled tern	*Onychoprion anaethetus*	North Atlantic	0	1	Moser and Lee 1992 (I)
	Sooty tern	*Onychoprion fuscatus*	North Pacific, South Pacific, Indian Ocean	1	1	Sileo et al. 1990b (I/E); Ceccarelli 2009 (I/E)
	Common tern	*Sterna hirundo*	Nortch Atlantic	0	1	Braune and Gaskin 1982 (I); Moser and Lee 1992 (I); Bugoni and Vooren 2004 (I)
	Black tern	*Chlidonias niger*	North Atlantic	0	1	Moser and Lee 1992 (I)

skuas, jaegers	South polar skua	*Stercorarius maccormicki*	Southern Ocean, South Pacific	1	1	Slip 1990 (E); Robards et al. 1997 (I)
	Brown skua	*Stercorarius antarcticus*	Southern Ocean, Indian Ocean, Pacific Ocean	1	1	Furness 1985a (I); Nel and Nel 1999 (E); Ceccarelli 2009 (I)
	Great skua	*Stercorarius skua*	South Atlantic, Mediterranean Sea	0	1	Ryan 1987b (I); Ryan and Fraser 1988 (I); Codina-García 2013 (I)
	Pomarine skua	*Stercorarius pomarinus*	North Atlantic	0	1	Moser and Lee 1992 (I)
	Parasitic jaeger	*Stercorarius parasiticus*	Southern hemisphere, North Atlantic	0	1	Ryan 1987b (I); Moser and Lee 1992 (I)
	Long-tailed jaeger	*Stercorarius longicaudus*	South Pacific, North Atlantic	0	1	Moser and Lee 1992 (I); Spear et al. 1995 (I)
murres, guillemots, murrelets, auks, auklets, puffins	Little auk	*Alle alle*	North Atlantic	0	1	Van Franeker 1983 (I); Day et al. 1985 (I); Lydersen et al. 1989 (I); Pedersen and Falk 2001 (I); Perry et al. 2013 (I)
	Thick-billed murre	*Uria lomvia*	North Atlantic, North Pacific	1	1	Day 1980 (I); Elliot in: Heneman 1988 (I); Lydersen et al. 1989 (I); Lucas 1992 (E); Provencher et al. 2010 (I); Bond et al. 2013 (I); Provencher et al. 2014 (I)
	Common murre	*Uria aalge*	North Atlantic, North Pacific	1	1	Bourne 1976 (I); Fed. Republic of Germany 1985 (I); Robards et al. 1995 (I), 1997 (I); Weir et al. 1997 (I); Camphuysen 2008 (E); Moore et al. 2009 (E); Good et al. 2009, 2010 (E); Stienen and Van de walle 2010 (E); Avery-Gomm 2012 (I); Bond et al. 2013 (I)
	Razorbill	*Alca torda*	North Atlantic	1	1	Onion and Rees 1992 (E); Weir et al. 1997 (I); Stienen and Van de walle 2010 (E)
	Black guillemot	*Cepphus grylle*	North Atlantic	1	0	Onion and Rees 1992 (E)
	Pigeon guillemot	*Cepphus columba*	North Pacific	1	1	Robards et al. 1995 (I), 1997 (I); Good et al. 2009, 2010 (E)
	Ancient murrelet	*Synthliboramphus antiquus*	North Pacific	1	0	Hong et al. 2013 (E)
	Cassin's auklet	*Ptychoramphus aleuticus*	North Pacific	0	1	Day 1980 (I); Robards et al. 1995, 1997 (I)
	Parakeet auklet	*Aethia psittacula*	North Pacific	0	1	Day 1980 (I); Pettit et al. 1981 (I); Robards et al. 1995 (I); Bond et al. 2010 (I)
	Least auklet	*Aethia pusilla*	North Pacific	0	1	Day 1980 (I); Robards et al. 1997 (I)
	Whiskered auklet	*Aethia pygmaea*	North Pacific	0	1	Bond et al. 2010 (I)
	Crested auklet	*Aethia cristatella*	North Pacific	0	1	Robards et al. 1995 (I), 1997 (I)
	Rhinoceros auklet	*Cerorhinca monocerata*	North Pacific	0	1	Baltz and Morejohn 1976 (I); Robards et al. 1997 (I)
	Atlantic puffin	*Fratercula arctica*	North Atlantic	1	1	Parslow and Jeffries 1972 (I); Onion and Rees 1992 (E); Harris and Wanless 1994 (I); Provencher et al. 2014 (I)
	Horned puffin	*Fratercula corniculata*	North Pacific	1	1	Day 1980 (I); Jones and Ferrero 1985 (E); Blight and Burger 1997 (I); Robards et al. 1995 (I); 1997 (I/E)
	Tufted puffin	*Fratercula cirrhata*	North Pacific	1	1	Day 1980 (I); DeGange and Newby 1980 (E); Jones and Ferrero 1985 (E); Blight and Burger 1997 (I); Robards et al. 1995 (I),

						1997 (I/E)
Marine mammals						
Baleen whales (Mysticeti)						
Balaenidae						
right whales	Southern right whale	*Eubalaena australis*	South Pacific, Indian Ocean	1	0	Cawthorn 1985 (E); Ceccarelli 2009 (E)
right whales	North Atlantic right whale	*Eubalaena glacialis*	North Atlantic, North Pacific	1	1	Kraus 1990 (E); Johnson et al. 2005 (E); Waring et al. 2004 (I/E); Marine Mammal Commission 1993, 2006 (E); Moore et al. 2009 (E); Cassoff et al. 2011 (E); GEF Council Meeting 2012 (I); Knowlton et al. 2012 (E); Van der Hoop et al. 2013 (E)
right whales	Bowhead whale	*Balaena mysticetus*	North Pacific, North Atlantic	1	1	Heyning and Lewis 1990 (E); Philo et al. 1992 (E); Lowry 1993 (I); Finley 2001 (I); Sternfeld 2004, 2005 (E); Jackson 2011 (E); Citta et al. 2014 (E)
Neobalaenidae						
	Pygmy right whale	Caperea marginata	South Pacific, Indian Ocean	1	1	Ceccarelli 2009 (E); Australian Antarctic Division in: Baulch and Perry 2014 (I)
Eschrichtiidae						
	Gray whale	*Eschrichtius robustus*	North Pacific	1	0	Mate 1985 (E); Hare and Mead 1987 (E); Heyning and Lewis 1990 (E); Sternfeld 2005 (E); Carretta et al. 2013 (E); Jackson 2010, 2012, 2013 (E)
Balaenopteridae						
rorquals	Common minke whale	*Balaenoptera acutorostrata*	North Atlantic, South Pacific	1	1	Cawthorn 1985 (E); Mate 1985 (E); Hare and Mead 1987 (I/E); Tarpley and Marwitz 1993 (I); Gill et al. 2000 (E); Mauger et al. 2002 (I); Waring et al. 2004 (E); De Pierrepont et al. 2005 (I); Ceccarelli 2009 (E); Bogomolni et al. 2010 (E); Deaville et al. 2010 (E); Cassoff et al. 2011 (E)
rorquals	Bryde's whale	*Balaenoptera edeni*	North Atlantic, South Pacific	1	1	Haynes and Limpus 2000 (I); Ceccarelli 2009 (I); Cassoff et al. 2011 (E)
rorquals	Blue whale	*Balaenoptera musculus*	South Pacific	0	1	Baxter 2009 (I); A. Baxter in: Baulch 2014 (I)
rorquals	Fin whale	*Balaenoptera physalus*	North Atlantic, North Pacific, Mediterranean Sea	1	1	Sadove and Morreale 1990 (I/E); Waring et al. 2004 (E); Fossi et al. 2012 (I); Arbelo et al. 2013 (E); Jackson 2013 (E)
rorquals	Humpback whale	*Megaptera novaeangliae*	North Atlantic, North Pacific	1	0	Mate 1985 (E); Humpback Whale Recovery Team 1991 (E); Waring et al. 2004 (E); Johnson et al. 2005 (E); Sternfeld 2004, 2005, 2006 (E); Ceccarelli 2009 (E); Moore et al. 2009 (E); Jackson and Sternfeld 2009 (E); Bogomolni et al. 2010 (E); Cassoff et al. 2011 (E); Jackson 2010, 2011, 2012, 2013, 2014 (E)
Toothed whales (Odontoceti)						
Physeteridae						

	Sperm whale	*Physeter macrocephalus*	Mediterranean Sea, South Pacific, Indian Ocean, North Atlantic, North Pacific	1	1	Mate 1985 (I); Martin and Clarke 1986 (I); Sadove and Morreale 1990 (I/E); Walker and Coe 1990 (I); Spence 1994 (I); Brown in: Laist 1997 (E); Evans and Hindell 2004 (I); Waring et al. 2004 (E); Fernández et al. 2009 (I); Moore et al. 2009(E); Jacobsen et al. 2010 (I); Mazzariol et al. 2011 (I); Arbelo et al. 2013 (E); Carretta et al. 2013 (I); de Stephanis et al. 2013 (I); Jackson 2013 (E)
Kogiidae						
	Pygmy sperm whale	*Kogia breviceps*	North Atlantic	1	1	Coleman and Wehle 1984 (E); Barros et al. 1990 (I); Sadove and Morreale 1990 (I); Tarpley 1990 (I); Walker and Coe 1990 (I); Tarpley and Marwitz 1993 (I); Schofield et al. 1994 (I); Scott et al. 2001 (E); Stamper et al. 2006 (I); Fernández et al. 2009 (I)
	Dwarf sperm whale	*Kogia sima*	North Atlantic	0	1	Barros et al. 1990 (I); Tarpley 1990 (I); Walker and Coe 1990 (I)
Pontoporiidae						
	Franciscana dolphin	*Pontoporia blainvillei*	South Atlantic	0	1	Pinedo 1982 (I); E. Secchi in: Laist 1997 (I); Denuncio et al. 2011 (I); Di Beneditto and Ramos 2014 (I)
Monodontidae						
	Beluga	*Delphinapterus leucas*	North Pacific	1	0	Sternfeld 2005 (E); Jackson 2011, 2012, 2013, 2014 (E)
Phocoenidae						
porpoises	Harbour porpoise	*Phocoena phocoena*	North Atlantic, Mediterranean Sea, North Pacific	1	1	Hare and Mead 1987 (I/E); Walker and Coe 1990 (I); Kastelein and Lavaleye 1992 (I); Baird and Hooker 2000 (I); Sternfeld 2005 (E); Tonay et al. 2007 (I); Sternfeld and Jackson 2009 (E); Bogomolni et al. 2010 (I/E); Deaville et al. 2010 (I); Carretta et al. 2013 (I); Jackson 2010, 2011, 2013, 2014 (E)
	Burmeister's porpoise	*Phocoena spinipinnis*	not noted	0	1	P. Denuncio in: Baulch and Perry 2014 (I)
	Finless porpoise	*Neophocaena phocaenoides*	not noted	0	1	C. Parsons in: Baird and Hooker 2000 (I)
	Dall's porpoise	*Phocoenoides dalli*	North Pacific	1	1	DeGange and Newby 1980 (E); Jones and Ferrero 1985 (E); Walker and Coe 1990 (I); Sternfeld 2004 (E); Sternfeld and Jackson 2009 (E); Jackson 2010 (E)
Delphinidae						
ocean dolphins	Rough-toothed dolphin	*Steno bredanensis*	North Atlantic, North Pacific	1	1	Coleman and Wehle 1984 (E); Walker and Coe 1990 (I); De Meirelles and Do Rego Barros 2011 (I)
	Indo-Pacific humpback dolphin	*Sousa chinensis*	North Pacific, South Pacific, Indian Ocean	1	0	Kiessling 2003 (E); Ceccarelli 2009 (E); Slooten et al. 2013 (E)
	Tucuxi	*Sotalia fluviatilis*	South Atlantic	1	1	Geise and Gomes 1992 (I); Secchi in: Laist 1997 (I/E)
	Guiana river dolphin	*Sotalia guianensis*	North Atlantic, South Atlantic	0	1	Geise and Gomes 1992 (I); Di Beneditto and Ramos 2014 (I)
	White-beaked dolphin	*Lagenorhynchus albirostris*	not noted	0	1	R. Kastelein in: Baird and Hooker 2000 (I)
	Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	North Pacific	0	1	Caldwell et al. 1965 (I); Walker and Coe 1990 (I)

	Risso's dolphin	*Grampus griseus*	North Atlantic, North Pacific, Mediterranean Sea	1	1	E. Nitta in Henderson 1988 (I); Walker and Coe 1990 (I); A. Collet in: Laist 1997 (I); Shoham-Frider et al. 2002 (I); Frantzis 2007 (E)
	Fraser's dolphin	*Lagenodelphis hosei*	North Atlantic	0	1	Fernández et al. 2009 (I)
	Common bottlenose dolphin	*Tursiops truncatus*	Indian Ocean, North Pacific, South Pacific, North Atlantic	1	1	Barros et al. 1990 (I); Walker and Coe 1990 (I); Schwartz et al. 1992 (I); Mann et al. 1995 (E); Gorzelany 1998 (I); Ceccarelli 2009 (I/E); Gomerčić et al. 2009 (I); Levy et al. 2009 (I); Deaville et al. 2010 (I); Adimey et al. 2014 (I)
	Indo-Pacific bottlenose dolphin	*Tursiops aduncus*	Indian Ocean, South Pacific	1	0	Chatto and Warneke 2000 (E); Ceccarelli 2009 (E); Bossley 2005 (E)
	Atlantic spotted dolphin	*Stenella frontalis*	North Atlantic	0	1	Arbelo et al. 2013 (I)
	Pantropical spotted dolphin	*Stenella attenuata*	not noted	0	1	K. Robertson in: Baird and Hooker 2000 (I)
	Striped dolphin	*Stenella coeruleoalba*	North Atlantic	1	1	Walker and Coe 1990 (I); Frantzis 2007 (E); Fernández et al. 2009 (I); Arbelo et al. 2013 (I)
	Common dolphin	*Delphinus delphis*	North Pacific, South Pacific, Indian Ocean	1	1	Walker and Coe 1990 (I); Ceccarelli 2009 (E); Deaville et al. 2010 (I)
	Long-beaked common dolphin	*Delphinus capensis*	North Pacific	0	1	Carretta et al. 2013 (I)
	Northern right whale dolphin	*Lissodelphis borealis*	North Pacific	0	1	Walker and Coe 1990 (I)
	False killer whale	*Pseudorca crassidens*	North Atlantic	0	1	Barros et al. 1990 (I)
	Killer whale	*Orcinus orca*	South Pacific	1	1	Cawthorn 1985 (E); K. Evans in: Baird and Hooker 2000 (I)
	Long-finned pilot whale	*Globicephala melas*	North Atlantic	0	1	A. Collet in: Laist 1997 (I)
	Short-finned pilot whale	*Globicephala macrorhynchus*	North Atlantic, South Atlantic	0	1	Walker and Coe 1990 (I); Barros et al. 1997 (I)
	Irrawaddy dolphin	*Orcaella brevirostris*	Indian Ocean, South Pacific	0	1	Kreb in: Baulch and Perry 2014 (I)
	Australian Snubfin Dolphin	*Orcaella heinsohni*	Indian Ocean, South Pacific	1	0	Ceccarelli 2009 (E)
Ziphiidae						
beaked whales	Shepherd's beaked whale	*Tasmacetus shepherdi*	not noted	0	1	Smithonian Research Institute in: Baulch and Perry 2014 (I)
	Baird's beaked whale	*Berardius bairdii*	North Pacific	0	1	Walker and Coe 1990 (I)
	Longman's beaked whale	*Mesoplodon pacificus*	North Pacific	0	1	Yamada et al. 2012a (I)
	Sowerby's beaked whale	*Mesoplodon bidens*	North Atlantic	0	1	Deaville et al. 2010 (I); Bravo Rebolledo, unpubl. data (I)
	Blainville's beaked whale	*Mesoplodon densirostris*	South Atlantic, North Atlantic	0	1	Walker and Coe 1990 (I); E. Secchi in: Laist 1997 (I); Secchi and Zarzur 1999 (I)
	Gervais' beaked whale	*Mesoplodon europaeus*	North Atlantic	0	1	Walker and Coe 1990 (I); Waring et al. 2004 (E); Fernández et al. 2009 (I)
	Gray's beaked whale	*Mesoplodon grayi*	South Pacific	0	1	Mayorga in: Baulch and Perry 2014 (I)
	Stejneger's beaked whale	*Mesoplodon stejnegeri*	North Pacific	0	1	Walker and Hanson 1999 (I); Yamada et al. 2012b (I)
	True's beaked whale	*Mesoplodon mirus*	South Atlantic	0	1	Souza et al. 2005 (I)

	Ginkgo-toothed beaked whale	*Mesoplodon ginkgodens*	North Pacific	0	1	IWC 2012 in: Baulch and Perry 2014 (I)
	Hubbs' beaked whale	*Mesoplodon carlhubbsi*	North Pacific	0	1	Yamada et al. 2012b (I)
	Cuvier's beaked whale	*Ziphius cavirostris*	North Atlantic, North Pacific	1	1	Coleman and Wehle 1984 (I); Walker and Coe 1990 (I); Poncelet et al. 2000 (I); Waring et al. 2004 (E); MacLeod 2007 (I); Santos et al. 2007 (I); Hebridean Whale and Dolphin Trust in: Simmonds 2012 (I); Arbelo et al. 2013 (I)
	Northern bottlenose whale	*Hyperoodon ampullatus*	North Atlantic	0	1	R. Michaud in: Baird and Hooker 2000 (I); Deaville et al. 2010 (I)
Seals (Pinnipedia)						
Phocidae						
true seals	Harbour seal	*Phoca vitulina*	North Atlantic, North Pacific	1	1	Stewart and Yochem 1987 (E); W. Bowen and S. Anderson in: Fowler 1988 (E); Lucas 1992 (E); Goldstein et al. 1999 (E); Hanni and Pyle 2000 (E); Osinga and 't Hart 2006 (I); Sternfeld 2004, 2006 (E); Moore et al. 2009 (E); Bogomolni et al. 2010 (E); Jackson 2011, 2012 (E); Bravo Rebolledo et al. 2013 (I); Carretta et al. 2013 (I/E)
true seals	Ringed seal	*Pusa hispida*	North Pacific	1	0	Sternfeld 2004 (E); Sternfeld and Jackson 2009 (E); Jackson 2011 (E)
true seals	Harp seal	*Pagophilus groenlandicus*	North Atlantic	1	1	W.D. Bowen in: Fowler 1988 (E); Bogomolni et al. 2010 (I)
true seals	Grey seal	*Halichoerus grypus*	North Atlantic	1	1	W. Bowen and S. Anderson in: Fowler 1988 (E); Lucas 1992 (E); Osinga and 't Hart 2006 (I); Bogomolni et al. 2010 (E); Allen et al. 2012 (E)
true seals	Leopard seal	*Hydrurga leptonyx*	South Pacific, Indian Ocean	1	0	Jenkin 1990 (E); Slater 1991 (E); Jones 1995 (E); Ceccarelli 2009 (E)
true seals	Northern elephant seal	*Mirounga angustirostris*	North Pacific	1	1	Heneman 1985 (E); Mate 1985 (I); Stewart and Yochem 1987, 1990 (E); Goldstein et al. 1999 (E); Hanni and Pyle 2000 (E); Moore et al. 2009 (E); Carretta et al. 2009, 2013 (I/E)
true seals	Southern elephant seal	*Mirounga leonina*	South Atlantic, South Pacific, Indian Ocean	1	0	Ramirez 1986 (E); Hofmeyr et al. 2002 (E); Campagna et al. 2007 (E); Ceccarelli 2009 (E)
true seals	Mediterranean monk seal	*Monachus monachus*	Mediterranean Sea	1	0	Gots 1992 (E); Johnson and Karamanlidis 2000 (E)
true seals	Hawaiian monk seal	*Monachus schauinslandi*	North Pacific	1	0	Henderson 1984, 1990, 2001 (E); Donohue et al. 2001 (E); Boland and Donohue 2003 (E); Marine Mammal Commission 2006 (E); Donohue and Foley 2007 (E); Carretta et al. 2009 (E)
Otariidae						
eared seals	Northern fur seal	*Callorhinus ursinus*	North Pacific	1	1	Waldichuk 1978 (E); Scordino 1985 (E); Fowler 1987 (E); Bengston et al. 1988 (E); Baba et al. 1990 (E); Fowler et al. 1990, 1992 (E); Hanni and Pyle 2000 (E); Moore et al. 2009 (E); Sternfeld and Jackson 2009 (E); GEF Council Meeting 2012 (I); Carretta et al. 2013 (E); Jackson 2012, 2013, 2014 (E)
eared seals	Guadalupe fur seal	*Arctocephalus townsendi*	North Pacific	1	0	B.J. Le Boeuf in: Laist 1997 (E); Goldstein et al. 1999 (E); Moore et al. 2009 (E); Carretta et al. 2013 (E)
eared seals	Juan Fernandez fur seal	*Arctocephalus philippi*	South Pacific	1	0	Cardenas and Cattan in: Wallace 1985 (E); Luna-Jorquera and L. Osman in: Thiel et al 2011 (E)

	South American fur seal	*Arctocephalus australis*	South Atlantic, South Pacific	1	0	Ramirez 1986 (E); Fowler 1988 (E)
	Cape/Australian fur seal	*Arctocephalus pusillus*	South Pacific, Indian Ocean	1	1	Shaughnessy 1980 (E); Slater 1992 (E); Pemberton et al. 1992 (E); Pemberton 1993 (E); Jones 1995 (E); Hugo in: Katsanevakis 2008 (E); Ceccarelli 2009 (I/E)
	New Zealand fur seal	*Arctocephalus forsteri*	South Pacific	1	1	Cawthorn 1985 (E); Fowler 1988 (E); Pemberton 1993 (E); Jones 1995 (E); Page et al. 2004 (E); Boren et al. 2006 (E); Ceccarelli 2009 (I/E)
	Antarctic fur seal	*Arctocephalus gazella*	Southern Ocean	1	1	Payne 1979 (E); Bonner and McCann 1982 (E); Croxall et al. 1990 (E); Arnould and Croxall, 1995 (E); Goldsworthy et al. 1997 (I); Hucke-Gaete et al. 1997 (E); Eriksson and Burton 2003 (I); Hofmeyr et al. 2002, 2006 (E); Waluda and Staniland 2013 €
	Subantarctic fur seal	*Arctocephalus tropicalis*	Southern Ocean, South Pacific, Indian Ocean	1	1	Hofmeyr et al. 2002 (E); Eriksson and Burton 2003 (I); Ceccarelli 2009 (E)
	Steller sea lion	*Eumetopias jubatus*	North Pacific	1	1	Calkins 1985 (E); Mate 1985 (I); Loughlin et al. 1986 (E); Manville 1990 (E); Hanni and Pyle 2000 (E); Sternfeld 2004 (E); Moore et al. 2009 (E); Raum-Suryan et al. 2009 (E); Sternfeld and Jackson 2009 (E); Jackson 2011, 2012, 2013, 2014 (E)
	California/Galapagos/Japanese sea lion	*Zalophus californianus*	South Pacific, North Pacific	1	1	Heneman 1985 (E); Stewart and Yochem 1987, 1990 (E); Harcourt et al. 1994 (E); F. Trillmich in: Laist 1997 (E); Zavala-González and Mellink 1997 (E); Goldstein et al. 1999 (E); Hanni and Pyle, 2000 (E); Aurioles-Gamboa et al. 2003 (E); Moore et al. 2009 (E); GEF Council meeting 2012 (I); Carretta et al. 2009, 2013 (I/E)
	South American sea lion	*Otaria* flavescens	South Pacific	1	0	Ramirez 1984, 1986 (E)
	Australian sea lion	*Neophoca cinerea*	South Pacific, Indian Ocean	1	0	Shaugnessy 1980 (E); Pemberton et al. 1992 (E); Jones 1995 (E); Page et al. 2004 (E); Ceccarelli 2009 (E)
	New Zealand sea lion	*Phocarctos hookeri*	South Pacific	1	1	Cawthorn 1985 (E); McMahon et al. 1999 (I)
Manatees and Dugongs (Sirenia)						
Trichechidae						
manatees	Amazonian manatee	*Trichechus inunguis*	North Atlantic, South Atlantic	0	1	Guterres-Pazin et al. 2012 (I)
manatees	West Indian/Florida manatee	*Trichechus manatus*	North Atlantic	1	1	O'Shea et al. 1985 (E); Beck and Barros 1991 (I/E); Mignucci-Giannoni et al. 2000 (I); Bossart et al. 2004 (I); Adimey et al. 2014 (I)
Dugongidae						
	Dugong	*Dugong dugon*	South Pacific, Indian Ocean	1	1	Kiessling 2003 (I/E); Ceccarelli 2009 (I/E)
Polar Bear and Otters (Carnivora)						
Mustelidae						
	Sea otter	*Enhydra lutris*	North Pacific	1	0	DeGange and Newby 1980 (E); Moore et al. 2009 (E)

Ursidae						
	Polar Bear	*Ursus maritimus*	North Atlantic	1	0	Bjørke 2014 (E)
			Turtles			
Carettinae						
	Loggerhead Sea Turtle	*Caretta caretta*	North Atlantic, North Pacific, South Atlantic, Mediterranean Sea, South Pacific, Indian Ocean	1	1	Brongersma 1968 (I); Hughes 1970, 1974b (I); Salvador 1978 (I); Rabalais and Rabalais 1980 (E); Van Nierop and Den Hartog 1984 (I); Balazs 1985 (I/E); Carr 1987 (I); Gramentz 1988 (I); Stanley et al. 1988 (I); Shoop and Ruckdeschel 1989 (I); Plotkin and Amos 1990 (I/E); Sadove and Morreale 1990 (I/E); Uchida 1990 (I); Bolten and Bjorndal 1991 (E); Duronslet et al. 1991 (I); Plotkin et al. 1993 (I); Bjorndal et al. 1994 (I); Teas and Witzell 1994 (E); Ryan in: Laist 1997 (E); Bugoni et al. 2001 (I); Tomás et al. 2002 (I); Ceccarelli 2009 (I/E); Frick et al. 2001, 2009 (I); Casale et al. 2010 (E); Reis et al. 2010 (I); Lazar and Gracan 2011 (I); Townsend 2011 (I); Müller et al. 2012 (E); Campani et al. 2013 (I); Barreiros and Raykov 2014 (I/E); Camedda et al. 2014 (I); Hoarau et al. 2014 (I)
	Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	North Atlantic	1	1	Balazs 1985 (E); Stanley et al. 1988 (I); Shoop and Ruckdeschel 1989 (I); Plotkin and Amos 1990 (E); Sadove and Morreale 1990 (E); Duronslet et al. 1991 (I); Shaver 1991 (I); Bjorndal et al. 1994 (I); Teas and Witzell 1994 (I); Witherington et al. 2012 (I)
	Olive Ridley Sea Turtle	*Lepidochelys olivacea*	North Atlantic, South Atlantic, North Pacific South Pacific, Indian Ocean	1	1	Afelin and Puleloa 1982 (E); Balazs 1985 (E); Work and Balazs 2002 (I); Mascarenhas et al. 2004 (I); White 2006 (E); Ceccarelli 2009 (I/E); Reis et al. 2010 (I)
Cheloniinae						
	Green Sea Turtle	*Chelonia mydas*	North Atlantic, South Atlantic, North Pacific, South Pacific, Indian Ocean	1	1	Hirth 1971 (I); Meylan 1978 (I); Hildebrand 1980 (E); Mooney and Naughton 1981 (E); Hays-Brown and Brown 1982 (I); Henderson 1984 (E); Balazs 1980, 1983, 1985 (E); Stanley et al. 1988 (I); Lutz 1990 (I); Plotkin and Amos 1990 (I/E); Sadove and Morreale 1990 (I/E); Uchida 1990 (I); Duronslet et al. 1991 (I); Bjorndal et al. 1994 (I); Teas and Witzell 1994 (E); Bugoni et al. 2001 (I); Guebert-Bartholo et al. 2004 (I); Mascarenhas et al. 2004 (I); White 2006 (E); Ceccarelli 2009 (I/E); Stamper et al. 2009 (I); Reis et al. 2010 (I/E); Tourinho et al. 2010 (I); Macedo et al. 2011 (I); Townsend 2011 (I); Awabdi et al. 2012 (I); Schuyler et al. 2012 (I); Witherington et al. 2012 (I); Adimey et al. 2014 (I); González Carman et al. 2014 (I)
	Hawksbill Sea Turtle	*Eretmochelys imbricata*	North Atlantic, North Pacific, South Pacific	1	1	Carr and Stancyk 1975 (I); Den Hartog 1980 (I); Hildebrand 1980 (I); Broadrick 1982 (E); Fletcher 1982 (E); Wolf 1982 (E); Meylan 1984 (I); Balazs 1978, 1985 (I/E); Plotkin and Amos 1990 (E); Uchida 1990 (I); Teas and Witzell 1994 (E); White 2006 (E); Ceccarelli 2009 (I/E); Macedo et al. 2011 (I); Townsend 2011 (I);

						Schuyler et al. 2012 (I)
	Flatback Sea Turtle	*Natator depressus*	South Pacific	1	1	Chatto et al. 1995 (I); White 2006 (E); Ceccarelli 2009 (E); Gunn et al. 2010 (E); Townsend 2011 (I)
Dermochelydae						
	Leatherback Sea Turtle	*Dermochelys coriacea*	North Atlantic, South Atlantic, North Pacific, South Pacific, Indian Ocean	1	1	Brongersma 1968 (I); Hughes 1974 (I); Duguy et al. 1980 (I); Duron and Duron 1980 (E); Sadove 1980 (I); Duguy and Duron 1981 (E); Lee and Palmer 1981 (E); Schoelkopf 1981 (I); Fritts 1982 (I); Duguy 1983 (I); Wehle and Coleman 1983 (I); Balazs 1985 (I/E); Cawthorn 1985 (I); Plotkin and Amos 1990 (E); Sadove and Morreale 1990 (I/E); Uchida 1990 (I); Lucas 1992 (I); Davenport et al. 1993 (I); Teas and Witzell 1994 (E); Barreiros and Barcelos 2001 (I); Bugoni et al. 2001 (I); Margaritoulis in Katsanevakis 2008 (I); Ceccarelli 2009 (I/E); Mrosovsky et al. 2009 (I); Plot and Georges 2010 (I); Reis et al. 2010 (I); Poppi et al. 2012 (I)
Sea snakes						
Hydrophiidae						
	Elegant sea snake	*Hydrophis elegans*	South Pacific	1	0	Udyawer et al. 2013 (E)
	Olive headed sea snake	*Disteira major*	South Pacific, Indian Ocean	1	0	Ceccarelli 2009 (E)
Fishes						
Elasmobranchii (Sharks and rays)						
Hexanchiformes						
	Sixgill shark	Hexanchus griseus	North Pacific	1	0	Good et al. 2010 (E)
Orectolobiformes						
	Leopard shark	*Stegostoma fasciatum*	Indian Ocean, South Pacific	0	1	Ceccarelli 2009 (I)
Lamniformes						
	Blackmouth catshark	*Galeus melastomus*	Mediterranean Sea	0	1	Anastasopoulou et al. 2013 (I)
	Ragged-tooth shark / Grey nurse shark	*Carcharias taurus*	Indian Ocean, South Atlantic, South Pacific	1	1	Ryan in: Laist 1997 (I/E); Cliff et al. 2002 (I); Ceccarelli 2009 (I)
	Great white shark	*Carcharodon carcharias*	Indian Ocean	1	1	Ryan in: Laist 1997 (I/E); Cliff et al. 2002 (I/E)
	Basking shark	*Cetorhinus maximus*	North Atlantic	1	0	Anonymus 2007, 2013 (E)
	Shortfin mako shark	*Isurus oxyrinchus*	Indian Ocean, North Pacific, South Atlantic	1	1	Ryan in: Laist 1997 (I); Cliff et al. 2002 (I); Wegner and Cartamil 2012 (E)
	Salmon shark	*Lamna ditropis*	South Atlantic	1	0	Ryan in: Laist 1997 (E)

	Porbeagle shark	*Lamna nasus*	North Atlantic	1	1	Lucas 1992 (E); Joyce et al. 2002 (I)
Charcharhiniformes						
	Grey reef shark	*Carcharhinus amblyrhynchos*	Indian Ocean, South Pacific	1	0	Ceccarelli 2009 (E)
	Copper shark	*Carcharhinus brachyurus*	Indian Ocean, Atlantic Ocean	1	1	Ryan in: Laist 1997 (E); Cliff et al. 2002 (I/E)
	Spinner shark	*Carcharhinus brevipinna*	Indian Ocean; South Atlantic	1	0	Ryan in: Laist 1997 (E); Cliff et al. 2002 (E)
	Bull shark	*Carcharhinus leucas*	Indian Ocean	1	1	Cliff et al. 2002 (I/E)
	Blacktip shark	*Carcharhinus limbatus*	Indian Ocean, South Atlantic	1	1	Ryan in: Laist 1997 (E); Cliff et al. 2002 (I/E)
	Black-tip reef shark	*Carcharhinus melanopterus*	Indian Ocean, South Pacific	1	0	Ceccarelli 2009 (E)
	Dusky shark	*Carcharhinus obscurus*	Indian Ocean, South Pacific, South Atlantic	1	1	Stevens 1984 (E); Ryan in: Laist 1997 (I/E); Misaki 1999 (E); Cliff et al. 2002 (I/E)
	Sandbar shark	*Carcharhinus plumbeus*	Indian Ocean, South Atlantic	1	0	Ryan in: Laist 1997 (E); Cliff et al. 2002 (E)
	Tiger shark	*Galeocerdo cuvier*	Indian Ocean, South Pacific, South Atlantic	1	1	Stevens and McLoughlin 1991 (I); Randall 1992 (I); Ryan in: Laist 1997 (I/E); Simpfendorfer et al. 2001 (I); Cliff et al. 2002 (I/E)
	Blue shark	*Prionace glauca*	South Atlantic	1	0	Montealegre-Quijano and Vooren 2010 (E)
	Brazilian sharpnose sharks	*Rhizoprionodon lalandii*	South Atlantic	1	0	Sazima et al. 2002 (E)
	Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	North Atlantic	0	1	Delorenzo et al. 2014 (I)
	Scalloped hammerhead	*Sphyrna lewini*	Indian Ocean, South Atlantic	0	1	Ryan in: Laist 1997 (E); Cliff et al. 2002 (I/E)
	Smooth hammerhead	*Sphyrna zygaena*	Indian Ocean, South Atlantic	0	1	Ryan in: Laist 1997 (E); Cliff et al. 2002 (I/E)
Squaliformes						
	Velvet belly	*Etmopterus spinax*	Mediterranean Sea	0	1	Anastasopoulou et al. 2013 (I)
	Greenland shark	*Somniosus microcephalus*	North Atlantic	0	1	Nielsen et al. 2014 (I)
	Picked dogfish/ Spiny dogfish shark	*Squalus acanthias*	North Atlantic	1	0	Carr et al. 1985 (E); Carr 1986 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Longnose spurdog	*Squalus blainville*	Mediterranean Sea	0	1	Anastasopoulou et al. 2013 (I)
Myliobatiformes						
	Estuary sting ray	*Dasyatis fluviorum*	Indian Ocean, South Pacific	1	0	Ceccarelli 2009 (E)
	Manta ray	*Manta birostris*	Indian Ocean, South Pacific	1	0	Ceccarelli 2009 (E)

	Pelagic stingray	*Pteroplatytrygon violacea*	Mediterranean Sea	0	1	Anastasopoulou et al. 2013 (I)
Holocephali (Chimaeres)						
Chimaeriformes						
	Spotted ratfish	*Hydrolagus colliei*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
Actinopterygii (Ray-finned fishes)						
Amiiformes						
	Bowfin	*Amia calva*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Anguilliformes						
	American eel	*Anguilla rostrata*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Clupeiformes						
	Gulf menhaden	*Brevoortia patronus*	North Atlantic	0	1	Govoni in: Hoss and Settle 1990 (I)
	Atlantic menhaden	*Brevoortia tyrannus*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
	Herring	*Clupea harengus*	North Atlantic, North Pacific	1	1	Carpenter et al. 1972 (I); Day 1988 (I); Breen 1990 (E); Foekema et al. 2013 (I)
Siluriformes						
	Hardhead catfish	Ariopsis felis	North Atlantic	1	0	Anderson and Alford 2014 (E)
	Catfish	*Cathorops agassizii*	South Atlantic	1	1	Possatto et al. 2011 (I), May 2006 in: Possatto et al. 2011 (E)
	Catfish	*Sciades herzbergii*	South Atlantic	0	1	Possatto et al. 2011 (I)
	Catfish	*Cathorops spixii*	South Atlantic	0	1	Possatto et al. 2011 (I)
Osmeriformes						
	Capelin/Candlefish	*Mallotus villosus*	North Pacific	1	0	Stevens et al. 2000 (E)
Salmoniformes						
	Pink salmon	*Oncorhynchus gorbuscha*	North Pacific	0	1	Day 1988 (I)
	Chum salmon	*Oncorhynchus keta*	North Pacific	1	0	DeGange and Newby 1980 (E)
	Coho salmon	*Oncorhynchus kisutch*	North Pacific	1	0	DeGange and Newby 1980 (E)
	Sockeye salmon	*Oncorhynchus nerka*	North Pacific	1	0	Good et al. 2010 (E)
	Chinook salmon	*Oncorhynchus tshawytscha*	North Pacific	1	0	Good et al. 2010 (E)
Stomiiformes						
	Pacific blackdragon	*Idiacanthus antrostomus*	North Pacific	0	1	Davison and Asch 2011 (I)
	Diaphanous hatchet fish	*Sternoptyx diaphana*	North Pacific	0	1	Davison and Asch 2011 (I)
	Highlight hatchetfish	*Sternoptyx pseudobscura*	North Pacific	0	1	Davison and Asch 2011 (I)
Aulopiformes						
	Longnose lancetfish	*Alepisaurus ferox*	North Pacific	0	1	Kubota 1990 (I); Fujieda et al. 2008 (I); Choy and Drazen 2013 (I); Jantz et al. 2013 (I)
Myctophiformes						
	Andre's lanternfish	*Centrobranchus andreae*	North Pacific	0	1	Van Noord 2013 (I)
	Andersen's lantern fish	*Diaphus anderseni*	North Pacific	0	1	Davison and Asch 2011 (I)
		Diaphus fulgens	North Pacific	0	1	Davison and Asch 2011 (I)

	Bolin's lantern fish	*Diaphus phillipsi*	North Pacific	0	1	Davison and Asch 2011 (I)
	Reinhardt's lantern fish	*Hygophum reinhardtii*	North Pacific	0	1	Boerger et al. 2010 (I)
	Cocco's lantern fish	*Lobianchia gemellarii*	North Pacific	0	1	Davison and Asch 2011 (I)
		Loweina interrupta	North Pacific	0	1	Boerger et al. 2010 (I)
	Golden lanternfish	*Myctophum aurolaternatum*	North Pacific	0	1	Boerger et al. 2010 (I)
		Myctophum lychnobium	North Pacific	0	1	Van Noord 2013 (I)
	Pearly lanternfish	*Myctophum nitidulum*	North Pacific	0	1	Davison and Asch 2011 (I)
	Bigfin lanternfish	*Symbolophorus californiensis*	North Pacific	0	1	Boerger et al. 2010 (I)
	Evermann's lantern fish	*Symbolophorus evermanni*	North Pacific	0	1	Van Noord 2013 (I)
Lampriformes						
	Southern opah	*Lampris immaculatus*	South Pacific	0	1	Jackson et al. 2000 (I)
	Big-eye moonfish/ opah	*Lampris sp*	North Pacific	0	1	Choy and Drazen 2013 (I)
	Small-eye moonfish/ opah	*Lampris sp*	North Pacific	0	1	Choy and Drazen 2013 (I)
Gadiformes						
	Five-beard rockling	*Ciliata mustela*	North Atlantic	0	1	Kartar et al. 1973 (I)
	Pacific cod	*Gadus macrocephalus*	North Pacific	1	0	High 1985 (E); Stevens et al. 2000 (E)
	Atlantic cod	*Gadus morhua*	North Atlantic	1	1	Carr et al. 1985 (E); Brothers 1989 (E); Anonymus 1975 in: Hoss and Settle 1990 (I); Lucas 1992 (E);Foekema et al. 2013 (I)
	Haddock	*Melanogrammus aeglefinus*	North Atlantic	0	1	Foekema et al. 2013 (I)
	Whiting	*Merlangius merlangus*	North Atlantic	0	1	Foekema et al. 2013 (I); Lusher et al. 2013 (I)
	Blue whiting	*Micromesistius poutassou*	North Atlantic	0	1	Anonymus 1975 in: Hoss and Settle 1990 (I); Lusher et al. 2013 (I)
	Pollack	*Pollachius virens*	North Atlantic	0	1	Carpenter et al. 1972 (I); Anonymus 1975 in Hoss and Settle 1990 (I); Day 1988 (I)
	Poor cod	*Trisopterus minutus*	North Atlantic	0	1	Lusher et al. 2013 (I)
Batrachoidiformes						
	Gulf Toadfish	*Opsanus beta*	North Atlantic	1	0	Anderson and Alford 2014 (E)
	Oyster Toadfish	*Opsanus tau*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Lophiiformes						
	American angler/ Goosefish	*Lophius americanus*	North Atlantic	0	1	Perry et al. 2013 (I)
Atheriniformes						
	Atlantic silverside	*Menidia menidia*	North Atlantic	0	1	Carpenter et al 1972 (I); Day 1988 (I)
Cyprinodontiformes						
	Striped killifish	*Fundulus majalis*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Beloniformes						
	Pacific saury	*Cololabis saira*	North Pacific	0	1	Boerger et al. 2010 (I)
Zeiformes						
	John Dory	*Zeus faber*	North Atlantic	0	1	Lusher et al. 2013 (I)
Scorpaeniformes						

	Red gurnard	Chelidonichthys *cuculus*	North Atlantic	0	1	Lusher et al. 2013 (I)
	Grey gurnard	*Eutrigla gurnardus*	North Atlantic	0	1	Foekema et al. 2013 (I)
	Red irish lord	*Hemilepidotus hemilepidotus*	North Pacific	1	0	Good et al. 2010 (E)
	Yellow irish lord	*Hemilepidotus jordani*	North Pacific	1	0	Stevens et al. 2000 (E)
	Sea raven	*Hemitripterus americanus*	North Atlantic	1	0	Carr 1986 (E)
	Kelp greenling	*Hexagrammos decagrammus*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Longfin sculpin	*Jordania zonope*	North Pacific	1	0	Good et al. 2010 (E)
	Striped seasnail	*Liparis liparis*	North Atlantic	0	1	Kartar et al. 1973 (I)
	Grubby	*Myoxocephalus aenaeus*	North Atlantic	0	1	Carpenter et al. 1972 (I); Day 1988 (I)
	Great sculpin	*Myoxocephalus polyacanthocephalus*	North Pacific	1	0	Good et al. 2010 (E)
	Sailfin sculpin	*Nautichthys oculofasciatus*	North Pacific	1	0	Good et al. 2010 (E)
	Pacific staghorn sculpin	*Leptocottus armatus*	North Pacific	1	0	Good et al. 2010 (E)
	Lingcod	*Ophiodon elongatus*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Sea robin	*Prionotus evolans*	North Atlantic	0	1	Carpenter et al. 1972 (I); Day 1988 (I)
	Small red scorpionfish	*Scorpaena notata*	Mediterranean Sea	1	0	Houard et al. 2012 (E)
	Black scorpionfish	*Scorpaena porcus*	Mediterranean Sea	1	0	Houard et al. 2012 (E)
	Red scorpionfish	*Scorpaena scrofa*	Mediterranean Sea	1	0	Houard et al. 2012 (E)
	Cabezon	*Scorpaenichthys marmoratus*	North Pacific	1	0	Good et al. 2010 (E)
	Rougheye rockfish	*Sebastes aleutianus*	North Pacific	1	0	Stevens et al. 2000 (E)
	Copper rockfish	*Sebastes caurinus*	North Pacific	1	0	Good et al. 2010 (E)
	Quillback rockfish	*Sebastes maliger*	North Pacific	1	0	Good et al. 2010 (E)
	Black rockfish	*Sebastes melanops*	North Pacific	1	0	Good et al. 2010 (E)
	Pudget Sound rockfish	*Sebastes emphaeus*	North Pacific	1	0	Good et al. 2010 (E)
Perciformes						
	Wahoo	*Acanthocybium solandri*	North Atlantic	0	1	Manooch and Hogarth 1983 (I)
	Sheepshead	*Archosargus probatocephalus*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E); Anderson and Alford 2014 (E)
	Northern stargazer	*Astroscopus guttatus*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
	Silver perch	*Bairdiella chrysoura*	North Atlantic	1	0	Anderson and Alford 2014 (E)
	Dragonet	*Callionymus lyra*	North Atlantic	0	1	Lusher et al. 2013 (I)
	Fat snook	*Centropomus parallelus*	South Atlantic	0	1	De Tarso Chaves 2010 (I)
	Black Seabass	*Centropristis striata*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
	Redband fish	*Cepola macrophthalma*	North Atlantic	0	1	Lusher et al. 2013 (I)
	Atlantic spadefish	*Chaetodipterus faber*	North Atlantic	1	0	Anderson and Alford 2014 (E); Bilkovic et al. 2014 (E)
	Common dolphinfish	*Coryphaena hippurus*	North Pacific	0	1	Choy and Drazen 2013 (I)
	Caitipa mojarra	*Diapterus rhombeus*	South Pacific	0	1	Ramos et al. 2012 (I)
	Flagfin mojarra	*Eucinostomus melanopterus*	South Pacific	0	1	Ramos et al. 2012 (I)

Brazilian mojarra	*Eugerres brasilianus*	South Pacific	0	1	Ramos et al. 2012 (I)
Little tunny	*Euthynnus alletteratus*	North Atlantic	0	1	Manooch et al. 1985 (I)
Snake mackerel	*Gempylus serpens*	North Pacific	0	1	Choy and Drazen 2013 (I)
Sand goby	*Gobius minutus*	North Atlantic	0	1	Kartar et al. 1973 (I); Day 1988 (I)
Feather blenny	*Hypsoblennius hentz*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Ragfish	*Icosteus aenigmaticus*	North Pacific	1	0	DeGange and Newby 1980 (E)
Black marlin	*Istiompax indica*	Indian Ocean	0	1	Fujieda et al. 2008 (I)
Pinfish	*Lagodon rhomboides*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Spot	*Leiostomus xanthurus*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Atlantic croacker	*Micropogonias undulatus*	North Atlantic	1	1	Govoni in: Hoss and Settle 1990 (I); Havens et al. 2011 (E); Anderson and Alford 2014 (E); Bilkovic et al. 2014 (E)
White perch	*Morone americana*	North Atlantic	0	1	Carpenter et al. 1972 (I); Day 1988 (I); Bilkovic et al. 2014 (E)
Striped bass	*Morone saxatilis*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Pigfish	*Orthopristis chrysoptera*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Axillary bream	*Pagellus acarne*	North Atlantic	1	0	Barreiros and Guerreiro 2014 (E)
Blackspot red seabream	*Pagellus bogaraveo*	Mediterranean Sea	0	1	Anastasopoulou et al. 2013 (I)
Butterfish	*Peprilus triacanthus*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Black drum	*Pogonias cromis*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Bluefish	*Pomatomus saltatrix*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Red Drum	*Sciaenops ocellatus*	North Atlantic	1	0	Havens et al. 2011 (E); Anderson and Alford 2014 (E); Bilkovic et al. 2014 (E)
Atlantic Mackerel	*Scomber scombrus*	North Atlantic	0	1	Foekema et al. 2013 (I)
Yellowtail fish	*Seriola lalandi*	North Pacific	0	1	Gassel et al. 2013 (I)
	Stellifer brasiliensis	South Pacific	0	1	Dantas et al. 2012 (I)
Little croaker	*Stellifer stellifer*	South Pacific	0	1	Dantas et al. 2012 (I)
Scup	*Stenotomus chrysops*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
Cunner	*Tautogolabrus adspersus*	North Atlantic	1	1	Carpenter et al. 1972 (I); Kartar et al. 1973 (I); Day 1988 (I); Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Tautog	*Tautoga onitis*	North Atlantic	1	0	Carr et al. 1985 (E); Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Albacore tuna	*Thunnus alalunga*	North Atlantic	0	1	Rogan and Mackey 2007 (I)
Blackfin tuna	*Thunnus albacares*	not noted	0	1	Manooch and Manson 1983 (I)
Yellowfin tuna	*Thunnus atlanticus*	not noted	0	1	Manooch and Manson 1983 (I)
Southern bluefin tuna	*Thunnus maccoyii*	South Pacific	0	1	Young et al. 1997 (I)
Bigeye tuna	*Thunnus obesus*	North Pacific	0	1	Choy and Drazen 2013 (I)
Bluefin tuna	*Thunnus thynnus*	North Atlantic	0	1	Butler et al. 2014 (I)
Atlantic horse mackerel	*Trachurus trachurus*	North Atlantic	0	1	Foekema et al. 2013 (I)
Ribbonfish	*Trichiurus lepturus*	South Atlantic	0	1	Di Beneditto and Awabdi 2014 (I)
Broadbill swordfish	*Xiphias gladius*	North Pacific	0	1	Choy and Drazen 2013 (I)

Pleuronectiformes						
	Arrowtooth flounder	*Atheresthes stomias*	North Pacific	1	0	Stevens et al. 2000 (E)
	Solenette	*Buglossidium luteum*	North Atlantic	0	1	Lusher et al. 2013 (I)
	Witch flounder / greysole	*Glyptocephalus cynoglossus*	North Atlantic	1	0	Brothers 1989 (E)
	Flathead sole	*Hippoglossoides elassodon*	North Pacific	1	0	Stevens et al. 2000 (E)
	American plaice	*Hippoglossoides platessoides*	North Atlantic	1	0	Brothers 1989 (E)
	Pacific halibut	*Hippoglossus stenolepis*	North Pacific	1	0	High and Worlund 1979 (E)
	Slender sole	*Lyopsetta exilis*	North Pacific	1	0	Good et al. 2010 (E)
	Thickback sole	*Microchirus variegatus*	North Atlantic	0	1	Lusher et al. 2013 (I)
	English sole	*Parophrys vetulus*	North Pacific	1	0	Good et al. 2010 (E)
	Southern flounder	*Paralichthys lethostigma*	North Atlantic	1	0	Anderson and Alford 2014 (E)
	European flounder	*Platichthys flesus*	North Atlantic	0	1	Kartar et al. 1973 (I); Day 1988 (I)
	Starry flounder	*Platichthys stellatus*	North Pacific	1	0	Good et al. 2010 (E)
	Winter flounder	*Pseudopleuronectes americanus*	North Atlantic	1	1	Carpenter et al. 1972 (I); Carr et al. 1985 (E); Day 1988 (I)
	Hogchoker	*Trinectes maculatus*	North Atlantic	1	0	Havens et al. 2011 (E); Bilkovic et al. 2014 (E)
Tetraodontiformes						
	Striped burrfish	*Chilomycterus schoepfii*	North Atlantic	1	0	Bilkovic et al. 2014 (E)
	Northern puffer	*Sphoeroides maculatus*	North Atlantic	1	0	Havens et al. 2011 (E)
			Invertebrates			
Crustacea						
	Red fur crab	*Acantholithodes hispidus*	North Pacific	1	0	Good et al. 2010 (E)
	Giant barnacle	*Balanus nubilus*	North Pacific	1	0	Good et al. 2010 (E)
	Northern cancer crab	*Cancer borealis*	North Atlantic	1	0	Carr et al. 1985 (E); Carr 1986 (E)
	Red rock crab	*Cancer productus*	North Pacific	1	0	High 1985 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Blue crab	*Callinectes sapidus*	North Atlantic	1	0	Havens et al. 2011 (E); Anderson and Alford 2014 (E)
	Convex crab	*Carpilius convexus*	North Pacific	1	0	Donohue et al. 2001 (E)
	Violet-eyed swimming crab	*Carupa tenuipes*	North Pacific	1	0	Donohue et al. 2001 (E)
	Tanner crab	*Chionoecetes bairdi*	North Pacific	1	0	Kimker 1994 (E); Stevens et al. 2000 (E)
	Longhorn decorator crab	*Chorilia longipes*	North Pacific	1	0	Good et al. 2010 (E)
	Butterfly crab	*Cryptolithodes typicus*	North Pacific	1	0	Good et al. 2010 (E)
	Jeweled anemone crab	*Dardanus gemmatus*	North Pacific	1	0	Donohue et al. 2001 (E)
	Red reef lobster	*Enoplometopus occidentalis*	North Pacific	1	0	Donohue et al. 2001 (E)
		Eualus avinus	North Pacific	1	0	Gilardi et al. 2010 (E)
	Geryon crab	*Geryon trispinosus*	Mediterranean Sea	1	0	Ramirez-Llodra et al. 2011 (E)
	Hairy cancer crab	*Glebocarcinus oregonensis*	North Pacific	1	0	Good et al. 2010 (E)
	Hawaiian cave shrimp	*Gnathophyllum precipuum*	North Pacific	1	0	Donohue et al. 2001 (E)

	Hairy lithodid	*Hapalogaster mertensii*	North Pacific	1	0	Good et al. 2010 (E)
	Purple shore crab	*Hemigrapsus nudus*	North Pacific	1	0	Good et al. 2010 (E)
	American lobster	*Homarus americanus*	North Atlantic	1	0	Carr et al. 1985 (E); Carr 1986 (E); Breen 1990 (E); Havens et al. 2011 (E)
	Lyre crab	*Hyas lyratus*	North Pacific	1	0	Stevens et al. 2000 (E)
	Graceful crab	Metacarcinus *gracilis*	North Pacific	1	0	Good et al. 2010 (E)
	Dungeness crab	Metacarcinus *magister*	North Pacific	1	0	High 1976, 1985 (E); Breen 1987 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E); Antonelis et al. 2011 (E)
	Gooseneck barnacle	*Lepas anatifera*	North Pacific	0	1	Goldstein and Goodwin 2013 (I)
	Gooseneck barnacle	*Lepas pacifica*	North Pacific	0	1	Goldstein and Goodwin 2013 (I)
	Knotted liomera	*Liomera supernodosa*	North Pacific	1	0	Donohue et al. 2001 (E)
	Brown box crab	*Lopholithodes foraminatus*	North Pacific	1	0	Good et al. 2010 (E)
	Pudget Sound king crab	*Lopholithodes mandtii*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
	European spider crab	*Maja squinado*	Mediterranean Sea	1	0	Houard et al. 2012 (E)
	Stone crab	*Menippe adina*	North Atlantic	1	0	Anderson and Alford 2014 (E)
	Velvet swimming crab	*Necora puber*	North Atlantic	1	0	Kaiser et al 1996 (E)
	Squat lobster	*Munida quadrispina*	North Pacific	1	0	Good et al. 2010 (E)
	Norway lobster	*Nephrops norvegicus*	North Atlantic, Mediterranean Sea	0	1	Cristo and Cartes 1998 (I); Wieczorek et al. 1999 (I); Murray and Cowie 2011 (I)
	Granular claw crab	*Oedignathus inermis*	North Pacific	1	0	Good et al. 2010 (E)
	Decorator crab	*Oregonia gracilis*	North Pacific	1	0	Stevens et al. 2000 (E)
	Signal crayfish	*Pacifastacus leniusculus*	North Pacific	1	0	Good et al. 2010 (E)
	Black-eyed hermit crab	*Pagurus armatus*	North Pacific	1	0	Good et al. 2010 (E)
	Hairy hermit crab	*Pagurus hirsutiusculus*	North Pacific	1	0	Good et al. 2010 (E)
	Spot shrimp	*Pandalus platyceros*	North Pacific	1	0	Good et al. 2010 (E)
	Red king crab	*Paralithodes camtschaticus*	North Pacific	1	0	High and Worlund 1979 (E); High 1985 (E); Stevens et al. 2000 (E)
	Heart crab	*Phyllolithodes papillosus*	North Pacific	1	0	Good et al. 2010 (E)
	Areolated xanthid crab	*Pilodius areolatus*	North Pacific	1	0	Donohue et al. 2001 (E)
	Scaly lithodid	*Placetron wosnessenskii*	North Pacific	1	0	Good et al. 2010 (E)
	Slender kelp crab	*Pugettia gracilis*	North Pacific	1	0	Good et al. 2010 (E)
	Kelp crab	*Pugettia producta*	North Pacific	1	0	High 1985 (E); Stevens et al. 2000 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Cryptic kelp crab	*Pugettia richii*	North Pacific	1	0	Good et al. 2010 (E)
	Golfball crab	*Rhinolithodes wosnessenskii*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Marbled shrimp	*Saron marmoratus*	North Pacific	1	0	Donohue et al. 2001 (E)
	Sharpnose crab	*Scyra acutifrons*	North Pacific	1	0	Good et al. 2010 (E)
	Helmet crab	*Telmessus cheiragonus*	North Pacific	1	0	Good et al. 2010 (E)
Echinodermata						

	Orange sea cucumber	*Cucumaria miniata*	North Pacific	1	0	Good et al. 2010 (E)
	Sea urchin	*Cidaris cidaris*	North Atlantic	1	0	Mordecai et al. 2011 (E)
	Rose star	*Crossaster papposus*	North Pacific	1	0	Good et al. 2010 (E)
	Mottled star	*Evasterias troschelii*	North Pacific	1	0	Stevens et al. 2000 (E); Good et al. 2010 (E)
	Gunpowder star	*Gephyreaster swifti*	North Pacific	1	0	Good et al. 2010 (E)
	Basket star	*Gorgonocephalus* eucnemis	North Pacific	1	0	Stevens et al. 2000 (E)
	Blood star	*Henricia leviuscula*	North Pacific	1	0	Good et al. 2010 (E)
	Fat henricia	*Henricia sanguinolenta*	North Pacific	1	0	Good et al. 2010 (E)
	Spiny mud star	*Luidia foliolata*	North Pacific	1	0	Good et al. 2010 (E)
	Vermilion sea star	*Mediaster aequalis*	North Pacific	1	0	Good et al. 2010 (E)
	Red sea urchin	*Mesocentrotus franciscanus*	North Pacific	1	0	Stevens et al. 2000 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Spiny brittle star	*Ophiocoma erinaceus*	North Pacific	1	0	Donohue et al. 2001 (E)
	Daisy brittle star	*Ophiopholis aculeata*	North Pacific	1	0	Good et al. 2010 (E)
	Painted star	*Orthasterias koehleri*	North Pacific	1	0	Good et al. 2010 (E)
	California sea cucumber	Parastichopus *californicus*	North Pacific	1	0	Good et al. 2010 (E)
	Spiny pink star	*Pisaster brevispinus*	North Pacific	1	0	Good et al. 2010 (E)
	Sunflower star	*Pycnopodia helianthoides*	North Pacific	1	0	Stevens et al. 2000 (E); Good et al. 2010 (E)
	Striped sunstar	*Solaster stimpsoni*	North Pacific	1	0	Good et al. 2010 (E)
	Great/Green sea urchin	*Strongylocentrotus droebachiensis*	North Pacific	1	0	Stevens et al. 2000 (E); Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Purple sea urchin	*Strongylocentrotus purpuratus*	North Pacific	1	0	Good et al. 2010 (E)
	Long ray star	*Stylasterias forreri*	North Pacific	1	0	Good et al. 2010 (E)
Mollusca						
Polyplacophora						
	Giant Pacific chiton	*Cryptochiton stelleri*	North Pacific	1	0	Good et al. 2010 (E)
Gastropoda						
	Hudson's dorid	*Acanthodoris hudsoni*	North Pacific	1	0	Good et al. 2010 (E)
	Yellow margin dorid	*Cadlina luteomarginata*	North Pacific	1	0	Good et al. 2010 (E)
	Leafy hornmouth	*Ceratostoma foliatum*	North Pacific	1	0	Good et al. 2010 (E)
	Hairy/Oregon triton	*Fusitriton oregonensis*	North Pacific	1	0	Stevens et al. 2000 (E); Good et al. 2010 (E)
	Northern abalone	*Haliotis kamtschatkana*	North Pacific	1	0	Gilardi et al. 2010 (E); Good et al. 2010 (E)
	Ribbed neptune	*Neptunea lyrata*	North Pacific	1	0	Stevens et al. 2000 (E)
	Moon snail	*Neverita lewisii*	North Pacific	1	0	Good et al. 2010 (E)
	Dogwinkle	*Nucella lamellosa*	North Pacific	1	0	Stevens et al. 2000 (E)
	Rapa whelk	*Rapana venosa*	North Atlantic	1	0	Havens et al. 2011 (E)
	Clown dorid	*Triopha catalinae*	North Pacific	1	0	Good et al. 2010 (E)
Cephalopoda						

	Giant Pacific octopus	Enteroctopus dofleini	North Pacific	1	0	Stevens et al. 2000 (E)
	Flying squid	*Ommastrephes bartramii*	North Pacific	0	1	Day 1988 (I)
	Deepwater squid	*Onykia s ingens*	South Atlantic	0	1	Jackson et al. 2000 (I)
Bivalvia						
clams, oysters, scallops, geoduck, mussel	Hind's/Smooth pink scallop	*Chlamys rubida*	North Pacific	1	0	Stevens et al. 2000 (E); Good et al. 2010 (E)
	Nuttall's cockle	*Clinocardium nuttallii*	North Pacific	1	0	Good et al. 2010 (E)
	Rock scallop	*Crassadoma gigantea*	North Pacific	1	0	Good et al. 2010 (E)
	Pacific oyster	*Crassostrea gigas*	North Pacific	1	0	Good et al. 2010 (E)
	Pacific littleneck clam	*Leukoma staminea*	North Pacific	1	0	Good et al. 2010 (E)
	Bent nose macoma	*Macoma nasuta*	North Pacific	1	0	Good et al. 2010 (E)
	Blunt gaper	*Mya truncata*	North Pacific	1	0	Good et al. 2010 (E)
	Mussel	*Mytilus galloprovincialis*	Mediterranean Sea	0	1	Galimany et al. 2009 (I)
	Blue mussel	*Mytilus trossulus*	North Pacific	1	0	Stevens et al. 2000 (E); Good et al. 2010 (E)
	Geoduck clam	*Panopea abrupta*	North Pacific	1	0	Good et al. 2010 (E)
	Green false-jingle	*Pododesmus macrochisma*	North Pacific	1	0	Good et al. 2010 (E)
	Manila clam	*Ruditapes philippinarum*	North Pacific	1	0	Good et al. 2010 (E)
	Butter clam	*Saxidomus gigantea*	North Pacific	1	0	Good et al. 2010 (E)
	Common lampshell	*Terebratalia transversa*	North Pacific	1	0	Good et al. 2010 (E)

Online Supplement 2: Appendix on smothered sedentary species of marine life, provided by Melanie Bergmann

Order	Common name	Scientific name	Region	Disturbance (effect)	Sources
Plantae (plants)	Saltmarsh cordgrass	*Spartina alterniflora*	North Atlantic	Shading, crushing	Uhrin and Schellinger 2011; Viehman et al. 2011
	Black rush	*Juncus roemerianus*	North Atlantic	Shading, crushing	Viehman et al. 2011
	Manatee grass	*Syringodium filiforme*	South Atlantic	Decreased shoot densities, injury, necrosis	Uhrin et al. 2005
	Turtle grass	*Thalassia testudinum*	South Atlantic	Decreased shoot densities, injury, necrosis	Uhrin et al. 2005
Porifera (sponges)		*Cladorhiza gelida*	Arctic Ocean	Coverage	Bergmann and Klages 2012
		Caulophacus arcticus	Arctic Ocean	Coverage	Bergmann and Klages 2012
Cnidaria (corals)	Whip coral	*Viminella flagellum*	North Atlantic	Smothering	Pham et al. 2013
		Dentomuricea cf. *meteor*	North Atlantic	Smothering, damage	Pham et al. 2013
	Knobby zoanthid	*Palythoa mammillosa*	South Atlantic	Smothering, tissue abrasion, colony mortality	Chiappone et al. 2005
	Sea ginger	*Millepora alcicornis*	South Atlantic	Smothering, tissue abrasion, colony mortality	Chiappone et al. 2005
	Blade fire coral	*Millepora complanata*	South Atlantic	Smothering, tissue abrasion, colony mortality	Chiappone et al. 2005
	Cauliflower coral	*Pocillopora meandrina*	South Atlantic	Smothering, mortality	Yoshikawa and Asoh 2004
	Solid table coral	*Acropora clathrata*	South Indian Ocean	Damage, vector for algal overgrowth, mortality	Schleyer and Tomalin 2000
	Hyacinth table coral	*Acropora hyacinthus*	South Indian Ocean	Damage, vector for algal overgrowth, mortality	Schleyer and Tomalin 2000
	Cold-water coral	*Lophelia pertusa*	Mediterranean Sea	Smothering, necrosis	Fabri et al. 2014
	Zigzag coral	*Madrepora oculata*	Mediterranean Sea	Smothering	Fabri et al. 2014
		Callogorgia verticillata	Mediterranean Sea	Smothering, damage	Fabri et al. 2014
		Funiculina quadrangularis	Mediterranean Sea	Smothering	Fabri et al. 2014
	Bamboo coral	*Isidella elongata*	Mediterranean Sea	Smothering	Fabri et al. 2014
		Dendronephthya australis	South Pacific	Sport fishing line	Smith and Edgar 2014
Mollusca	Ribbed dog whelk	*Nassarius pullus*	North Pacific	Smothering alters feeding behaviour	Aloy et al. 2011
Crustacea		*Neohelice granulata*	South Atlantic	Litter in crab burrows	Iribarne et al. 2000

References

Acampora, H., Schuyler, Q.A., Townsend, K.A., Hardesty, B.D. (2014). Comparing Plastic Ingestion in Juvenile and Adult Stranded Short-Tailed Shearwaters (*Puffinus tenuirostris*) in Eastern Australia. Marine Pollution Bulletin 78, 63-68.

Adey, J., Smith, I., Atkinson, R., Tuck, I., Taylor, A. (2008). Ghost Fishing'of Target and Non-Target Species by Norway Lobster *Nephrops norvegicus* Creels. Marine Ecological Progress Series 366, 119-127.

Adimey, N.M., Hudak, C.A., Powell, J.R., Bassos-Hull, K., Foley, A., Farmer, N.A., White, L., Minch, K. (2014). Fishery Gear Interactions from Stranded Bottlenose Dolphins, Florida Manatees and Sea Turtles in Florida, USA. Marine Pollution Bulletin 81, 103-115.

Afelin, C., Puleloa, B. (1982). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 7, 13.

Ainley, D.G., Fraser, W.R., Spear, L.B. (1990a). The Incidence of Plastic in the Diets of Antarctic Seabirds, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 682-691.

Ainley, D.G., Spear, L.B., Ribic, C.A. (1990b). The Incidence of Plastic in the Diets of Pelagic Seabirds in the Eastern Equatorial Pacific Region, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 653-665.

Allen, R., Jarvis, D., Sayer, S., Mills, C. (2012). Entanglement of grey seals *Halichoerus grypus* at a haul out site in Cornwall, UK. Marine Pollution Bulletin, 64(12), 2815-2819. doi: 10.1016/j.marpolbul.2012.09.005

Al-Masroori, H., Al-Oufi, H., McIlwain, J., McLean, E. (2004). Catches of Lost Fish Traps (Ghost Fishing) from Fishing Grounds near Muscat, Sultanate of Oman. Fisheries Research 69, 407-414.

Aloy, A.B., Vallejo Jr, B.M., Juinio-Meñez, M.A. (2011). Increased plastic litter cover affects the foraging activity of the sandy intertidal gastropod *Nassarius pullus*. Marine Pollution Bulletin 62, 1772-1779 doi http://dx.doi.org/10.1016/j.marpolbul.2011.05.021

Anastasopoulou, A., Mytilineou, C., Smith, C.J., Papadopoulou, K.N. (2013). Plastic Debris Ingested by Deep-Water Fish of the Ionian Sea (Eastern Mediterranean). Deep Sea Research Part I: Oceanographic Research Papers 74, 11-13

Anderson, J.A., Alford, A.B. (2014). Ghost Fishing Activity in Derelict Blue Crab Traps in Louisiana. Marine Pollution Bulletin 79, 261-267.

Anderson, D.J., Huyvaert, K.P., Awkerman, J.A., Proaño, C.B., Milstead, W.B., Jiménez-Uzcátegui, G., Cruz, S., Grace, J.K. (2008). Population Status of the Critically Endangered Waved Albatross *Phoebastria irrorata*, 1999 to 2007. Endangered Species Research 5, 185-192.

Anonymus (2007, July). Divers enjoy the company of basking sharks in Kerry! Update. Irish Whale and Dolphin Society. Retrieved June 20, 2014 from http://www.iwdg.ie/index.php?option=com_k2&view=item&id=1433:divers-enjoy-the-company-of-basking-sharks-in-kerry!....update.

Anonymus (2013, November) Basking sharks Injured by Marine Debris. Basking shark Scotland. Retrieved June 19, 2014 from http://baskingsharkscotland.co.uk/basking-sharks-injured-by-marine-debris/.

Antonelis, K., Huppert, D., Velasquez, D., June, J. (2011). Dungeness Crab Mortality Due to Lost Traps and a Cost–Benefit Analysis of Trap Removal in Washington State Waters of the Salish Sea. North American Journal of Fisheries Management 31, 880-893.

Arbelo, M., de los Monteros, A.E., Herráez, P., Andrada, M., Sierra, E., Rodríguez, F., Jepson, P.D., Fernández, A. (2013). Pathology and Causes of Death of Stranded Cetaceans in the Canary Islands (1999–2005). Diseases of Aquatic Organisms 103, 87-99.

Arnould, J.P.Y., Croxall, J.P. (1995). Trends in Entanglement of Antarctic Fur Seals (*Arctocephalus gazella*) in Man-Made Debris at South Georgia. Marine Pollution Bulletin 30, 707-712.

Auman, H.J., Ludwig, J.P., Giesy, J.P., Colborn, T. (1997). Plastic Ingestion by Laysan Albatross Chicks on Sand Island, Midway Atoll, in 1994 and 1995, in: Robinson, G., Gales, R. (Eds.), Albatross Biology and Conservation. Surrey Beatty and Sons, Chipping Norton.

Auman, H.J., Woehler, E.J., Riddle, M.J., Burton, H. (2004). First Evidence of Ingestion of Plastic Debris by Seabirds at Sub-Antarctic Heard Island. Marine Ornithology 32, 105-106.

Aurioles-Gamboa, D., García-Rodríguez, F., Ramírez-Rodríguez, M., Hernández-Camacho, C. (2003). Interacción Entre El Lobo Marino De California Y La Pesquería Artesanal En La Bahía De La Paz, Golfo De California, México. Interaction between the California Sea Lion and the Artisanal Fishery in La Paz Bay, Gulf of California, Mexico. Ciencias Marinas 29, 357-370.

Australian Government (2009). Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Marine Life May 2009, in: Department of the Environment, Heritage and the Arts (Ed.), Australia.

Avery-Gomm, S., O'Hara, P.D., Kleine, L., Bowes, V., Wilson, L.K., Barry, K.L. (2012). Northern Fulmars as Biological Monitors of Trends of Plastic Pollution in the Eastern North Pacific. Marine Pollution Bulletin 64, 1776-1781.

Avery-Gomm, S., Provencher, J.F., Morgan, K.H., Bertram, D.F. (2013). Plastic Ingestion in Marine-Associated Bird Species from the Eastern North Pacific. Marine Pollution Bulletin 72, 257-259.

Awabdi, D.R., Siciliano, S., Di Beneditto, A.P.M. (2013). Ingestão De Resíduos Sólidos Por Tartarugas-Verdes Juvenis, *Chelonia mydas* (L. 1758), Na Costa Leste Do Estado Do Rio De Janeiro, Brasil. Biotemas 26, 197-200.

Ayaz, A., Acarli, D., Altinagac, U., Ozekinci, U., Kara, A., Ozen, O. (2006). Ghost Fishing by Monofilament and Multifilament Gillnets in Izmir Bay, Turkey. Fisheries Research 79, 267-271.

Baba, N., Kiyota, M., Yoshida, K. (1990). Distribution of Marine Debris in Northern Fur Seals in the Eastern Bering Sea, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, 419-430.

Baeta, F., Costa, M.J., Cabral, H. (2009). Trammel Nets' Ghost Fishing Off the Portuguese Central Coast. Fisheries Research 98, 33-39.

Baird, R.W., Hooker, S.K. (2000). Ingestion of Plastic and Unusual Prey by a Juvenile Harbour Porpoise. Marine Pollution Bulletin 40, 719-720.

Balazs, G.H. (1978). A Hawksbill Turtle in Kanehoe Bay, Oahu. Elepaio 38, 128-129.

Balazs, G.H. (1980). Synopsis of Biological Data on the Green Turtle in the Hawaiian Islands. U.S. Department of Commerce, p. 141.

Balazs, G.H. (1983). Sea Turtles and Their Traditional Usage in Tokelau. Atoll Research Bulletin 279, 1-29.

Balazs, G.H. (1985). Impact of Ocean Debris on Marine Turtles: Entanglement and Ingestion, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 387-429.

Barbieri, E. (2009). Occurrence of Plastic Particles in Procellariiforms, South of São Paulo State (Brazil). Brazilian Archives of Biology and Technology 52, 341-348.

Baltz, D.M., Morejohn, G.V. (1976). Evidence from Seabirds and Plastic Partlicle Pollution Off Central California. Western Birds 7, 11-112.

Barreiros, J.P., Barcelos, J. (2001). Plastic Ingestion by a Leatherback Turtle, *Dermochelys coriacea*, from the Azores (NE Atlantic). Marine Pollution Bulletin 42, 1196-1197.

Barreiros, J.P., Guerreiro, O. (2014). Notes on a plastic debris collar on a juvenile *Pagellus acarne* (Perciformes: Sparidae) from Terceira Island, Azores, NE Atlantic. Bothalia–Pretoria 44, 2-5.

Barreiros, J.P., Raykov, V.S. (2014). Lethal lesions and amputation caused by plastic debris and fishing gear on the loggerhead turtle *Caretta caretta* (Linnaeus, 1758). Three case reports from Terceira Island, Azores (NE Atlantic). Marine Pollution Bulletin 86(1-2), 518-522. doi: 10.1016/j.marpolbul.2014.07.020

Barros, N.B., Odell, D.K., Patton, G.W. (1990). Ingestion of Plastic Debris by Stranded Marine Mammals from Florida, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, 746.

Barros, N.B., Gasparini, J.L., Barbosa, L.A., Netto, R.F., Moreaes, C.S. (1997). Ingestao De Plástico Como Provável Causa Mortis De Una Baleia-Pilto-De-Peitorais-Curtas, *Globicephala macrorhynchus* Gray, 1846 No Litoral Do Estado De Espírito Santo, Anais do 7o Congresso Nordestino de Ecologia, Ilhéus, Bahia, Brazil, 336.

Baulch, S., Perry, C. (2014). Evaluating the Impacts of Marine Debris on Cetaceans. Marine Pollution Bulletin 80, 210-221.

Baxter, A. (2009). Report on the Blue Whale Stranding Northwest Coast of the South Island, New Zealand, May 2009. Department of Conservation, Nelson, New Zealand.

Beck, C.A., Barros, N.B. (1991). The Impact of Debris on the Florida Manatee. Marine Pollution Bulletin 22, 508-510.

Below, T.H. (1979). First Report of Pellet Ejection in 11 Species. Wilson Bulletin 91, 626-628.

Bengston, J.L., Fowler, C.W., Kajimura, H., Merrick, R., Yoshida, K., Nomura, S. (1988). Fur Seal Entanglement Studies: Juvenile Males and Newly Weaned Pups, St. Paul Island, Alaska, in: Kozloff, P., Kajimura, H. (Eds.), Fur seal investigations 1985. Department of Commerce, NOAA, National Marine Fisheries Service, Washingeton, D.C., 34-57.

Bergmann, M., Klages, M. (2012). Increase of litter at the Arctic deep-sea observatory HAUSGARTEN. Marine Pollution Bulletin 64(12), 2734-2741. doi: 10.1016/j.marpolbul.2012.09.018

Berón, M.P., Favero, M. (2009). Mortality and Injuries of Olrog's Gull *Larus atlanticus* Individuals Associated with Sport Fishing Activities in Mar Chiquita Coastal Lagoon, Buenos Aires Province. El Hornero 24, 99-102.

Bester, A.J., Priddel, D., Klomp, N.I. (2010). Diet and Foraging Behaviour of the Providence Petrel *Pterodroma solandri*. Marine Ornithology 39, 163-172.

Bilkovic, D.M., Havens, K., Stanhope, D., Angstadt, K. (2014). Derelict Fishing Gear in Chesapeake Bay, Virginia: Spatial Patterns and Implications for Marine Fauna. Marine Pollution Bulletin 80, 114-123.

Bjørke, C.N. (2014, 1st August 2014). Her kjemper ryddegruppa mot en gigantisk not. 300 meter unna sitter en isbjern fast i en annen. Svalbardposten, 10-13.

Bjorndal, K.A., Bolten, A.B., Lagueux, C.J. (1994). Ingestion of Marine Debris by Juvenile Sea Turtles in Coastal Florida Habitats. Marine Pollution Bulletin 28, 154-158.

Blight, L.K., Burger, A.E. (1997). Occurence of Plastic Particles in Seabirds from the Eastern North Pacific. Marine Pollution Bulletin 34, 323-325.

Boerger, C.M., Lattin, G.L., Moore, S.L., Moore, C.J. (2010). Plastic Ingestion by Planktivorous Fishes in the North Pacific Central Gyre. Marine Pollution Bulletin 60, 2275-2278.

Bogomolni, A.L., Pugliares, K.R., Sharp, S.M., Patchett, K., Harry, C.T., LaRocque, J.M., Touhey, K.M., Moore, M.J. (2010). Mortality Trends of Stranded Marine Mammals on Cape Cod and Southeastern Massachusetts, USA, 2000 to 2006. Diseases of Aquatic Organisms 88, 143–155.

Boland, R.C., Donohue, M.J. (2003). Marine Debris Accumulation in the Nearshore Marine Habitat of the Endangered Hawaiian Monk Seal, *Monachus schauinslandi*, 1999–2001. Marine Pollution Bulletin 46, 1385-1394.

Bolten, A.B., Bjorndal, K.A. (1991). Effect of Marine Debris on Juvenile, Pelagic Sea Turtles. Interim Report to the National Marine Fisheries Service Marine Entanglement Research Program. Northwest and Alaska Fisheries Science Center, Seattle.

Bond, A.L., Jones, I.L., Williams, J.C., Byrd, G.V. (2010). Auklet (Charadriiformes: Alcidae, *Aethia* Spp.) Chick Meals from the Aleutian Islands, Alaska, have a Very Low Incidence of Plastic Marine Debris. Marine Pollution Bulletin 60, 1346-1349.

Bond, A.L., Montevecchi, W.A., Guse, N., Regular, P.M., Garthe, S., Rail, J.F. (2012). Prevalence and composition of fishing gear debris in the nests of northern gannets (*Morus bassanus*) are related to fishing effort. Marine Pollution Bulletin 64(5), 907-911. doi: 10.1016/j.marpolbul.2012.03.011

Bond, A.L., Provencher, J.F., Elliot, R.D., Ryan, P.C., Rowe, S., Jones, I.L., Robertson, G.J., Wilhelm, S.I. (2013). Ingestion of Plastic Marine Debris by Common and Thick-Billed Murres in the Northwestern Atlantic from 1985 to 2012. Marine Pollution Bulletin 77, 192-195.

Bonner, W.N., McCann, T.S. (1982). Neck Collars on Fur Seals, *Arctocephalus gazella*, at South Georgia. British Antarctic Survey Bulletin 57, 73-77.

Boren, L.J., Morrissey, M., Muller, C.G., Gemmell, N.J. (2006). Entanglement of New Zealand Fur Seals in Man-Made Debris at Kaikoura, New Zealand. Marine Pollution Bulletin 52, 442-446.

Bossart, G.D., Meisner, R.A., Rommel, S.A., Lightsey, J.D., Varela, R.A., Defran, R. (2004). Pathologic Findings in Florida Manatees (*Trichechus manatus latirostris*). Aquatic Mammals 30, 434-440.

Bossley, M. (2005). The Last Word: Tangled up in Blue. Nature Australia 28(80).

Bourne, W.R.P. (1976). Seabirds and Pollution. Academic Press, New York.

Bourne, W.R.P., Imber, M.J. (1982). Plastic Pellets Collected by a Prion on Gough Island, Central South Atlantic Ocean. Marine Pollution Bulletin 13, 20-21.

Braune, B.M., Gaskin, D.E. (1982). Feeding Ecology of Nonbreeding Populations of Lairds Off Deer Island, New Brunwick. The Auk 99, 67-76.

Bravo Rebolledo, E.L., Van Franeker, J.A., Jansen, O.E., Brasseur, S.M. (2013). Plastic Ingestion by Harbour Seals (*Phoca vitulina*) in the Netherlands. Marine Pollution Bulletin 67, 200-202.

Breen, P.A. (1987). Mortality of Dungeness Crabs Caused by Lost Traps in the Fraser River Estuary, British Columbia. North American Journal of Fisheries Management 7, 429-435.

Breen, P.A. (1990). A Review of Ghost Fishing by Traps and Gillnets, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, 571-599.

Broadrick, T. (1982). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 7, 18.

Brongersma, L.D. (1968). Notes Upon Some Turtles from the Canary Islands and from Madeira. Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series C Biological and Medical Sciences 71, 128-136.

Brothers, G. (1989). Plastic Debris Summary of Lost Fishing Gear Retrieval Projects. Information paper prepared for the Workshop on plastic debris and abandoned fishing gear in the aquatic environment. Canadian Department of Fisheries and Oceans, Oceanography and Contaminants Branch.

Bugoni, L., Krause, L., Petry, M.V. (2001). Marine Debris and Human Impact on Sea Turtles in Southern Brazil. Marine Pollution Bulletin 42, 1330-1334.

Bugoni, L., Vooren, C.M. (2004). Feeding Ecology of the Common Tern *Sterna hirundo* in a Wintering Area in Southern Brazil. Ibis 146, 438-453.

Butler, C.M., Logan, J.M., Provaznik, J.M., Hoffmayer, E.R., Staudinger, M.D., Quattro, J.M., Roberts, M.A., Ingram, G.W., Pollack, A.G., Lutcavage, M.E. (2014). Atlantic bluefin tuna *Thunnus thynnus* feeding ecology in the northern Gulf of Mexico: a preliminary description of diet from the western Atlantic spawning grounds. Journal of Fish Biology. In press. doi: 10.1111/jfb.1

Buxton, R.T., Currey, C.A., Lyver, P.O.B., Jones, C.J. (2013). Incidence of Plastic Fragments among Burrow-Nesting Seabird Colonies on Offshore Islands in Northern New Zealand. Marine Pollution Bulletin 74, 420-424.

Calkins, D.G. (1985). Steller Sea Lion Entanglement in Marine Debris, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, 26-29.

Caldwell, M.C., Caldwell, D.K., Sibenaler, J.B. (1965). Observation on Captive and Wild Atlantic Bottlenose Dolphins (*Tursiops truncatus*) in the Northeastern Gulf of Mexico. Los Angeles County Museum Contributions in Science 91, 1-10.

Camedda, A., Marra, S., Matiddi, M., Massaro, G., Coppa, S., Perilli, A., Ruiu, A., Briguglio, P., de Lucia, G.A. (2014). Interaction between loggerhead sea turtles (*Caretta caretta*) and marine litter in Sardinia (Western Mediterranean Sea). Marine Environmental Research 100, 25-32.

Campagna, C., Falabella, V., Lewis, M. (2007). Entanglement of Southern Elephant Seals in Squid Fishing Gear. Marine Mammal Science 23, 414-418.

Campani, T., Baini, M., Giannetti, M., Cancelli, F., Mancusi, C., Serena, F., Marsili, L., Casini, S., Fossi, M.C. (2013). Presence of Plastic Debris in Loggerhead Turtle Stranded Along the Tuscany Coasts of the Pelagos Sanctuary for Mediterranean Marine Mammals (Italy). Marine Pollution Bulletin 74, 225-230.

Camphuysen, C.J. (2008). Entanglement of Seabirds in Marine Litter and Fishing Gear. Sula 21, 88-92.

Camphuysen, C.J., Boekhout, S., Gronert, A., Hunt, V., Van Nus, T., Ouwehand, J. (2008). Bizarre Prey Items: Odd Food Choices in Herring Gulls and Lesser Black-Backed Gulls at Texel. Sula 21, 29-61.

Camphuysen, C., de Boer, P., Bouten, W., Gronert, A., Shamoun-Baranes, J. (2010). Mammalian Prey in Laridae: Increased Predation Pressure on Mammal Populations Expected. Lutra 53, 5-20.

Camphuysen, C.J. (2013). A Historical Ecology of Two Closely Related Gull Species (Laridae): Multiple Adaptations to a Man-Made Environment. Dissertation, University Groningen, pp. 422

Carey, M.J. (2011). Intergenerational Transfer of Plastic Debris by Short-Tailed Shearwaters (*Ardenna tenuirostris*). Emu 111, 229-234.

Carpenter, E.J., Anderson, S.J., Harvey, G.R., Miklas, H.P., Peck, B.B. (1972). Polystyrene Spherules in Coastal Waters. Science 178, 749-750.

Carr, H.A. (1986). Observations on the Occurence of Impacts of Ghost Gillnets on Jeffrey's Ledge. Programm and abstracts Sixth International Ocean Disposal Symposium, Pacific Groove, C.A., 134-135.

Carr, A. (1987). Impact of Nondegradable Marine Debris on the Ecology and Survival Outlook of Sea Turtles. Marine Pollution Bulletin 18, 352-356.

Carr, A., Stancyk, S. (1975). Observation On the Ecology and Survival Outlook of the Hawksbill Turtle. Biological Conservation 8, 161-172.

Carr, H.A., Amaral, E.A., Hulbert, A.W., Cooper, R.A. (1985). Underwater Survey of Simulated Lost Demersal and Lost Commercial Gill Nets Off New England, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, 438-447.

Carretta, J.V., Forney, K.A., Lowry, M.S., Barlow, J., Baker, J., Johnston, D., Hanson, B., Brownell Jr, R.L., Robbins, J., Mattila, D.K. (2009). US Pacific Marine Mammal Stock Assessments: 2009. Publications, Agencies and Staff of the U.S. Department of Commerce.

Carretta, J.V., Wilkin, S.M., Muto, M.M., Wilkinson, K. (2013). Sources of Human-Related Injury and Mortality for US Pacific West Coast Marine Mammal Stock Assessments, 2007-2011. US Dep. Commer. NOAA Tech. Memo. NMFS-SWFSC, 514, 83.

Casale, P., Affronte, M., Insacco, G., Freggi, D., Vallini, C., Pino d'Astore, P., Basso, R., Paolillo, G., Abbate, G., Argano, R. (2010). Sea Turtle Strandings Reveal High Anthropogenic Mortality in Italian Waters. Aquatic Conservation: Marine and Freshwater Ecosystems 20, 611-620.

Cassoff, R.M., Moore, K.M., McLellan, W.A., Barco, S.G., Rotstein, D.S., Moore, M.J. (2011). Lethal Entanglement in Baleen Whales. Diseases of Aquatic Organisms 96, 175-185.

Cawthorn, M.W. (1985). Entanglement in and Ingestion of Plastic Litter by Marine Mammals, Sharks and Turtles in New Zealand Waters, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, 336-343.

Ceccarelli, D.M. (2009). Impacts of Plastic Debris on Australian Marine Wildlife, in: C&R Consulting (Ed.), Report by C&R Consulting for the Department of the Environment, Water, Heritage and the Arts., pp. 83.

Centaur Associates, Inc. (1986). Issue Report and Work Plan for the Development of a Marine Debris Education Program for the Northwestern Atlantic and Gulf of Mexico. Report to the National Marine Fisheries Service. U.S. Department of Commerce, Northwest and Alaska Fisheries Center, Seattle, pp. 62.

Chatto, R., Guinea, M., Conway, S. (1995). Sea Turtles Killed by Flotsam in Northern Australia. Marine Turtle Newsletter 69, 17-18.

Chatto, R., Warneke, R.M. (2000). Records of Cetacean Strandings in the Northern Territory of Australia. Beagle: Records of the Museums and Art Galleries of the Northern Territory 16, 163.

Chiappone, M., Dienes, H., Swanson, D.W., Miller, S.L. (2005). Impacts of lost fishing gear on coral reef sessile invertebrates in the Florida Keys National Marine Sanctuary. Biological Conservation 121(2), 221–230.

Choy, C.A., Drazen, J.C. (2013). Plastic for Dinner? Observations of Frequent Debris Ingestion by Pelagic Predatory Fishes from the Central North Pacific. Marine Ecology Progress Series 485, 155-163.

Citta, J.J., Burns, J.J., Quakenbush, L.T., Vanek, V., George, J.C., Small, R.J., Heide-Jørgensen, M.P., Brower, H. (2014). Potential for Bowhead Whale Entanglement in Cod and Crab Pot Gear in the Bering Sea. Marine Mammal Science 30, 445-459.

Cliff, G., Dudley, S.F.J., Ryan, P.G., Singleton, N. (2002). Large Sharks and Plastic Debris in Kwazulu-Natal, South Africa. Marine and Freshwater Research 53, 575-581.

Codina-García, M., Militão, T., Moreno, J., González-Solís, J. (2013). Plastic Debris in Mediterranean Seabirds. Marine Pollution Bulletin 77, 220-226.

Colabuono, F.I., Vooren, C.M. (2007). Diet of Black-Browed *Thalassarche melanophrys* and Atlantic Yellow-Nosed *T. chlororhynchos* Albatrosses and White-Chinned *Procellaria aequinoctialis* and Spectacled *P. conspicillata* Petrels Off Southern Brazil. Marine Ornithology 35, 9-20.

Colabuono, F.I., Barquete, V., Domingues, B.S., Montone, R.C. (2009). Plastic Ingestion by Procellariiformes in Southern Brazil. Marine Pollution Bulletin 58, 93-96.

Colabuono, F.I., Taniguchi, S., Montone, R.C. (2010). Polychlorinated Biphenyls and Organochlorine Pesticides in Plastics Ingested by Seabirds. Marine Pollution Bulletin 60, 630-634.

Coleman, F., Wehle, D. (1984). Plastic Pollution: A Worldwide Oceanic Problem. Parks 9, 9-12.

Conant, S. (1984). Man-Made Debris and Marine Wildlife in the Northwestern Hawaiian Islands. Elepaio 44, 87-88.

Connors, P.G., Smith, K.G. (1982). Oceanic Plastic Particle Pollution: Suspected Effect on Fat Deposition in Red Phalaropes. Marine Pollution Bulletin 13, 18-20.

Cooper, J.M. (1995). Fishing Hooks Associated with Albatrosses at Bird Island, South Georgia 1992/1993. Marine Ornithology 23, 17-21.

Cooper, J., Auman, H., Klavitter, J. (2004). Do the Albatrosses on Midway Atoll Select Cigarette Lighters by Color? Pacific Seabirds 31, 2-4.

Copello, S., Quintana, F. (2003). Marine Debris Ingestion by Southern Giant Petrels and its Potential Relationships with Fisheries in the Southern Atlantic Ocean. Marine Pollution Bulletin 46, 1513-1515.

Coulson, R., Coulson, G. (1993). Diets of the Pacific Gull, *Larus pacificus*, and the Kelp Gull, *Larus dominicanus*, in Tasmania. Emu 93, 50-53.

Crawford, R., Cooper, J., Dyer, B. (1995). Conservation of an Increasing Population of Great White Pelicans *Pelecanus onocrotalus*, in South Africa's Western Cape. South African Journal of Marine Science 15, 33-42.

Creet, S., Van Franeker, J., Van Spanje, T., Wolff, W. (1994). Diet of the Pintado Petrel *Daption capense* at King George Island, Antarctica, 1990/91. Marine Ornithology 22, 221-229.

Cristo, M., Cartes, J.E. (1998). A comparative study of the feeding ecology of *Nephrops norvegicus* L.(Decapoda: Nephropidae) in the bathyal Mediterranean and the adjacent Atlantic. Scientia Marina 62(S1), 81-90.

Crockett, D.E., Reed, S.M. (1976). Phenomenal Antarctic Fulmar Wreck. Notornis 23, 250-262.

Croxall, J., Rodwell, S., Boyd, I. (1990). Entanglement in Man-Made Debris of Antarctic Fur Seals at Bird Island, South Georgia. Marine Mammal Science 6, 221-233.

Dantas, D.V., Barletta, M., da Costa, M.F. (2012). The Seasonal and Spatial Patterns of Ingestion of Polyfilament Nylon Fragments by Estuarine Drums (Sciaenidae). Environmental Science and Pollution Research 19, 600-606.

Dau, B.K., Gilardi, K.V., Gulland, F.M., Higgins, A., Holcomb, J.B., Leger, J.S., Ziccardi, M.H. (2009). Fishing Gear-Related Injury in California Marine Wildlife. Journal of Wildlife Diseases 45, 355-362.

Davenport, J., Balazs, G.H., Faithfull, J.V., Williamson, D.A. (1993). A Struvite faecolith in the Leatherback turtle *Dermochelys coriacea* Vandelli: A means of Packaging garbage? Herpetological Journal 3, 81-83.

Davison, P., Asch, R.G. (2011). Plastic Ingestion by Mesopelagic Fishes in the North Pacific Subtropical Gyre. Marine Ecology Progress Series 432, 173-180.

Day, R.H. (1980). The Occurence and Characteristics of Plastic Pollution in Alaska's Marine Birds, Mater Thesis, University of Alaska, Fairbanks.

Day, R.H. (1988). Quantitative Distribution and Characteristics of Neustonic Plastic in the North Pacific. Final Report to the Auke Ba Laboratory National Marine Fisheries Service, Juneau, A.K.

Day, R.H., Wehle, D.H.S., Coleman, F.C. (1985). Ingestion of Plastic Pollutants by Marine Birds, in: Shomura, R.S., Yoshida, H.O. (Ed.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 344-386.

Deaville, R., Jepson, P.D., Brownlow, A., Reid, R.J., Smith, B., Duffell, E.L., Sabin, R.C., Penrose, R., Perkins, M. (2010). Final Report for the Period 1st January 2005–31st December 2010. UK Strandings Investigation Programme, pp. 98.

DeGange, A.R., Newby, T.C. (1980). Mortality of Seabirds and Fish in a Lost Salmon Driftnet. Marine Pollution Bulletin 11, 322-323.

Delorenzo, D.M., Bethea, D.M., Carlson, J.K. (2014). An assessment of the diet and trophic level of Atlantic sharpnose shark *Rhizoprionodon terraenovae*. Journal of Fish Biology. In press. doi: 10.1111/jfb.12558

De Meirelles, A.C.O., do Rego Barros, H.M.D. (2011). Plastic Debris Ingested by a Rough-Toothed Dolphin, *Steno bredanensis*, Stranded Alive in Northeastern Brazil. Biotemas 20, 127-131.

Den Hartog , C.J. (1980). Notes on the Food of Sea Turtles: *Eretmochelys imbricata*. Netherlands Journal of Zoology 30, 595-610.

Denuncio, P., Bastida, R., Dassis, M., Giardino, G., Gerpe, M., Rodriguez, D. (2011). Plastic Ingestion in Franciscana Dolphins, *Pontoporia blainvillei* (Gervais and D'orbigny, 1844), from Argentina. Marine Pollution Bulletin 62, 1836-1841.

De Pierrepont, J.F., Dubois, B., Desormonts, S.M., Santos, B.O., Robin, J.P. (2005). Stomach Contents of English Channel Cetaceans Stranded on the Coast of Normandy. Journal of the Marine Biological Association of the United Kingdom 85, 1539-1546.

De Stephanis, R., Gimenez, J., Carpinelli, E., Gutierrez-Exposito, C., Canadas, A. (2013). As Main Meal for Sperm Whales: Plastics Debris. Marine Pollution Bulletin 69, 206-214.

De Tarso Chavez, P. (2010). Loss and Abandon of fishing gears in Southern Brazil and risks of occurence of ghost fishing. Universidade Federal do Paraná, Brazil, pp 4.

Di Beneditto, A.P., Awabdi, D.R. (2014). How marine debris ingestion differs among megafauna species in a tropical coastal area. Marine Pollution Bulletin 88, 86-90. doi: 10.1016/j.marpolbul.2014.09.020

Di Beneditto, A.P.M., Ramos, R.M.A. (2014). Marine Debris Ingestion by Coastal Dolphins: What Drives Differences between Sympatric Species? Marine Pollution Bulletin 83, 298-301.

Dobbs, K.A. (2005). Recovery of Seabirds Banded between 1978 and 1987 at Raine Island Maclennan and Moulter Cays and Sandbanks 8, Northern Great Barrier Reef, Australia. Corella 29, 65-72.

Donnelly-Greenan, E.L., Harvey, J.T., Nevins, H.M., Hester, M.M., Walker, W.A. (2014). Prey and Plastic Ingestion of Pacific Northern Fulmars (*Fulmarus glacialis rogersii*) from Monterey Bay, California. Marine Pollution Bulletin 85(1), 214-224. DOI: 10.1016/j.marpolbul.2014.05.046

Donohue, M., Foley, D.G. (2007). Remote Sensing Reveals Links among the Endangered Hawaiian Monk Seal, Marine Debris, and El Nino. Marine Mammal Science 23, 468-473.

Donohue, M.J., Boland, R.C., Sramek, C.M., Antonelis, G.A. (2001). Derelict Fishing Gear in the Northwestern Hawaiian Islands: Diving Surveys and Debris Removal in 1999 Confirm Threat to Coral Reef Ecosystems. Marine Pollution Bulletin 42, 1301-1312.

Duguy, R. (1983). Observations De Tortues Luth Sur Les Cotes De France. Annales de la Société de Sciences Naturelles de la Charente-Maritimes (Supplement), 38.

Duguy, R., Duron, M. (1981). Observations De Tortues Luth Sur Les Cotes De France En 1980. Annales de la Société de Sciences Naturelles de la Charente-Maritimes 6, 819-825.

Duguy, R., Duron, M., Alzieu, C. (1980). Observaction De Tortues Luth (*Dermochelys coriacea*) Dans Les Partuis Charentais En 1979. Annales de la Société de Sciences Naturelles de la Charente-Maritimes 6, 681-691.

Duron, M., Duron, P. (1980). Les Tortues Luth Dans Le Pertuis Charentais. Courrier de la Nature 69, 37-41.

Duronslet, M.J., Revera, D.B., Stanley, K.M. (1991). Man-Made Marine Debris and Sea Turtle Strandings on Beaches of the Upper Texas and Southwestern Louisiana Coasts, June 1987 through September 1989. Technical Memo. National Marine Fisheries Service, Galveston, TX (United States). Galveston Lab.

Environment Canada (2008). Recovery Strategy for the Short-Tailed Albatross (*Phoebastria albatrus*) and the Pink-Footed Shearwater (*Puffinus creatopus*) in Canada, in: Environment Canada (Ed.), Species at Risk Act Recovery Strategy Series, Ottawa.

Eriksson, C., Burton, H. (2003). Origins and Biological Accumulation of Small Plastic Particles in Fur Seals from Macquarie Island. AMBIO: A Journal of the Human Environment 32, 380-384.

Erzini, K., Bentes, L., Coelho, R., Lino, P.G., Monteiro, P., Ribeiro, J., Gonçalves, J. (2008). Catches in Ghost-Fishing Octopus and Fish Traps in the Northeastern Atlantic Ocean (Algarve, Portugal). Fishery Bulletin 106, 321-327.

Evans, K., Hindell, M.A. (2004). The Diet of Sperm Whales (*Physeter macrocephalus*) in Southern Australian Waters. ICES Journal of Marine Science: Journal du Conseil 61, 1313-1329.

Fabri, M.C., Pedel, L., Beuck, L., Galgani, F., Hebbeln, D., Freiwald, A. (2014). Megafauna of vulnerable marine ecosystems in French mediterranean submarine canyons: Spatial distribution and anthropogenic impacts. Deep Sea Research Part II: Topical Studies in Oceanography 104, 184-207. doi http://dx.doi.org/10.1016/j.dsr2.2013.06.016

Federal Republic of Germany (1985). Verschmutzung Der Nordsee Durch Öl Und Schiffsmüll, in: Umweltbundesamt (Ed.).

Fernandez, R., Santos, M., Carrillo, M., Tejedor, M., Pierce, G.J. (2009). Stomach Contents of Cetaceans Stranded in the Canary Islands 1996–2006. Journal of the Marine Biological Association of the United Kingdom 89, 873-883.

Ferns, P.N., Mudge, G.P. (2000). Abundance, Diet and Salmonella Contamination of Gulls Feeding at Seawage Outfalls. Water Research 34, 2653-2660.

Fijn, R.C., Van Franeker, J.A., Trathan, P.N. (2012). Dietary Variation in Chick-Feeding and Self-Provisioning Cape Petrel, *Daption capense*, and Snow Petrel, *Pagodroma nivea*, at Signy Island, South Orkney Islands, Antarctica. Marine Ornithology 40, 81-87.

Finley, K.J. (2001). Natural History and Conservation of the Greenland Whale or Bowhead, in the Northwest Atlantic. Arctic 54, 55-76.

Fletcher, E. (1982). Marine turtles. Scientific Event Alert Network (SEAN) Bulletin 7(5), 15.

Foekema, E.M., De Gruijter, C., Mergia, M.T., van Franeker, J.A., Murk, A.J., Koelmans, A.A. (2013). Plastic in North Sea Fish. Environmental Science & Technology 47, 8818-8824.

Fossi, M.C., Panti, C., Guerranti, C., Coppola, D., Giannetti, M., Marsili, L., Minutoli, R. (2012). Are Baleen Whales Exposed to the Threat of Microplastics? A Case Study of the Mediterranean Fin Whale (*Balaenoptera physalus*). Marine Pollution Bulletin 64, 2374-2379.

Fowler, C.W. (1987). Marine Debris and Northern Fur Seals: A Case Study. Marine Pollution Bulletin 18, 326-335.

Fowler, C.W. (1988). A Review of Seal and Sea Lion Entanglement in Marine Debris in: Alverson, D.L., June, J.A. (Eds.), Proceedings of the North Pacific Rim Fishermen's Conference on marine debris. Natural Resources Consultants, Seattle, pp. 16-63.

Fowler, C.W., Merrick, R., Baker, J.D. (1990). Studies of the Population Level Effects of Entanglement on Northern Fur Seals, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 453-474.

Fowler, C.W., Ream, R., Robson, B., Kiyota, M. (1992). Entanglement studies on juvenile male northern fur seals, St. Paul Island, 1991. U.S. Department of Commerce, Alaska Fisheries Science Center, Seattle, p. 42.

Frantzis, A. (2007). Fisheries Interaction with Cetacean Species in Hellas, in: Papaconstantinou, C., Zenetos, A., Tserpes, G., Vassilopoulou, V. (Eds.), State of the Hellenic Fisheries. Hellenic Centre for Marine Research, Athens.

Frick, M., Williams, K., Pierrard, L. (2001). Summertime foraging and feeding by immature loggerhead sea turtles (Caretta caretta) from Georgia. Chelonian Conservation and Biology 4(1), 178-181.

Frick, M.G., Williams, K.L., Bolten, A.B., Bjorndal, K.A., Martins, H.R. (2009). Foraging ecology of oceanic-stage loggerhead turtles *Caretta caretta*. Endangered Species Research 9, 91-97. doi: 10.3354/esr00227

Fritts, T.H. (1982). Plastic Bags in the Intestinal Tracts of Leatherback Marine Turtles (*Dermochelys coriacea*). Herpetological Review 13, 72-73.

Fry, D.M., Fefer, S.I., Sileo, L. (1987). Ingestion of Plastic Debris by Laysan Albatrosses and Wedge-Tailed Shearwaters in the Hawaiian Islands. Marine Pollution Bulletin 18, 339-343.

Fujieda, S., Uchiyama, M., Azuma, T., Fukuda, R., Arita, Y. (2008). Ingestion Case of Plastics by Black Marlin *Makaira indica* and Lancetfish *Alepisaurus ferox* Caught in the East Indian Ocean. Memoirs of Faculty of Fisheries-Kagoshima University 57.

Furness, B.L. (1983). Plastic Particles in Three Procellariiform Seabirds from the Benguela Current, South Africa. Marine Pollution Bulletin 14, 307-308.

Furness, R.W. (1985a). Ingestion of Plastic Particles by Seabirds at Gough Island, South Atlantic Ocean. Environmental Pollution 38, 261-272.

Furness, R.W. (1985b). Plastic Particle Pollution: Accumulation by Procellariiform Seabirds at Scottish Colonies. Marine Pollution Bulletin 16, 103-106.

Galimany, E., Ramón, M., Delgado, M. (2009). First Evidence of Fiberglass Ingestion by a Marine Invertebrate (*Mytilus galloprovincialis*) in a NW Mediterranean Estuary. Marine Pollution Bulletin 58, 1334-1338.

García-Godos, I., Goya, E., Jahncke, J. (2002). The Diet of Markham's Storm Petrel *Oceanodroma markhami* on the Central Coast of Peru. Marine Ornithology 30, 77-83.

Gassel, M., Harwani, S., Park, J.S., Jahn, A. (2013). Detection of Nonylphenol and Persistent Organic Pollutants in Fish from the North Pacific Central Gyre. Marine Pollution Bulletin 73, 231-242.

GEF Council Meeting (2012). Global environmental facility, investing in our planet. GEF Council Meeting November 13-15 2012, Washington DC. GEF/STAP/C.43/Inf.04 October 15, 2012 Impact of marine debris on biodiversity: Current status and potential solutions

Geise, L., Gomes, N. (1992). Occurencia De Plastico No Estomago De Um Golfinho, *Sotalia guianensis* (Cetacea, Delphinidae), Anais da 3a Reuniao de Trabalho de Especialistas em mamiferos aquaticos de America do sul, Montevideo, Uruguay, pp. 26-28.

Gilardi, K.V.K., Carlson-Bremer, D., June, J.A., Antonelis, K., Broadhurst, G., Cowan, T. (2010). Marine Species Mortality in Derelict Fishing Net in Puget Sound, WA and the Cost/Benefit of Derelict Net Removal. Marine Pollution Bulletin 60, 376-382.

Gill, A., Fairbairns, B., Fairbairns, R. (2000). Some Observations of Minke Whale (*Balaenoptera acutorostrata*) Feeding Behaviour and Associations with Seabirds in the Coastal Waters of the Isle of Mull, Scotland. European Research on Cetaceans 13, 61-64.

Gilliland, S.G., Ankney, C.D., Hicklin, P.W. (2004). Foraging Ecology of Great Black-Backed Gulls During Brood-Rearing in the Bay of Fundy, New Brunswick. Canadian Journal of Zoology 82, 1416-1426.

Gochfield, M. (1973). Effect of Artefact Pollution on the Viability of Seabird Colonies on Long Island, New York. Environmental Pollution 4, 1-6.

Goldstein, M.C., Goodwin, D.S. (2013). Gooseneck Barnacles (*Lepas* Spp.) Ingest Microplastic Debris in the North Pacific Subtropical Gyre. PeerJ 1, e184.

Goldstein, T., Johnson, S., Phillips, A., Hanni, K., Fauquier, D., Gulland, F. (1999). Human-Related Injuries Observed in Live Stranded Pinnipeds Along the Central California Coast 1986-1998. Aquatic Mammals 25, 43-51.

Goldsworthy, S., Hindell, M., Crowley, H. (1997). Diet and Diving Behaviour of Sympatric Fur Seals *Arctocephalus gazella* and *A. tropicalis* at Macquarie Island, Marine Mammal Research in the Southern Hemisphere, pp. 151-163.

Gomerčić, M.D., Galov, A., Gomerčić, T., Škrtić, D., Ćurković, S., Lucić, H., Vuković, S., Arbanasić, H., Gomerčić, H. (2009). Bottlenose Dolphin (*Tursiops truncates*) Depredation Resulting in Larynx Strangulation with Gill-Net Parts. Marine Mammal Science 25, 392-401.

González Carman, V., Acha, E.M., Maxwell, S.M., Albareda, D., Campagna, C., Mianzan, H. (2014). Young green turtles, *Chelonia mydas*, exposed to plastic in a frontal area of the SW Atlantic. Marine Pollution Bulletin 78(1-2), 56-62.

Good, T.P., June, J.A., Etnier, M.A., Broadhurst, G. (2009). Ghosts of the Salish Sea: Threats to Marine Birds in Puget Sound and the Northwest Straits from Derelict Fishing Gear. Marine Ornithology 37, 67-76.

Good, T.P., June, J.A., Etnier, M.A., Broadhurst, G. (2010). Derelict Fishing Nets in Puget Sound and the Northwest Straits: Patterns and Threats to Marine Fauna. Marine Pollution Bulletin 60, 39-50.

Gorzelany, J.F. (1998). Unusual Deaths of Two Free-Ranging Atlantic Bottlenose Dolphins (*Tursiops truncatus*) Related to Ingestion of Recreational Fishing Gear. Marine Mammal Science 14, 614-617.

Gots, B., Ronald, K., Dougan, J. (1992). The Newsletter of the League for the Conservation of the Monk Seal. Institute for Environmental Policy and Stewartship at the Arboretum, University of Guelph, Ontario, Canada.

Gottdenker, N.L., Walsh, T., Jiménez-Uzcátegui, G., Betancourt, F., Cruz, M., Soos, C., Miller, R.E., Parker, P.G. (2008). Causes of Mortality of Wild Birds Submitted to the Charles Darwin Research Station, Santa Cruz, Galapagos, Ecuador from 2002-2004. Journal of Wildlife Diseases 44, 1024-1031.

Gould, P., Ostrom, P., Walker, W. (1997). Trophic Relationships of Albatrosses Associated with Squid and Large-Mesh Drift-Net Fisheries in the North Pacific Ocean. Canadian Journal of Zoology 75, 549-562.

Gramentz, D. (1988). Involvement of Loggerhead Turtle with the Plastic, Metal, and Hydrocarbon Pollution in the Central Mediterranean. Marine Pollution Bulletin 19, 11-13.

Gray, H., Lattin, G.L., Moore, C.J. (2012). Incidence, Mass and Variety of Plastics Ingested by Laysan (*Phoebastria immutabilis*) and Black-Footed Albatrosses (*P. nigripes*) Recovered as by-Catch in the North Pacific Ocean. Marine Pollution Bulletin 64, 2190-2192.

Guebert-Bartholo, F.M., Barletta, M., Costa, M.F., Monteiro-Filho, E.L.A. (2011). Using Gut Contents to Assess Foraging Patterns of Juvenile Green Turtles, *Chelonia mydas*, in the Paranaguá Estuary, Brazil. Endangered Species Research 13, 131-143.

Gunn, R., Hardesty, B.D., Butler, J. (2010). Tackling 'Ghost Nets': Local Solutions to a Global Issue in Northern Australia. Ecological Management & Restoration 11, 88-98.

Guterres-Pazin, M.G., Rosas, F.C., Marmontel, M. (2012). Ingestion of Invertebrates, Seeds, and Plastic by the Amazonian Manatee (*Trichechus inunguis*, Mammalia, Sirenia). Aquatic Mammals 38(3), 322.

Hanni, K.D., Pyle, P. (2000). Entanglement of Pinnipeds in Synthetic Materials at South-East Farallon Island, California, 1976–1998. Marine Pollution Bulletin 40, 1076-1081.

Harcourt, R., Aurioles, D., Sanchez, J. (1994). Entanglement of California Sea Lions at Los Islotes, Baja California Sur, Mexico. Marine Mammal Science 10, 122-125.

Hare, M.P., Mead, J.G. (1987). Handbook for Determination of Adverse Human-Marine Mammal Interactions from Necropsis. U.S. Department of Commerce, Northwest and Alaska Fisheries Service, Seattle, p. 35.

Harper, P.C., Fowler, J.A. (1987). Plastic Pellets in New Zealand Storm-Killed Prions. Notornis 34, 65-70.

Harrigan, K. (1992). Causes of Mortality of Little Penguins, *Eudyptula minor*, in Victoria. Emu 91, 273-277.

Harris, M.P., Wanless, S. (1994). Ingested Elastic and Other Artefacts Found in Puffins in Britain over a 24-Year Period. Marine Pollution Bulletin 28, 54-55.

Harris, R.J., Tseng, F.S., Pokras, M.A., Suedmeyer, B.A., Bogart, J., Prescott, R., Newman, S. (2006). Beached Bird Surveys in Massachusetts: The Seabird Ecological Assessment Network (Seanet). Marine Ornithology 34, 115-122.

Harrison, P. (1983). Seabirds: An Identification Guide. Houghton Mifflin Company, Boston.

Havens, K., Bilkovic, D.M., Stanhope, D., Angstadt, K. (2011). Fishery Failure, Unemployed Commercial Fishers, and Lost Blue Crab Pots: An Unexpected Success Story. Environmental Science & Policy 14, 445-450.

Haynes, J.A., Limpus, C.J. (2000). Marine Wildlife Stranding and Mortality Database Annual Report, 2000: II Cetacean and Pinnipeds, in: Research Coordination Unit Parks and Wildlife Strategy Division, Queensland Parks and Wildlife Service (Ed.).

Hays-Brown, C., Brown, W.M. (1982). Status of Sea Turtles in the Southeastern Pacific: Emphasis on Peru. Biology and Conservation of Sea Turtles. Smithsonian Press, Washington DC, 235-240.

Hedd, A., Gales, R. (2001). The Diet of Shy Albatrosses (*Thalassarche cauta*) at Albatross Island, Tasmania. Journal of Zoology 253, 69-90.

Henderson, J.R. (1984). Encounters of Hawaiian Monk Seals with Fishing Gear at Lisianski Island 1982. Marine Fisheries Review 46, 59-61.

Henderson, J.R. (1988). Marine Debris in Hawaii, in: Alverson, D.L., June, J.A. (Eds.), Proceedings of the North Pacific Rim Fishermen's Conference on marine debris. Natural Resources Consultants, Seattle.

Henderson, J.R. (1990). Recent Entanglement of Hawaiian Monk Seals in Marine Debris, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 540-553.

Henderson, J.R. (2001). A Pre-and Post-Marpol Annex V Summary of Hawaiian Monk Seal Entanglements and Marine Debris Accumulation in the Northwestern Hawaiian Islands, 1982–1998. Marine Pollution Bulletin 42, 584-589.

Heneman, B. (1985). Records of Pinniped Entanglement in Fishing Gear at South-East Farallon Island, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, p. 555.

Heneman, B. (1988). Persistent Marine Debris in the North Sea, Northwest Atlantic Ocean and the West Coast of Baja California, A report to the Marine Mammal Commission and the national Ocean Pollution Program Office, Washington, D.C.

Heyning, J.E., Lewis, T.D. (1990). Entanglements of Baleen Whales in Fishing Gear Off Southern California, 40th Report of the international Whaling Commission, Cambridge, pp. 427-431.

High, W.L. (1976). Escape of Dungeness Crabs from Pots. Marine Fishery Review 38, 19-23.

High, W.L. (1985). Some Consequences of Lost Fishing Gear, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 430-437.

High, W.L., Worlund, D.D. (1979). Escape of King Crab, *Paralithodes camtschatica*, from Derelict Pots, NOAA Technical Report NMFS SSRF-734. GPO, Washington D.C.

Hildebrand, H.H. (1980). Report on the Incidental Capture, Harassment and Mortality of Sea Turtles in Texas. Department of Commerce Southwest Fisheries Center, La Jolla, C.A., p. 33.

Hirth, H.F. (1971). Synopsis of Biological Data on the Green Turtles, *Chlonia mydas* (Linnaeus 1758). FAO Fisheries Biology Synopsis 85, 1-8.

Hoarau, L., Ainley, L., Jean, C., Ciccione, S. (2014). Ingestion and defecation of marine debris by loggerhead sea turtles, *Caretta caretta*, from by-catches in the South-West Indian Ocean. Marine Pollution Bulletin 84(1-2), 90-96. doi: http://dx.doi.org/10.1016/j.marpolbul.2014.05.031

Hocken, A.G. (2005). Necropsy Findings in Yellow-Eyed Penguins (*Megadyptes antipodes*) from Otago, New Zealand. New Zealand Journal of Zoology 32, 1-8.

Hofmeyr, G.J.G., De Maine, M., Beste, M., Kirkman, S., Pistorius, P., Makhado, A. (2002). Entanglement of Pinnipeds at Marion Island, Southern Ocean: 1991-2001. Australian Mammalogy 24, 141-146.

Hofmeyr, G.J.G., Bester, M.N., Kirkman, S.P., Lydersen, C., Kovacs, K.M. (2006). Entanglement of Antarctic Fur Seals at Bouvetøya, Southern Ocean. Marine Pollution Bulletin 52, 1077-1080.

Hong, S., Lee, J., Jang, Y.C., Kim, Y.J., Kim, H.J., Han, D., Hong, S.H., Kang, D., Shim, W.J. (2013). Impacts of Marine Debris on Wild Animals in the Coastal Area of Korea. Marine Pollution Bulletin 66, 117-124.

Hoss, D.E., Settle, L.R. (1990). Ingestion of Plastics by Teleost Fishes, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 693-709.

Houard, T., Boudouresque, C.F., Barcelo, A., Cottalorda, J.-M., Formentin, J.-Y., Jullian, E., Kerlidou, B. Pironneau, E. (2012). Occurrence of a lost fishing net within the marine area of the Port-Cros national Park (Provence, northwestern Mediterranean Sea). Scientific Report Port-Cros National Park 25, 109-118.

Hucke-Gaete, R., Torres, D., Vallejos, V. (1997). Entanglement of Antarctic Fur Seals, Arctocephalus gazella, in Marine Debris at Cape Shirreff and San Telmo Islets, Livingston Island, Antarctica: 1988–1977. Series Cientifica INACH 47, 123-135.

Hughes, G.R. (1970). Further Studies on Marine Turtles in Tongaland, IV. Lammergeyer 12, 7-25.

Hughes, G.R. (1974). The Sea Turtles of Southeast Africa. II. The Biology of the Tongaland Loggerhead Turtles, *Caretta caretta* L., with Comments on the Leatherback Turtle, *Dermochelys coriacea* L., in the Study Region. Investigational Report, Oceanographic Research Institute, Durban, p. 96.

Huin, N., Croxall J.P. (1996). Fishing Gear, Oil and Marine Debris Assiociated with Seabirds at Bird Island, South Georgia, During 1993/1994. Marine Ornithology 24, 19-22.

Humpback Whale Recovery Team (1991). Final Recovery Plan for the Humpback Whale, *Megaptera novaeangliae*. National Marine Fisheries Service, Silverspring, M.D.

Hutton, I., Carlile, N., Priddel, D. (2008). Plastic Ingestion by Flesh-Footed Shearwaters, *Puffinus carneipes*, and Wedge-Tailed Shearwaters, *Puffinus pacificus*. Papers and Proceedings of the Royal Society of Tasmania 142, 67-72.

Hyrenbach, K.D., Michelle, M., Johnson, J.A., Lyday, S., Bingham, S., Pawloski, J. (2013). First Evidence of Plastic Ingestion by White-Tailed Tropicbirds from O'ahu, Hawai'i. Marine Ornithology 41, 167-169.

Imber, M., Jolly, J., Brooke, M.d.L. (1995). Food of Three Sympatric Gadfly Petrels (*Pterodroma* Spp.) Breeding on the Pitcairn Islands. Biological Journal of the Linnean Society 56, 233-240.

Imber, M. (1996). The Food of Cook's Petrel, *Pterodroma cookii*, During Its Breeding Season on Little Barrier Island, New Zealand. Emu 96, 189-194.

Iribarne, O., Botto, F., Martinetto, P., Gutierrez, J.L. (2000). The Role of Burrows of the SW Atlantic Intertidal Crab *Chasmagnathus granulata* in Trapping Debris. Marine Pollution Bulletin 40, 1057-1062. doi http://dx.doi.org/10.1016/S0025-326X(00)00058-8

Jackson, K. (2010). 2009 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska: National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, K. (2011). 2010 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska: National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, K. (2012). 2011 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska: National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, K. (2013). 2012 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, K. (2014). 2013 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, K., Sternfeld, M. (2009). 2008 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska: National Marine Fisheries Service, Alaska Region, Protected Resources.

Jackson, G.D., Buxton, N.G., George, M.J.A. (2000). Diet of the Southern Opah, *Lampris immaculatus*, on the Patagonian Shelf; the Significance of the Squid Moroteuthis Ingens and Anthropogenic Plastic. Marine Ecology Progress Series 206, 261-271.

Jacobsen, J.K., Massey, L., Gulland, F. (2010). Fatal Ingestion of Floating Net Debris by Two Sperm Whales (*Physeter macrocephalus*). Marine Pollution Bulletin 60, 765-767.

Jameson, G.L. (1986). Trial Systematic Salvage of Beach-Cast Sea Otter, *Enhydra Lutris*, Carcasses in the Central and Southern Potion of the Sea Otter Range in California. US Marine Mammal Commision, Springfield, VA, p. 60.

Jantz, L.A., Morishige, C.L., Bruland, G.L., Lepczyk, C.A. (2013). Ingestion of Plastic Marine Debris by Longnose Lancetfish (*Alepisaurus ferox*) in the North Pacific Ocean. Marine Pollution Bulletin 69, 97-104.

Jenkin, M. (1990). Plastic a Problem for Tasmania's Wildlife, The Southern Star Newspaper (19 November), Hobart, Tasmania.

Johnson, W., Karamanlidis, A. (2000). When Fishermen Save Seals. The Monachus Guardian 3, 18-22.

Johnson, A., Salvador, G., Kenney, J., Robbins, J., Kraus, S., Landry, S., Clapham, P. (2005). Fishing Gear Involved in Entanglements of Right and Humpback Whales. Marine Mammal Science 21, 635-645.

Jones, L.J., Ferrero, R.C. (1985). Observations of Net Debris and Associated Entanglements in the North Pacific and Bering Sea, 1978-1984, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 183-196.

Jones, M.M. (1995). Fishing Debris in the Australian Marine Environment. Marine Pollution Bulletin 30, 25-33.

Joyce, W.N., Campana, S.E., Natanson, L.J., Kohler, N.E., Pratt, H.L., Jensen, C.F. (2002). Analysis of Stomach Contents of the Porbeagle Shark (*Lamna nasus,* Bonnaterre) in the Northwest Atlantic. ICES Journal of Marine Science: Journal du Conseil 59, 1263-1269.

Kaiser, M., Bullimore, B., Newman, P., Lock, K., Gilbert, S. (1996). Catches In 'Ghost Fishing' Set Nets. Marine Ecology Progress Series 145, 11-16.

Kartar, S., Abou-Seedo, F., Sainsbury, M. (1973). Polystirene Waste in the Seventh Estuary: A Progress Report. Marine Pollution Bulletin 4, 144.

Kasteleine, R.A., Lavaleye, M.S.S. (1992). Foreign Bodies in the Stomach of a Female Harbour Porpoise (*Phococena phococena*) from the North Sea. Aquatic Mammals 18, 40-46.

Katsanevakis, S. (2008). Marine debris, a growing problem: Sources, distribution, composition, and impacts. Marine Pollution: New Research. Nova Science Publishers, New York, 53-100.

Kenyon, K.W., Kridler, E. (1969). Laysan Albatrosses Swallow Indigestible Matter. The Auk 86, 339-343.

Kiessling, I. (2003). Finding Solutions: Derelict Fishing Gear and Other Marine Debris in Northern Australia. National Oceans Office, Darwin.

Kimker, A. (1994). Tanner Crab Survival in Closed Pots. Alaska Fishery Research Bulletin 1, 179-183.

Kinan, I., Cousins, K. (2000). Abundance of Plastic Debris and Ingestion by Albatross on Kure Atoll, North-Western Hawaiian Islands. In: Second International Conference on the Biology and Conservation of Albatrosses and other Petrels, 8‑10 May 2000. Waikiki, Hawaii.

Knowlton, A.R., Hamilton, P.K., Marx, M.K., Pettis, H.M., Kraus, S.D. (2012). Monitoring North Atlantic Right Whale, *Eubalaena glacialis*, Entanglement Rates: A 30 Yr Retrospective. Marine Ecology Progress Series 466, 293-302.

Kraus, S.D. (1990). Rates and Potential Causes of Mortality in North Atlantic Right Whales (*Eubalaena glacialis*). Marine Mammal Science 6, 278-291.

Kubota, T. (1990). Synthetic Materials Found in the Stomachs of Lancetfish from Suruga Bay, Central Japan, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 710-717.

Kühn, S., Van Franeker, J.A. (2012). Plastic Ingestion by the Northern Fulmar (*Fulmarus glacialis*) in Iceland. Marine Pollution Bulletin 64, 1252-1254.

Laist, D.W. (1997). Impacts of Marine Debris: Entanglement of Marine Life in Marine Debris Including a Comprehensive List of Species with Entanglement and Ingestion Records. Springer Series on Environmental Management. Springer-Verlag., New York.

Lavers, J.L., Hodgson, J.C., Clarke, R.H. (2013). Prevalence and Composition of Marine Debris in Brown Booby (*Sula leucogaster*) Nests at Ashmore Reef. Marine Pollution Bulletin 77, 320-324.

Lavers, J.L., Bond, A.L., Hutton, I. (2014). Plastic Ingestion by Flesh-Footed Shearwaters (*Puffinus carneipes*): Implications for Fledgling Body Condition and the Accumulation of Plastic-Derived Chemicals. Environmental Pollution 187, 124-129.

Lazar, B., Gracan, R. (2011). Ingestion of Marine Debris by Loggerhead Sea Turtles, *Caretta caretta*, in the Adriatic Sea. Marine Pollution Bulletin 62, 43-47.

Lee, D.S., Palmer, W.M. (1981). Records of Leatherback Turtles, *Dermochelys coriacea*, (Linnaeus), and Other Marine Turtles in North Carolina Waters. Brimleyana 5, 95-106.

Levy, A.M., Brenner, O., Scheinin, A., Morick, D., Ratner, E., Goffman, O., Kerem, D. (2009). Laryngeal Snaring by Ingested Fishing Net in a Common Bottlenose Dolphin (*Tursiops truncatus*) Off the Israeli Shoreline. Journal of Wildlife Diseases 45, 834-838.

Lindborg, V.A., Ledbetter, J.F., Walat, J.M., Moffett, C. (2012). Plastic Consumption and Diet of Glaucous-Winged Gulls (*Larus glaucescens*). Marine Pollution Bulletin 64, 2351-2356.

Lindsay, M.C.M., Meathrel, C.E. (2008). Where, When and How? Limitations of the Techniques Used to Examine Dietary Preference of Pacific Gulls (*Larus pacificus*) Using Non-Consumed Parts of Prey and Regurgitated Pellets of Prey Remains. Waterbirds 31, 611-619.

Loughlin, T.R. (1986). Assessment of Net Entanglement on Northern Sea Lions in the Aleutian Islands, 25 June-15 July 1985. National Marine Mammal Laboratory, Northwest and Alaska Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration.

Lowry, L. (1993). Foods and Feeding Ecology, in: Burns, J.J., Montague, J.J., Cowles, C.J. (Eds.), The Bowhead Whale. The society for Marine Mammology, Lawrence K.S., pp. 201-238.

Lucas, Z. (1992). Monitoring Persistent Litter in the Marine Environment on Sable Island, Nova Scotia. Marine Pollution Bulletin 24, 192-199.

Lusher, A.L., McHugh, M., Thompson, R.C. (2013). Occurrence of Microplastics in the Gastrointestinal Tract of Pelagic and Demersal Fish from the English Channel. Marine Pollution Bulletin 67, 94-99.

Lutz, P.L. (1990). Studies on ingestion of plastic and Latex by Sea turtles. Shomura, R.S., Yoshida H.O. (eds.), Proceedings of the workshop on the fate and impact of marine debris, Honolulu, 719-735.

Lydersen, C., Gjertz, I., Weslawski, J.M. (1989). Stomach Contents of Autumn-Feeding Marine Vertebrates from Hornsund, Svalbard. Polar Record 25, 107-114.

Macedo, G.R., Leal, D.C., Pires, T.T., Rostán, G., Garcez Neto, A.F., Wrobel Goldberg, D., Franke, C.R. (2011). Ingestão de resíduos antropogênicos por tartarugas marinhas no litoral norte do estado da Bahia, Brasil. Sciencia Rural 41(11), 1938-1941.

MacLeod, C.D. (2007). Understanding the Impacts of Human Activities on Beaked Whales: From Individuals to Species, and from Local to Global, in: Dolman, J.S., MacLeod, C.D., Evans, P.G.H. (Eds.), Proceedings of the ECS workshop on beaked whale research. ECS, San Sebastián, Spain.

Mäder, A., Costa, A.S., Casa Jr, G.E., Sander, M. (2010). Ingestão De Lixo Marinho Por Procelariformes Arribados Nas Praias Do Rio Grande Do Sul, III Congresso Brasileiro de Oceanografia, Rio Grande.

Mallory, M.L. (2008). Marine Plastic Debris in Northern Fulmars from the Canadian High Arctic. Marine Pollution Bulletin 56, 1501-1504.

Mallory, M.L., Roberston, G.J., Moenting, A. (2006). Marine Plastic Debris in Northern Fulmars from Davis Strait, Nunavut, Canada. Marine Pollution Bulletin 52, 813-815.

Mann, J., Smolker, R.A., Smuts, B.B. (1995). Response to Calf Entanglement in Free-Ranging Bottlenose Dolphins. Marine Mammal Science 11, 100-106.

Manooch, C.S., Hogarth, W.T. (1983). Stomach Contents and Giant Trematodes from Wahoo, *Acanthocybium solanderi*, Collected Along the South Atlantic and Gulf Coasts of the United States. Bulletin of Marine Science 33, 223-227.

Manooch, C.S., Mason, D.L. (1983). Comparative Food Studies of Yellowfin Tuna, *Thunnus albacares*, and Blackfin Tuna, *Thunnus atlanticus*, (Pisces: Scombridae) from the Southeastern and Gulf Coasts of the United States. Brimleyana 9, 33-52.

Manooch, C.S., Mason, D.L., Nelson, R.S. (1985). Foods and Little Tunny. Bulletin of the Japanese Society of Scientific Fisheries 51.

Manville, A.M. (1990). A Survey of Plastics on Western Aleutian Island Beaches and Realted Wildlife Management, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 349-362.

Mariano, E.D.F., Targino, C.H. (2012). Ingestão De Plástico Pelo Atobá-Mascarado, *Sula dactylatra* Lesson, 1831, Na Reserva Biológica Do Atol Das Rocas, Rn, Brasil. Biotemas 25.

Marine Mammal Commission (1993). Annual Report to Congress 1992, Washington D.C.

Marine Mammal Commission (2006). Annual Report to Congress 2005, Bethesda, M.D.

Martin, A.R., Clarke, M.R. (1986). The Diet of Sperm Whales (*Physeter macrocephalus*) Captured between Iceland and Greenland. Journal of the Marine Biological Association of the United Kingdom 66, 779-790.

Mascarenhas, R., Santos, R., Zeppelini, D. (2004). Plastic Debris Ingestion by Sea Turtle in Paraiba, Brazil. Marine Pollution Bulletin 49, 354-355.

Mate, B.R. (1985). Incidents of Marine Mammal Encounters with Debris in Active Fishing Gear, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 453-457.

Mauger, G., Kerleau, F., Robin, J.P., Dubois, B., De Pierrepont, J.F., De Meersman, P., Custers, I. (2002). Marine Debris Obstructing Stomach of a Young Minke Whale (*Balaenoptera acutorostrata*) Stranded in Normany, France, 8th International American Cetacean Society International Conference, Seattle W.A.

Mazzariol, S., Di Guardo, G., Petrella, A., Marsili, L., Fossi, C.M., Leonzio, C., Zizzo, N., Vizzini, S., Gaspari, S., Pavan, G. (2011). Sometimes Sperm Whales (*Physeter macrocephalus*) Cannot Find Their Way Back to the High Seas: A Multidisciplinary Study on a Mass Stranding. PloS ONE 6, e19417.

McMahon, C.R., Holley, D., Robinson, S. (1999). The Diet of Itinerant Male Hooker's Sea Lions, *Phocarctos hookeri*, at Sub-Antarctic Macquarie Island. Wildlife Research 26, 839-846.

Meylan, A.B. (1978). The Behavorial Ecology of the West Carribean Green Turtle (*Chelonia mydas*) in the Interesting Habitat. University of Florida, Gainesville, p. 131.

Meylan, A.B. (1984). Feeding Ecology of the Hawksbill Turtle (*Eretmochelys imbricata*). University of Florida, Gainesville, p. 115.

Mignucci-Giannoni, A.A., Montoya-Ospina, R.A., Jiménez-Marrero, N.M., Rodríguez-López, M.A., Williams Jr, E.H., Bonde, R.K. (2000). Manatee Mortality in Puerto Rico. Environmental Management 25, 189-198.

Misaki, H. (1999). Sharks Entanglement in Plastic Band. Report of Japanese Society of Elasmobranch Studies 35, 8-9.

Montealegre-Quijano, S., Vooren, C.M. (2010). Distribution and Abundance of the Life Stages of the Blue Shark (*Prionace glauca*) in the Southwest Atlantic. Fisheries Research 101, 168-179.

Mooney, J., Naughton, J. (1981). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 6, 10.

Moore, E., Lyday, S., Roletto, J., Litle, K., Parrish, J.K., Nevins, H., Harvey, J., Mortenson, J., Greig, D., Piazza, M., Hermance, A., Lee, D., Adams, D., Allen, S., Kell, S. (2009). Entanglement of Marine Mammals and Seabirds in Central California and the North-West Coast of the United States 2001-2005. Marine Pollution Bulletin 58, 1045-1051.

Mordecai, G., Tyler, P.A., Masson, D.G., Huvenne, V.A.I. (2011). Litter in submarine canyons off the west coast of Portugal. Deep Sea Research Part II: Topical Studies in Oceanography 58(23-24), 2489-2496.

Moser, M.L., Lee, D.S. (1992). A Fourteen-Year Survey of Plastic Ingestion by Western North Atlantic Seabirds. Colonial Waterbirds 15, 83-94.

Mrosovsky, N., Ryan, G.D., James, M.C. (2009). Leatherback Turtles: The Menace of Plastic. Marine Pollution Bulletin 58, 287-289.

Müller, C., Townsend, K., Matschullat, J. (2012). Experimental degradation of polymer shopping bags (standard and degradable plastic, and biodegradable) in the gastrointestinal fluids of sea turtles. Science of the Total Environment 416, 464-467.

Murray, F., Cowie, P.R. (2011). Plastic Contamination in the Decapod Crustacean, *Nephrops norvegicus* (Linnaeus, 1758). Marine Pollution Bulletin 62, 1207-1217.

Nel, D.C., Nel, J.L. (1999). Marine Debris and Fishing Gear Associated with Seabirds at Sub-Antarctic Marion Island, 1996/97 and 1997/98: In Relation to Longline Fishing Activity. CCAMLR Science 6, 85-96.

Nevins, H., Hyrenbach, D., Keiper, C., Stock, J., Hester, M., Harvey, J. (2005). Seabirds as Indicators of Plastic Pollution in the North Pacific. Paper for Plastic Debris Rivers to the Sea Conference.

Nielsen, J., Hedeholm, R.B., Simon, M., Steffensen, J.F. (2013). Distribution and feeding ecology of the Greenland shark (*Somniosus microcephalus*) in Greenland waters. Polar Biology, 37(1), 37-46.

Norman, F.I., Brown, R. (1987). Notes on Common Diving-Petrels *Pelecanoides urinatrix* Found Beach-Washed in Victoria, 1985. Emu 87, 179-184.

Norman, F.I., Menkhorst, P.W., Hurley, V.G. (1995). Plastics in Nests of Australasian Gannets, *Morus serrator*, in Victoria, Australia. Emu 95, 129-133.

Ogi, H. (1990). Ingestion of Plastic Particles by Sooty and Short-Tailed Shearwaters in the North Pacific, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 635-652.

Onions, C., Rees, G. (1992). An Assessment of the Environmental Impacts of Carriers Discarded in the Marine Environemtn and the Benefits Derived from Those Fabricated from a Photodegradable Plastic Giving Enhanced Degradability. The Tidy Group, Wigan.

O'Shea, T.J., Beck, C.A., Bonde, R.K., Kochman, H.I., Odell, D.K. (1985). An Analysis of Manatee Mortality Patterns in Florida, 1976-81. The Journal of Wildlife Management 49, 1-11.

Osinga, N., t Hart, P. (2006). Fish-Hook Ingestion in Seals (*Phoca vitulina* and *Halichoerus grypus*): The Scale of the Problem and a Non-Invasive Method for Removing Fish-Hooks. Aquatic Mammals 32, 261-264.

Page, B., McKenzie, J., McIntosh, R., Baylis, A., Morrissey, A., Calvert, N., Haase, T., Berris, M., Dowie, D., Shaughnessy, P.D., Goldsworthy, S.D. (2004). Entanglement of Australian Sea Lions and New Zealand Fur Seals in Lost Fishing Gear and Other Marine Debris before and after Government and Industry Attempts to Reduce the Problem. Marine Pollution Bulletin 49, 33-42.

Parslow, J.L.F., Jefferies, D.J. (1972). Elastic Thread Pollution of Puffins. Marine Pollution Bulletin 3, 43-45.

Payne, M. (1979). Growth in the Antarctic Fur Seal *Arctocephalus gazella*. Journal of Zoology 187, 1-20.

Pedersen, C.E., Falk, K. (2001). Chick Diet of Dovekies, *Alle alle*, in Northwest Greenland. Polar Biology 24, 53-58.

Pemberton, D. (1993). Ecology of Fur Seals. Status and Management of Seals in Tasmania. Report for the Australian National Parks and Wildlife Service. Department of Environment and Land Management, Canberra.

Pemberton, D., Brothers, N., Kirkwood, R. (1992). Entanglement of Australian Fur Seals in Man-Made Debris in Tasmanian Waters. Wildlife Research 19, 151-159.

Perry, M.C., Olsen, G.H., Richards, R.A., Osenton, P.C. (2013). Predation on Dovekies by Goosefish over Deep Water in the Northwest Atlantic Ocean. Northeastern Naturalist 20, 148-154.

Petracci, P., La Sala, L., Aguirre, F., Perez, G., Acosta, C., Sotelo, N., Pamparana, M. (2004). Diet of the kelp gull (*Larus dominicanus*) during the breeding season in the Bahia Blanca estuary, Buenos Aires, Argentina: Hornero 23-29.

Petry, M.V., Da Silva Fonseca, V.S. (2002). Effects of Human Activities in the Marine Environment on Seabirds Along the Coast of Pio Grande Do Sul, Brazil. Ornitologia Neotropical 13, 137-142.

Petry, M., Da Silva Fonseca, V.S., Scherer, A. (2007). Analysis of Stomach Contents from the Black-Browed Albatross, *Thalassarche melanophris*, on the Coast of Rio Grande Do Sul, Southern Brazil. Polar Biology 30, 321-325.

Petry, M.V., Da Silva Fonseca, V.S., Krüger-Garcia, L., da Cruz Piuco, R., Brummelhaus, J. (2008). Shearwater Diet During Migration Along the Coast of Rio Grande Do Sul, Brazil. Marine Biology 154, 613-621.

Petry, M.V., Krüger, L., Da Silva Fonseca, V.S., Brummelhaus, J., da Cruz Piuco, R. (2009). Diet and Ingestion of Synthetics by Cory's Shearwater, *Calonectris diomedea*, Off Southern Brazil. Journal of Ornithology 150, 601-606.

Pettit, T.N., Grant, G.S., Whittow, G.C. (1981). Ingestion of Plastics by Laysan Albatross. Auk 98, 839-841.

Phillips, R.A., Ridley, C., Reid, K., Pugh, P.J.A., Tuck, G.N., Harrison, N. (2010). Ingestion of Fishing Gear and Entanglements of Seabirds: Monitoring and Implications for Management. Biological Conservation 143, 501-512.

Philo, L.M., George, J.C., Albert, T.F. (1992). Rope Entanglement of Bowhead Whales (*Balaena mysticetus*). Marine Mammal Science 8, 306-311.

Pierce, K.E., Harris, R.J., Larned, L.S., Pokras, M.A. (2004). Obstruction and Starvation Associated with Plastic Ingestion in a Northern Gannet *Morus bassanus* and a Greater Shearwater *Puffinus gravis*. Marine Ornithology 32, 187-189.

Pinedo, M.C. (1982). Análises Dos Conteúdos Estomacias De *Pontoporia blainvillei* (Gervais and D'orbigny, 1844) E *Tursiops gephyreus* (Lahille, 1908) (Cetacea, Platanistidae E Delphinidae) Na Zona Estuarial E Costeira Do Rio Grande, Rs, Brazil. Inuversidade do Rio Grande, Rio Grande, Brazil, p. 95.

Pinto, M.B.L.C., Siciliano, S., Di Benedite, M. (2006). Stomach Contents of the Magellanic Penguin, *Spheniscus magellanicus*, from the Northern Distribution Limit on the Atlantic Coast of Brazil. Marine Ornithology 35, 77-78.

Pham, C.K., Gomes-Pereira, J.N., Isidro, E.J., Santos, R.S., Morato, T. (2013). Abundance of litter in the Condor Seamount. Deep Sea Research Part II: Topical Studies in Oceanography 98(A), 204-208. doi: http://dx.doi.org/10.1016/j.dsr2.2013.01.011

Plot, V., Georges, J.-Y. (2010). Plastic Debris in a Nesting Leatherback Turtle in French Guiana. Chelonian Conservation and Biology 9, 267-270.

Plotkin, P., Amos, A.F. (1990). Effects of Anthropogenic Debris on Sea Turtles in the Northwestern Gulf of Mexico, in: Shomura, R.S., Godfrey, M. L. (Eds.), Proceedings of the Second International Conference of marine debris U.S Dep. Commer., NOAA Tech Memo, NMFS, Honolulu, Hawaii, pp. 736-743.

Plotkin, P., Wicksten, M., Amos, A. (1993). Feeding Ecology of the Loggerhead Sea Turtle *Caretta caretta* in the Northwestern Gulf of Mexico. Marine Biology 115, 1-5.

Podolski, R.H., Kress, S.W. (1989). Plastic Debris Encorporated into Double-Crested Cormorant Nests in the Gulf of Maine. Journal of Field Ornithology 60, 248-250.

Poncelet, E., Van Canneyt, O., Boubert, J.-J. (2000). Considerable Amount of Plastic Debris in the Stomach of a Cuvier’s Beaked Whale (*Ziphius cavirostris*) Washed Ashore on the French Atlantic Coast. European Research on Cetaceans 14, 44-47.

Poppi, L., Zaccaroni, A., Pasotto, D., Dotto, G., Marcer, F., Scaravelli, D., Mazzariol, S. (2012). Post-Mortem Investigations on a Leatherback Turtle, *Dermochelys coriacea*, Stranded Along the Northern Adriatic Coastline. Diseases of Aquatic Organisms 100, 71.

Possatto, F.E., Barletta, M., Costa, M.F., Ivar do Sul, J.A., Dantas, D.V. (2011). Plastic Debris Ingestion by Marine Catfish: An Unexpected Fisheries Impact. Marine Pollution Bulletin 62, 1098-1102.

Powlesland, R.G., Sharp, S.E., Smith, A.H. (2008). Aspects of the Breeding Biology of the Pied Shag (*Phalacrocorax varius*) at Makara Beach, Wellington, New Zealand. Notornis 55, 69-76.

Provencher, J.F., Gaston, A.J., Mallory, M. (2009). Evidence for Increased Ingestion of Plastics by Northern Fulmars (*Fulmarus glacialis*) in the Canadian Arctic. Marine Pollution Bulletin 58, 1078-1096.

Provencher, J.F., Gaston, A.J., Mallory, M.L., O'Hara, P.D., Gilchrist, H.G. (2010). Ingested Plastic in a Diving Seabird, the Thick-Billed Murre (*Uria lomvia*), in the Eastern Canadian Arctic. Marine Pollution Bulletin 60, 1406-1411.

Provencher, J.F., Bond, A.L., Hedd, A., Montevecchi, W.A., Muzaffar, S.B., Courchesne, S.J., Gilchrist, H., Jamieson, S.E., Merkel, F.R., Falk, K., Durinck, J., Mallory, M. L. (2014). Prevalence of marine debris in marine birds from the North Atlantic. Marine Pollution Bulletin 84(1–2), 411-417. doi: http://dx.doi.org/10.1016/j.marpolbul.2014.04.044

Rabalais, S.C., Rabalais, N.N. (1980). The Occurence of Sea Turtles on the South Texas Coast. Contributions in Marine Science 23, 123-129.

Ramirez, G.D. (1984). Capture of Southern Sea Lions (*Otaria flavescens*) in the Wild by Drug Immobilization. Abstract from the First Conference on the Work of Experts on Marine Mammals of South America, Buenos Aires, Argentina.

Ramirez, G.D. (1986). Rescue of Entangled South American Sea Lions (*Otaria flavescens*). A report for the center of environmental education, Washington D.C., p. 16.

Ramirez-Llodra, E., Tyler, P.A., Baker, M.C., Bergstad, O.A., Clark, M.R., Escobar, E., Levin, L.A., Menot, L., Rowden, A.A., Smith, C.R. (2011). Man and the Last Great Wilderness: Human Impact on the Deep Sea. PloS ONE 6, e22588.

Ramos, J.A., Barletta, M., Costa, M.F. (2012). Ingestion of Nylon Threads by Gerreidae While Using a Tropical Estuary as Foraging Grounds. Aquatic Biology 17, 29-34.

Randall, J. (1992). Review of the Biology of the Tiger Shark (*Galeocerdo cuvier*). Marine and Freshwater Research 43, 21-31.

Raum-Suryan, K.L., Jemison, L.A., Pitcher, K.W. (2009). Entanglement of Steller Sea Lions (*Eumetopias jubatus*) in Marine Debris: Identifying Causes and Finding Solutions. Marine Pollution Bulletin 58, 1487-1495.

Reed, S. (1981). Wreck of Kerguelen and Blue Petrel. Notornis 28, 239-240.

Reis, E.C., Pereira, C.S., Rodrigues, D.d.P., Secco, H.K.C., Lima, L.M., Rennó, B., Siciliano, S. (2010). Condicao De Saúde Das Tartarugas Marinhas Do Litoral Centro-Norte Do Estado Do Rio De Janeiro, Brasil: Avaliacao Sobre a Presenca De Agentes Bacterianos, Fibropapilomatose E Interacao Com Resíduos Antropogenicos. Oecologia Australis 14(3), 756-765.

Richardson, S.A., Hays, D., Spencer, R., Stofel, J. (2000). Washington State Status Report for the Common Loon. Washington Department of Fish and Wildlife, Olympia.

Robards, M.D., Piatt, J.F., Wohl, K.D. (1995). Increasing Frequency of Plastic Particles Ingested by Seabirds in the Subarctic North Pacific. Marine Pollution Bulletin 30, 151-157.

Robards, M.D., Gould, P.J., Piatt, J.F. (1997). The Highest Global Concentration and Increased Abundance of Oceanic Plastic Debris in the North Pacific: Evidence from Seabirds. Springer Series on Environmental Management. Springer Verlag, New York.

Robertson, C.J.R., Bell, E. (2002). Autopsy Report for Seabirds Killed and Returned from New Zealand Fisheries, 1 October 1998 to 30 September 1999. DOC Science Internal Series 155 Department of Conservation, Wellington, New Zealand.

Robertson, C.J.R., Bell, E., Scofield, P. (2004). Autopsy Report for Seabirds Killed and Returned from New Zealand Fisheries, 1 October 2001 to 30 September 2002, DOC Science Internal Series 155 Department of Conservation, Wellington, New Zealand.

Rodriguez, A., Rodriguez, B., Nazaret Carrasco, M. (2012). High Prevalence of Parental Delivery of Plastic Debris in Cory's Shearwaters (*Calonectris diomedea*). Marine Pollution Bulletin 64, 2219-2223.

Rodríguez, B., Bécares, J., Rodríguez, A., Arcos, J. M. (2013). Incidence of entanglement with marine debris by northern gannets (*Morus bassanus*) in the non-breeding grounds. Marine Pollution Bulletin, 75, 259-263.

Rogan, E., Mackey, M. (2007). Megafauna Bycatch in Drift Nets for Albacore Tuna (*Thunnus alalunga*) in the NE Atlantic. Fisheries Research 86, 6-14.

Rothstein, S.I. (1973). Plastic Particle Pollution of the Surface of the Atlantic Ocean: Evidence from a Seabird. Condor 75, 344-345.

Ryan, P.G. (1986). The Incidence and Effects of Ingested Plastic on Seabirds. University of Cape Town.

Ryan, P.G. (1987a). The Origin and Fate of Artefacts Stranded on Islands in the African Sector of the Southern Ocean. Environmental Conservation 14, 341-346.

Ryan, P.G. (1987b). The Incidence and Characteristics of Plastic Particles Ingested by Seabirds. Marine Environmental Research 23, 175-206.

Ryan, P.G. (1990a). The Marine Plastic Debris Problem Off Southern Africa: Types of Debris, Their Environmental Effects, and Control Measures. , in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii.

Ryan, P.G. (1990b). The Intraspecific Variation in Plastic Ingestion by Seabirds and the Flux of Plastic through Seabird Populations. Condor 90, 446-452.

Ryan, P.G. (1991). The Impact of the Commercial Lobster Fishery on Seabirds at the Tristan Da Cunha Islands, South Atlantic Ocean. Biological Conservation 57, 339-350.

Ryan, P.G., Fraser, M.W. (1988). The Use of Great Skua Pellets as Indicators of Plastic Pollution in Seabirds. Emu 88, 16-19.

Sadove, S.S. (1980). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 5, 15.

Sadove, S.S., Morreale, S.J. (1990). Marine Mammal and Sea Turtle Encounters with Marine Debris in the New York Bight and the Northeast Atlantic, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 562-570.

Salvador, A. (1978). Materiales Para Una Herpetofauna Balearica. 5 Las Salamanquesas Y Tortugas Del Archipelagi De Caberera. Donana. Acta Vertebratica 5, 5-17.

Santos, M.N., Saldanha, H.J., Gaspar, M.B., Monteiro, C.C. (2003). Hake (*Merluccius merluccius* L., 1758) Ghost Fishing by Gill Nets Off the Algarve (Southern Portugal). Fisheries Research 64, 119-128.

Santos, M., Martin, V., Arbelo, M., Fernández, A., Pierce, G. (2007). Insights into the Diet of Beaked Whales from the Atypical Mass Stranding in the Canary Islands in September 2002. Journal of the Marine Biological Association of the United Kingdom 87, 243-251.

Sazima, I., Gadig, O.B.F., Namora, R.C., Motta, F.S. (2002). Plastic Debris Collars on Juvenile Carcharhinid Sharks (Rhizoprionodon lalandii) in Southwest Atlantic. Marine Pollution Bulletin 44, 1149-1151.

Schleyer, M.H., Tomalin, B.J. (2000). Damage on South African coral reefs and an assessment of their sustainable diving capacity using a fisheries approach. Bulletin of Marine Science 67, 1025-1042.

Schoelkopf, R. (1981). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 6, 17.

Schofield, T.D., Stamper, A., Whitaker, B., Geraci, J. (1994). A Young Whale, the Victim of Ocean-Borne Plastic. Paper posters and manuscripts from the Third International Conference on Marine Debris, 35

Schrey, E., Vauk, G.J. (1987). Records of Entangled Gannets, *Sula bassana*, at Helgoland, German Bight. Marine Pollution Bulletin 18, 350-352.
Schuyler, Q., Hardesty, B.D., Wilcox, C., Townsend, K. (2012). To Eat or Not to Eat? Debris Selectivity by Marine Turtles. PloS ONE 7, e40884.

Schwartz, M.L., Hohn, A.A., Bernard, H.J., Chivers, S.J., Peltier, K.M. (1992). Stomach Contens of Beach-Cast Cetaceans Collected Along the San Diego County Coast of California 1972-1991. U.S. Department of Commerce, Southwest Fisheries Science Center.

Scordino, J. (1985). Studies on Fur Seal Entanglement, 1981-84, St Paul Island, Alaska, in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, p. 29.

Scott, M.D., Hohn, A.A., Westgate, A.J., Nicolas, J., Whitaker, B.R., Campbell, W.B. (2001). A Note on the Release and Tracking of a Rehabilitated Pygmy Sperm Whale (*Kogia breviceps*). Journal of Cetacean Research and Management 3, 87-94.

Secchi, E.R., Zarzur, S. (1999). Plastic Debris Ingested by a Blainville's Beaked Whale, *Mesoplodon densirostris*, Washed Ashore in Brazil. Aquatic Mammals 25, 21-24.

Shaughnessy, P.D. (1980). Entanglement of Cape Fur Seals with Man-Made Objects. Marine Pollution Bulletin 11, 332-336.

Shaver, D.J. (1991). Feeding Ecology of Wild and Head-Started Kemp's Ridley Sea Turtles in South Texas Waters. Journal of Herpetology, 327-334.

Shoham-Frider, A., Amiel, S., Roditi-Elasar, M., Kress, N. (2002). Risso's Dolphin (*Grampus griseus*) Stranding on the Coast Off Israel (Eastern Mediterranean). Autopsy Results and Trace Metal Concetrations. The Science of the Total Environment 295, 157-166.

Shoop, C.R., Ruckdeschel, C.A. (1989). Analysis of Sea Turtles Gut Contents for Nonfood Components, Final Report to the U.S. Department of Commerce.

Sileo, L., Sievert, P.R., Samuel, M.D. (1990a). Causes of Mortality of Albatross Chicks at Midway Atoll. Journal of Wildlife Diseases 26, 329-338.

Sileo, L., Sievert, P.R., Samuel, M.D., Fefer, S.I. (1990b). Prevalence and Characteristics of Plastic Ingested by Hawaiian Seabirds, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the second international Conference on marine debris, 2-7 April 1989, Honolulu, Hawaii, pp. 665-681.

Simmonds, M.P. (2012). Cetaceans and Marine Debris: The Great Unknown. Journal of Marine Biology 2012 Article ID 684279, 1-8.

Simpfendorfer, C.A., Goodreid, A.B., McAuley, R.B. (2001). Size, Sex and Geographic Variation in the Diet of the Tiger Shark, *Galeocerdo cuvier*, from Western Australian Waters. Environmental Biology of Fishes 61, 37-46.

Skira, I. (1986). Food of the Short-Tailed Shearwater, *Puffinus tenuirostris*, in Tasmania. Wildlife Research 13, 481-488.

Slater, J. (1991). Leopard Seal Entanglement in Tasmania, Australia. Marine Mammal Science 7, 323.

Slater, J. (1992). The Incidence of Marine Debris in the Southwest of the World Heritage Area. The Tasmanian Naturalist 111, 32-35.

Slater, J. (1994). Plastic Ingestion by Seabirds in Tasmania, Australia, in: Clary, J.C. (Ed.), In posters and manuscripts from the Third International Conference on Marine Debris. U.S Department of Commerce.

Slip, D.J. (1990). Fishing Debris Brings a New Problem to the Southern Ocean. Australian National Antarctic Research Expedition ANARE News (June).

Slooten, E., Wang, J.Y., Dungan, S.Z., Forney, K.A., Hung, S.K., Jefferson, T.A., Riehl, K.N., Rojas-Bracho, L., Ross, P.S., Wee, A. (2013). Impacts of Fisheries on the Critically Endangered Humpback Dolphin *Sousa chinensis* Population in the Eastern Taiwan Strait. Endangered Species Research 22, 99-114.

Smith, S.D.A., Edgar, R.J. (2014). Documenting the Density of Subtidal Marine Debris across Multiple Marine and Coastal Habitats. PLoS ONE 9, e94593. doi 10.1371/journal.pone.0094593

Souza, S., Siciliano, S., Cuenca, S., Sanctis, B. (2005). A True's Beaked Whale (*Mesoplodon mirus*) on the Coast of Brazil: Adding a New Beaked Whale Species to the Western Tropical Atlantic and South America. Latin American Journal of Aquatic Mammals 4, 129-136.

Spear, L.B., Ainley, D.G., Ribic, C.A. (1995). Incidence of Plastic in Seabirds from the Tropical Pacific 1984-91: Relation with Distribution of Species, Sex, Age, Season, Year and Body Weight. Marine Environmental Research 40, 123-146.

Spence, L. (1994). The Death of a Whale: Using a Stranding Incident for Public Education. Papers, posters and manuscripts from the Third International Conference on Marine Debris.

Stamper, M.A., Whitaker, B.R., Schofield, T.D. (2006). Case Study: Morbidity in a Pygmy Sperm Whale *Kogia breviceps* Due to Ocean-Bourne Plastic. Marine Mammal Science 22, 719-722.

Stamper, M.A., Spicer, C.W., Neiffer, D.L., Mathews, K.S., Fleming, G.J. (2009). Morbidity in a Juvenile Green Sea Turtle (*Chelonia mydas*) Due to Ocean-Borne Plastic. Journal of Zoo and Wildlife Medicine 40, 196-198.

Stanley, K., Stabenau, E., Landry, A. (1988). Debris Ingestion by Sea Turtles Along the Texas Coast. Eighth Annual Workshop on Sea Turtle Conservation and Biology. Fort Fisher, NC, USA: NOAA Technical Memorandum, pp. 119-121.

Steele, W. (1992). Diet of Hartlaub's Gull *Larus hartlaubii* and the Kelp Gull *L. dominicanus* in the Southwestern Cape Province, South Africa. Ostrich 63, 68-82.

Sternfeld, M. (2004). Marine Mammal Strandings as Reported to National Marine Fisheries Service, Alaska Region: 2003. Juneau, Alaska: National Marine Fisheries Service, Alaska Region Protected Resources.

Sternfeld, M. (2005). Draft 2004 Marine Mammal Strandings as Reported to National Marine Fisheries Service, Alaska Region. Juneau, Alaska: National Marine Fisheries Service, Alaska Region Protected Resources.

Sternfeld, M. (2006). Draft 2005 Alaska Region Marine Mammal Stranding Summary. Juneau, Alaska. National Marine Fisheries Service, Alaska Region, Protected Resources.

Stevens, J.D. (1984). Biological observations on sharks caught by sport fisherman of New South Wales. Marine and Freshwater Research 35(5), 573-590.

Stevens, J., McLoughlin, K. (1991). Distribution, Size and Sex Composition, Reproductive Biology and Diet of Sharks from Northern Australia. Marine and Freshwater Research 42, 151-199.

Stevens, B.G., Vining, I., Byersdorfer, S., Donaldson, W. (2000). Ghost Fishing by Tanner Crab (*Chionoecetes bairdi*) Pots Off Kodiak, Alaska: Pot Density and Catch Per Trap as Determined from Sidescan Sonar and Pot Recovery Data. Fishery Bulletin 98, 389-399.

Stewart, B.S., Yochem, P.K. (1987). Entanglement of Pinnipeds in Synthetic Debris and Fishing Net and Line Fragments at San Nicolas and San Miguel Islands, California, 1978-1986. Marine Pollution Bulletin 18, 336-339.

Stewart, B.S., Yochem, P.K. (1990). Pinniped Entanglement in Synthetic Materials in the Southern California Bight, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 554-561.

Stienen, E.W.M., Van de walle, M. (2010). Vogelstrandingen op de Vlaamse stranden winter 2009/10. Rapport van het Instituut voor Natuur- en Bosonderzoek, R.2010.55. Instituut voor Natuur- en Bosonderzoek (INBO): Brussel. 38 pp.

Tarpley, R.J. (1990). Plastic Ingestion in a Pygmy Sperm Whale, *Kogia breviceps*, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, p. 745.

Tarpley, R.J., Marwitz, S. (1993). Plastic Debris Ingestion by Cetaceans Along the Texas Coast: Two Case Reports. Aquatic Mammals 19, 93-98.

Taylor, J.A. (2004). Beach Patrol Scheme: Seabirds Found Dead on New Zealand Beaches, 1997-1999. Notornis 51, 176-191.

Teas, W.G., Witzell, W.N. (1994). Effects of Anthrogogenic Debris on Marine Turtles in the Western North Atlantic, in: Clary, J.C. (Ed.), In posters and manuscripts from the Third International Conference on Marine Debris. U.S Department of Commerce.

Threlfall, W. (1968). The Food of Three Species of Gulls in Newfoundland. The Canadian Field Naturalist 82, 176-180.

Thiel, M., Bravo, M., Hinojosa, I.A., Luna, G., Miranda, L., Núñez, P., Pacheco, A.S., Vásquez, N. (2011). Anthropogenic Litter in the SE Pacific: An Overview of the Problem and Possible Solutions. RGCI-Revista de Gestão Costeira Integrada 11.

Tomás, J., Guitart, R., Mateo, R., Raga, J.A. (2002). Marine debris ingestion in loggerhead sea turtles, *Caretta caretta*, from the Western Mediterranean. Marine Pollution Bulletin 44(3), 211-216. doi: http://dx.doi.org/10.1016/S0025-326X(01)00236-3

Tonay, A.M., Dede, A., Öztürk, A.A., Öztürk, B. (2007). Stomach Content of Harbour Porpoises (*Phocoena phocoena*) from the Turkish Western Black Sea in Spring and Early Summer. Rapport Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée 38, 616.

Tourinho, P.S., Ivar do Sul, J.A., Fillmann, G. (2010). Is Marine Debris Ingestion Still a Problem for the Coastal Marine Biota of Southern Brazil? Marine Pollution Bulletin 60, 396-401.

Townsend, S.E. (2011). Impact of Ingested Marine Debris on Sea Turtles of Eastern Australia: Life History Stage Susceptibility, Pathological Implications and Plastic Bag Preference. Fifth International Marine Debris Conference, Honolulu, Hawaii, pp. 136-140.

Uchida, I. (1990). On the Synthetic Materials Found in the Digestive Systems of, and Discharged by, Sea Turtles Collected in Waters Adjacent to Japan, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, p. 744.

Udyawer, V., Read, M.A., Hamann, M., Simpfendorfer, C.A., Heupel, M.R. (2013). First Record of Sea Snake (*Hydrophis elegans*, Hydrophiinae) Entrapped in Marine Debris. Marine Pollution Bulletin 73, 336-338.

Uhrin, A.V, Fonseca, M.S., DiDomenico, G.P. (2005). Effect of Caribbean Spiny Lobster Traps on Seagrass Beds of the Florida Keys National Marine Sanctuary: Damage Assessment and Evaluation of Recovery American Fisheries Society Symposium. American Fisheries Society, pp 579-588.

Uhrin, A.V., Schellinger, J. (2011). Marine debris impacts to a tidal fringing-marsh in North Carolina. Marine Pollution Bulletin 62(12), 2605-2610. doi: http://dx.doi.org/10.1016/j.marpolbul.2011.10.006

United States of America (1991). Report on Assessment and Avoidance of Incidental Mortality in the Convention Area 1990/91. Report of the U.S. Delegation to the Commission for the Conservation of Antarctic Marine Living Resources. CCAMLR-X/BG/7.

US Fish and Wildlife Service (1980). California Brown Pelican Recovery Plan. U.S. Fish and Wildlife Service Regional Office, Portland, OR.

Van der Hoop, J., Moore, M., Fahlman, A., Bocconcelli, A., Gearge, C., Kackson, K., Miller, C., Morin, D., Pichford, T., Rowles, T., Smith, J., Zoodsma, B. (2013). Behavioral Impact of Disentanglement of a Right Whale under Sedation and the Energetic Costs of Entanglement. Marine Mammal Science 30, 282–307.

Van Franeker, J.A. (1983). Plastics - een bedreiging voor zeevogels. Nieuwsbrief NSO 14(2), 41-61.

Van Franeker, J.A. (1985). Plastic ingestion in the North Atlantic fulmar. Marine Pollution Bulletin 16(9), 367-369. doi: 10.1016/0025-326x(85)90090-6

Van Franeker, J.A., Bell, P.J. (1988). Plastic Ingestion by Petrels Breeding in Antarctica. Marine Pollution Bulletin 19, 672-674.

Van Franeker, J.A., Blaize, C., Danielsen, J., Fairclough, K., Gollan, J., Guse, N., Hansen, P.L., Heubeck, M., Jensen, J.K., Le Guillou, G., Olsen, B., Olsen, K.O., Pedersen, J., Stienen, E.W., Turner, D.M. (2011). Monitoring Plastic Ingestion by the Northern Fulmar *Fulmarus glacialis* in the North Sea. Environmental Pollution 159, 2609-2615.

Van Nierop, M.M., Den Hartog , C.J. (1984). A Study on the Gut Contents of Five Juvenile Loggerhead Turtles, *Caretta caretta* (Linnaeus) (Reptilia, Cheloniidae), from the Southeastern Part of the North Atlantic Ocean, with Emphasis on Coelenterata Identification. Zoologische Mededelingen (Leiden) 59, 35-54.

Van Noord, J.E. (2013). Diet of Five Species of the Family Myctophidae Caught Off the Mariana Islands. Ichthyological Research 60, 89-92.

Vargo, G.A., Atwood, K., van Deventer, M., Harris, R. (2006). Beached Bird Surveys on Shell Key, Pinellas County, Florida. Florida Field Naturalist 34, 21-27.

Vauk-Hentzelt, K. (1982). Missbildungen, Verletzungen Und Krankheiten Auf Helgoland Erlegter Silbermöwen (Deformities, Injuries and Illnesses of Silver Gulls That Died in Helgoland). Niedersächsischer Jäger 15, 700-702.

Viehman, S., Vander Pluym, J.L., Schellinger, J. (2011). Characterization of marine debris in North Carolina salt marshes. Marine Pollution Bulletin 62(12), 2771-2779.

Vliestra, L.S., Parga, J.A. (2002). Long-Term Changes in the Type, but Not Amount, of Ingested Plastic Particles in Short-Tailed Shearwaters in the Southeastern Berin Sea. Marine Pollution Bulletin 44, 945-955.

Votier, S.C., Archibald, K., Morgan, G., Morgan, L. (2011). The use of plastic debris as nesting material by a colonial nesting seabird and associated entanglement mortality. Marine Pollution Bulletin, 62, 168-172.

Waldichuk, M. (1978). Disposal of Mine Wastes into the Sea. Marine Pollution Bulletin 9, 141-143.

Walker, W.A., Coe, J.M. (1990). Survey of Marine Debris Ingestion by Odontocete Cetaceans, in: Shomura, R.S., Godfrey, M.L. (Eds.), Proceedings of the Second International Conference on marine debris. U.S. Dep. Commer., NOAA Tech. Memo., NMFS, Honolulu, Hawaii, pp. 747-774.

Walker, W.A., Hanson, M.B. (1999). Biological Observations on Stejneger's Beaked Whale, *Mesoplodon stejnegeri*, from Strandings on Adak Island, Alaska. Marine Mammal Science 15, 1314-1329.

Wallace, N. (1985). Debris Entanglement in the Marine Environment: A Review in: Shomura, R.S., Yoshida, H.O. (Eds.), Proceedings of the Workshop on the fate and impact of marine debris. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, Honolulu, Hawaii, pp. 259-277.

Waluda, C.M., Staniland, I.J. (2013). Entanglement of Antarctic Fur Seals at Bird Island, South Georgia. Marine Pollution Bulletin 74, 244-252.

Waring, G., Pace, R., Quintal, J., Fairfield, C., Maze-Foley, K. (2004). US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2003. NOAA Technical Memorandum NMFS-NE 182, 287.

Wegner, N.C., Cartamil, D.P. (2012). Effects of Prolonged Entanglement in Discarded Fishing Gear with Substantive Biofouling on the Health and Behavior of an Adult Shortfin Mako Shark, *Isurus oxyrinchus*. Marine Pollution Bulletin 64, 391-394.

Wehle, D., Coleman, F.C. (1983). Plastics at Sea. Natural History 92, 21-26.

Weir, D.N., Kitchener, A.C., McGowan, R.Y., Kinder, A. Zonfrillo, B. (1997). Origins, population structure, pathology and diet samples of diver and auk casualties of the Sea Empress oil spill. Final Report by the National Museums of Scotland and University of Edinburgh to the Sea Empress Environmental Evaluation Committee, CCW Contract No. FC 73-02-69.

Weiser, E.L., Powell, A.N. (2011). Evaluating Gull Diets: A Comparison of Conventional Methods and Stable Isotope Analysis. Evaluando Las Dietas De Gaviotas: Una Comparación De Métodos Convencionales Y El Análisis De Isótopos Estables. Journal of Field Ornithology 82, 297-310.

White, D. (2006). Marine Debris in Northern Territory Waters, WWF Australia, Sydney.

West, J.A., Imber, M.J. (1986). Some foods of Buller's mollymawk *Diomedea bulleri*. New Zealand Journal of Zoology 13(2), 169-174. doi: 10.1080/03014223.1986.10422659

Wieczorek, S., Campagnuolo, S., Moore, P., Froglia, C., Atkinson, R., Gramitto, E., Bailey, N. (1999). The composition and fate of discards from *Nephrops* trawling in Scottish and Italian waters. EC Study Project Report 96, 092.

Witherington, B., Hirama, S., Hardy, R. (2012). Young Sea Turtles of the Pelagic Sargassum-Dominated Drift Community: Habitat Use, Population Density, and Threats. Marine Ecology Progress Series 463, 1-22.

Wolf, R. (1982). Marine Turtles. Scientific Event Alert Network (SEAN) Bulletin 7, 15.

Work, T. M., Balazs, G. H. (2002). Necropsy findings in sea turtles taken as bycatch in the North Pacific longline fishery. Fishery Bulletin 100(4), 876-880.

Yamada, T.K., Tajima, Y., Yatabe, A., Pitman, R., Brownell Jr, R. (2012a). Review of Current Knowledge on *Indopacetus pacificus* Including Identification of Knowledge Gaps and Suggestions for Future Research. 64th Meeting of the International Whaling Commission. Panama City, Panama. SC/64/SM26.

Yamada, T.K., Tajima, Y., Yatabe, A., Allen, B., Brownell Jr, R. (2012b). Review of Current Knowledge on Hubbs' Beaked Whale, *Mesoplodon carlhubbsi*, from the Seas around Japan and Data from the North America. 64th Meeting of the International Whaling Commission. Panama City, Panama. SC/64/SM27.

Yamashita, R., Takada, H., Fukuwaka, M.A., Watanuki, Y. (2011). Physical and Chemical Effects of Ingested Plastic Debris on Short-Tailed Shearwaters, *Puffinus tenuirostris*, in the North Pacific Ocean. Marine Pollution Bulletin 62, 2845-2849.

Yorio, P., Marinao, C., Suárez, N. (2014). Kelp Gulls (*Larus dominicanus*) Killed and Injured by Discarded Monofilament Lines at a Marine Recreational Fishery in Northern Patagonia. Marine Pollution Bulletin 85(1), 186-189. DOI: 10.1016/j.marpolbul.2014.05.052

Yoshikawa, T., Asoh, K. (2004). Entanglement of monofilament fishing lines and coral death. Biological Conservation 117, 557-560. doi http://dx.doi.org/10.1016/j.biocon.2003.09.025

Young, J.W., Lamb, T.D., Le, D., Bradford, R.W., Whitelaw, A.W. (1997). Feeding Ecology and Interannual Variations in Diet of Southern Bluefin Tuna, Thunnus maccoyii, in Relation to Coastal and Oceanic Waters Off Eastern Tasmania, Australia. Environmental Biology of Fishes 50, 275-291.

Young, L.C., Vanderlip, C., Duffy, D.C., Afanasyev, V., Shaffer, S.A. (2009). Bringing Home the Trash: Do Colony-Based Differences in Foraging Distribution Lead to Increased Plastic Ingestion in Laysan Albatrosses? PloS ONE 4, e7623.

Zavala-González, A., Mellink, E. (1997). Entanglement of California Sea Lions, *Zalophus Californianus californianus*, in Fishing Gear in the Central-Northern Part of the Gulf of California, Mexico. Fishery Bulletin 95, 180-184.

Zorich, N.A., Jonas, M.R., Madson, P.L. (2010). Avian Predation at John Day Dam 2009: Estimated Fish Consumption Using Direct Observation with Diet Analysis. US Army Corps of Engineers, Fisheries Field Unit, Bonneville Lock and Dam.

Online supplement 3 Marine Birds and Mammals on which the calculations in this manuscript are made (IOC list of World's birds: Gill and Donsker 2013; Marine Mammal Commission 2013).

Marine birds	
Greater Scaup	*Aythya marila*
Lesser Scaup	*Aythya affinis*
Steller's Eider	*Polysticta stelleri*
Spectacled Eider	*Somateria fischeri*
King Eider	*Somateria spectabilis*
Common Eider	*Somateria mollissima*
Harlequin Duck	*Histrionicus histrionicus*
Labrador Duck	*Camptorhynchus labradorius*
Surf Scoter	*Melanitta perspicillata*
Velvet Scoter	*Melanitta fusca*
White-winged Scoter	*Melanitta deglandi*
Common Scoter	*Melanitta nigra*
Black Scoter	*Melanitta americana*
Red-throated Loon	*Gavia stellata*
Black-throated Loon	*Gavia arctica*
Pacific Loon	*Gavia pacifica*
Great Northern Loon	*Gavia immer*
Yellow-billed Loon	*Gavia adamsii*
King Penguin	*Aptenodytes patagonicus*
Emperor Penguin	*Aptenodytes forsteri*
Gentoo Penguin	*Pygoscelis papua*
Adelie Penguin	*Pygoscelis adeliae*
Chinstrap Penguin	*Pygoscelis antarcticus*
Fiordland Penguin	*Eudyptes pachyrhynchus*
Snares Penguin	*Eudyptes robustus*
Erect-crested Penguin	*Eudyptes sclateri*

Southern Rockhopper Penguin	*Eudyptes chrysocome*
Northern Rockhopper Penguin	*Eudyptes moseleyi*
Royal Penguin	*Eudyptes schlegeli*
Macaroni Penguin	*Eudyptes chrysolophus*
Yellow-eyed Penguin	*Megadyptes antipodes*
Little Penguin	*Eudyptula minor*
African Penguin	*Spheniscus demersus*
Magellanic Penguin	*Spheniscus magellanicus*
Humboldt Penguin	*Spheniscus humboldti*
Galapagos Penguin	*Spheniscus mendiculus*
Laysan Albatross	*Phoebastria immutabilis*
Black-footed Albatross	*Phoebastria nigripes*
Waved Albatross	*Phoebastria irrorata*
Short-tailed Albatross	*Phoebastria albatrus*
Wandering Albatross	*Diomedea exulans*
Antipodean Albatross	*Diomedea antipodensis*
Amsterdam Albatross	*Diomedea amsterdamensis*
Tristan Albatross	*Diomedea dabbenena*
Southern Royal Albatross	*Diomedea epomophora*
Northern Royal Albatross	*Diomedea sanfordi*
Sooty Albatross	*Phoebetria fusca*
Light-mantled Albatross	*Phoebetria palpebrata*
Black-browed Albatross	*Thalassarche melanophris*
Campbell Albatross	*Thalassarche impavida*
Shy Albatross	*Thalassarche cauta*
Chatham Albatross	*Thalassarche eremita*
Salvin's Albatross	*Thalassarche salvini*
Grey-headed Albatross	*Thalassarche chrysostoma*
Atlantic Yellow-nosed Albatross	*Thalassarche chlororhynchos*

Indian Yellow-nosed Albatross	*Thalassarche carteri*
Buller's Albatross	*Thalassarche bulleri*
Southern Giant Petrel	*Macronectes giganteus*
Northern Giant Petrel	*Macronectes halli*
Northern Fulmar	*Fulmarus glacialis*
Southern Fulmar	*Fulmarus glacialoides*
Antarctic Petrel	*Thalassoica antarctica*
Cape Petrel	*Daption capense*
Snow Petrel	*Pagodroma nivea*
Blue Petrel	*Halobaena caerulea*
Broad-billed Prion	*Pachyptila vittata*
Salvin's Prion	*Pachyptila salvini*
Antarctic Prion	*Pachyptila desolata*
Slender-billed Prion	*Pachyptila belcheri*
Fairy Prion	*Pachyptila turtur*
Fulmar Prion	*Pachyptila crassirostris*
Kerguelen Petrel	*Aphrodroma brevirostris*
Great-winged Petrel	*Pterodroma macroptera*
White-headed Petrel	*Pterodroma lessonii*
Atlantic Petrel	*Pterodroma incerta*
Providence Petrel	*Pterodroma solandri*
Magenta Petrel	*Pterodroma magentae*
Murphy's Petrel	*Pterodroma ultima*
Soft-plumaged Petrel	*Pterodroma mollis*
Zino's Petrel	*Pterodroma madeira*
Fea's Petrel	*Pterodroma feae*
Desertas Petrel	*Pterodroma deserta*
Bermuda Petrel	*Pterodroma cahow*
Black-capped Petrel	*Pterodroma hasitata*

Jamaican Petrel	*Pterodroma caribbaea*
Juan Fernandez Petrel	*Pterodroma externa*
Vanuatu Petrel	*Pterodroma occulta*
Kermadec Petrel	*Pterodroma neglecta*
Herald Petrel	*Pterodroma heraldica*
Trindade Petrel	*Pterodroma arminjoniana*
Henderson Petrel	*Pterodroma atrata*
Phoenix Petrel	*Pterodroma alba*
Barau's Petrel	*Pterodroma baraui*
Hawaiian Petrel	*Pterodroma sandwichensis*
Galapagos Petrel	*Pterodroma phaeopygia*
Mottled Petrel	*Pterodroma inexpectata*
White-necked Petrel	*Pterodroma cervicalis*
Black-winged Petrel	*Pterodroma nigripennis*
Chatham Petrel	*Pterodroma axillaris*
Bonin Petrel	*Pterodroma hypoleuca*
Gould's Petrel	*Pterodroma leucoptera*
Collared Petrel	*Pterodroma brevipes*
Cook's Petrel	*Pterodroma cookii*
De Filippi's Petrel	*Pterodroma defilippiana*
Stejneger's Petrel	*Pterodroma longirostris*
Pycroft's Petrel	*Pterodroma pycrofti*
Mascarene Petrel	*Pseudobulweria aterrima*
St. Helena Petrel	*Pseudobulweria rupinarum*
Tahiti Petrel	*Pseudobulweria rostrata*
Beck's Petrel	*Pseudobulweria becki*
Fiji Petrel	*Pseudobulweria macgillivrayi*
Grey Petrel	*Procellaria cinerea*
White-chinned Petrel	*Procellaria aequinoctialis*

Spectacled Petrel	*Procellaria conspicillata*
Black Petrel	*Procellaria parkinsoni*
Westland Petrel	*Procellaria westlandica*
Streaked Shearwater	*Calonectris leucomelas*
Scopoli's Shearwater	*Calonectris diomedea*
Cory's Shearwater	*Calonectris borealis*
Cape Verde Shearwater	*Calonectris edwardsii*
Wedge-tailed Shearwater	*Puffinus pacificus*
Buller's Shearwater	*Puffinus bulleri*
Sooty Shearwater	*Puffinus griseus*
Short-tailed Shearwater	*Puffinus tenuirostris*
Pink-footed Shearwater	*Puffinus creatopus*
Flesh-footed Shearwater	*Puffinus carneipes*
Great Shearwater	*Puffinus gravis*
Christmas Shearwater	*Puffinus nativitatis*
Manx Shearwater	*Puffinus puffinus*
Yelkouan Shearwater	*Puffinus yelkouan*
Balearic Shearwater	*Puffinus mauretanicus*
Bryan's Shearwater	*Puffinus bryani*
Black-vented Shearwater	*Puffinus opisthomelas*
Townsend's Shearwater	*Puffinus auricularis*
Newell's Shearwater	*Puffinus newelli*
Fluttering Shearwater	*Puffinus gavia*
Hutton's Shearwater	*Puffinus huttoni*
Audubon's Shearwater	*Puffinus lherminieri*
Persian Shearwater	*Puffinus persicus*
Tropical Shearwater	*Puffinus bailloni*
Galapagos Shearwater	*Puffinus subalaris*
Bannerman's Shearwater	*Puffinus bannermani*

Heinroth's Shearwater	*Puffinus heinrothi*
Little Shearwater	*Puffinus assimilis*
Barolo Shearwater	*Puffinus baroli*
Boyd's Shearwater	*Puffinus boydi*
Bulwer's Petrel	*Bulweria bulwerii*
Olson's Petrel	*Bulweria bifax*
Jouanin's Petrel	*Bulweria fallax*
Wilson's Storm Petrel	*Oceanites oceanicus*
Elliot's Storm Petrel	*Oceanites gracilis*
Grey-backed Storm Petrel	*Garrodia nereis*
White-faced Storm Petrel	*Pelagodroma marina*
White-bellied Storm Petrel	*Fregetta grallaria*
Black-bellied Storm Petrel	*Fregetta tropica*
New Zealand Storm Petrel	*Fregetta maoriana*
Polynesian Storm Petrel	*Nesofregetta fuliginosa*
European Storm Petrel	*Hydrobates pelagicus*
Least Storm Petrel	*Oceanodroma microsoma*
Wedge-rumped Storm Petrel	*Oceanodroma tethys*
Band-rumped Storm Petrel	*Oceanodroma castro*
Monteiro's Storm Petrel	*Oceanodroma monteiroi*
Cape Verde Storm Petrel	*Oceanodroma jabejabe*
Swinhoe's Storm Petrel	*Oceanodroma monorhis*
Leach's Storm Petrel	*Oceanodroma leucorhoa*
Markham's Storm Petrel	*Oceanodroma markhami*
Tristram's Storm Petrel	*Oceanodroma tristrami*
Black Storm Petrel	*Oceanodroma melania*
Guadalupe Storm Petrel	*Oceanodroma macrodactyla*
Matsudaira's Storm Petrel	*Oceanodroma matsudairae*
Ashy Storm Petrel	*Oceanodroma homochroa*

Hornby's Storm Petrel	*Oceanodroma hornbyi*
Fork-tailed Storm Petrel	*Oceanodroma furcata*
Peruvian Diving Petrel	*Pelecanoides garnotii*
Magellanic Diving Petrel	*Pelecanoides magellani*
South Georgia Diving Petrel	*Pelecanoides georgicus*
Common Diving Petrel	*Pelecanoides urinatrix*
Alaotra Grebe	*Tachybaptus rufolavatus*
Little Grebe	*Tachybaptus ruficollis*
Tricolored Grebe	*Tachybaptus tricolor*
Australasian Grebe	*Tachybaptus novaehollandiae*
Madagascar Grebe	*Tachybaptus pelzelnii*
Least Grebe	*Tachybaptus dominicus*
Pied-billed Grebe	*Podilymbus podiceps*
Atitlan Grebe	*Podilymbus gigas*
White-tufted Grebe	*Rollandia rolland*
Titicaca Grebe	*Rollandia microptera*
Hoary-headed Grebe	*Poliocephalus poliocephalus*
New Zealand Grebe	*Poliocephalus rufopectus*
Great Grebe	*Podiceps major*
Red-necked Grebe	*Podiceps grisegena*
Great Crested Grebe	*Podiceps cristatus*
Horned Grebe	*Podiceps auritus*
Black-necked Grebe	*Podiceps nigricollis*
Colombian Grebe	*Podiceps andinus*
Silvery Grebe	*Podiceps occipitalis*
Junin Grebe	*Podiceps taczanowskii*
Hooded Grebe	*Podiceps gallardoi*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*

Red-billed Tropicbird	*Phaethon aethereus*
Red-tailed Tropicbird	*Phaethon rubricauda*
White-tailed Tropicbird	*Phaethon lepturus*
Great White Pelican	*Pelecanus onocrotalus*
Pink-backed Pelican	*Pelecanus rufescens*
Spot-billed Pelican	*Pelecanus philippensis*
Dalmatian Pelican	*Pelecanus crispus*
Australian Pelican	*Pelecanus conspicillatus*
American White Pelican	*Pelecanus erythrorhynchos*
Brown Pelican	*Pelecanus occidentalis*
Peruvian Pelican	*Pelecanus thagus*
Ascension Frigatebird	*Fregata aquila*
Christmas Frigatebird	*Fregata andrewsi*
Magnificent Frigatebird	*Fregata magnificens*
Great Frigatebird	*Fregata minor*
Lesser Frigatebird	*Fregata ariel*
Northern Gannet	*Morus bassanus*
Cape Gannet	*Morus capensis*
Australasian Gannet	*Morus serrator*
Abbott's Booby	*Papasula abbotti*
Blue-footed Booby	*Sula nebouxii*
Peruvian Booby	*Sula variegata*
Masked Booby	*Sula dactylatra*
Nazca Booby	*Sula granti*
Red-footed Booby	*Sula sula*
Brown Booby	*Sula leucogaster*
Little Pied Cormorant	*Microcarbo melanoleucos*
Reed Cormorant	*Microcarbo africanus*
Crowned Cormorant	*Microcarbo coronatus*

Little Cormorant	*Microcarbo niger*
Pygmy Cormorant	*Microcarbo pygmeus*
Red-legged Cormorant	*Phalacrocorax gaimardi*
Flightless Cormorant	*Phalacrocorax harrisi*
Bank Cormorant	*Phalacrocorax neglectus*
Spotted Shag	*Phalacrocorax punctatus*
Pitt Shag	*Phalacrocorax featherstoni*
Pallas's Cormorant	*Phalacrocorax perspicillatus*
Brandt's Cormorant	*Phalacrocorax penicillatus*
Pelagic Cormorant	*Phalacrocorax pelagicus*
Red-faced Cormorant	*Phalacrocorax urile*
Neotropic Cormorant	*Phalacrocorax brasilianus*
Double-crested Cormorant	*Phalacrocorax auritus*
European Shag	*Phalacrocorax aristotelis*
Black-faced Cormorant	*Phalacrocorax fuscescens*
Indian Cormorant	*Phalacrocorax fuscicollis*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Australian Pied Cormorant	*Phalacrocorax varius*
Great Cormorant	*Phalacrocorax carbo*
White-breasted Cormorant	*Phalacrocorax lucidus*
Japanese Cormorant	*Phalacrocorax capillatus*
Cape Cormorant	*Phalacrocorax capensis*
Socotra Cormorant	*Phalacrocorax nigrogularis*
Rock Shag	*Phalacrocorax magellanicus*
Guanay Cormorant	*Leucocarbo bougainvillii*
Imperial Shag	*Leucocarbo atriceps*
South Georgia Shag	*Leucocarbo georgianus*
Antarctic Shag	*Leucocarbo bransfieldensis*
Heard Island Shag	*Leucocarbo nivalis*

Crozet Shag	*Leucocarbo melanogenis*
Macquarie Shag	*Leucocarbo purpurascens*
Kerguelen Shag	*Leucocarbo verrucosus*
Rough-faced Shag	*Leucocarbo carunculatus*
Bronze Shag	*Leucocarbo chalconotus*
Chatham Shag	*Leucocarbo onslowi*
Campbell Shag	*Leucocarbo campbelli*
Auckland Shag	*Leucocarbo colensoi*
Bounty Shag	*Leucocarbo ranfurlyi*
Snowy Sheathbill	*Chionis albus*
Black-faced Sheathbill	*Chionis minor*
Wilson's Phalarope	*Phalaropus tricolor*
Red-necked Phalarope	*Phalaropus lobatus*
Red Phalarope	*Phalaropus fulicarius*
Brown Noddy	*Anous stolidus*
Lesser Noddy	*Anous tenuirostris*
Black Noddy	*Anous minutus*
Blue Noddy	*Procelsterna cerulea*
Grey Noddy	*Procelsterna albivitta*
White Tern	*Gygis alba*
Black Skimmer	*Rynchops niger*
African Skimmer	*Rynchops flavirostris*
Indian Skimmer	*Rynchops albicollis*
Swallow-tailed Gull	*Creagrus furcatus*
Black-legged Kittiwake	*Rissa tridactyla*
Red-legged Kittiwake	*Rissa brevirostris*
Ivory Gull	*Pagophila eburnea*
Sabine's Gull	*Xema sabini*
Slender-billed Gull	*Chroicocephalus genei*

Bonaparte's Gull	*Chroicocephalus philadelphia*
Red-billed Gull	*Chroicocephalus scopulinus*
Silver Gull	*Chroicocephalus novaehollandiae*
Black-billed Gull	*Chroicocephalus bulleri*
Andean Gull	*Chroicocephalus serranus*
Brown-headed Gull	*Chroicocephalus brunnicephalus*
Brown-hooded Gull	*Chroicocephalus maculipennis*
Black-headed Gull	*Chroicocephalus ridibundus*
Grey-headed Gull	*Chroicocephalus cirrocephalus*
Hartlaub's Gull	*Chroicocephalus hartlaubii*
Saunders's Gull	*Chroicocephalus saundersi*
Little Gull	*Hydrocoloeus minutus*
Ross's Gull	*Rhodostethia rosea*
Dolphin Gull	*Leucophaeus scoresbii*
Lava Gull	*Leucophaeus fuliginosus*
Laughing Gull	*Leucophaeus atricilla*
Franklin's Gull	*Leucophaeus pipixcan*
Grey Gull	*Leucophaeus modestus*
Relict Gull	*Ichthyaetus relictus*
Audouin's Gull	*Ichthyaetus audouinii*
Mediterranean Gull	*Ichthyaetus melanocephalus*
Pallas's Gull	*Ichthyaetus ichthyaetus*
White-eyed Gull	*Ichthyaetus leucophthalmus*
Sooty Gull	*Ichthyaetus hemprichii*
Pacific Gull	*Larus pacificus*
Belcher's Gull	*Larus belcheri*
Olrog's Gull	*Larus atlanticus*
Black-tailed Gull	*Larus crassirostris*
Heermann's Gull	*Larus heermanni*

Mew Gull	*Larus canus*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Great Black-backed Gull	*Larus marinus*
Kelp Gull	*Larus dominicanus*
Glaucous-winged Gull	*Larus glaucescens*
Western Gull	*Larus occidentalis*
Yellow-footed Gull	*Larus livens*
Glaucous Gull	*Larus hyperboreus*
Iceland Gull	*Larus glaucoides*
Thayer's Gull	*Larus thayeri*
European Herring Gull	*Larus argentatus*
American Herring Gull	*Larus smithsonianus*
Vega Gull	*Larus vegae*
Caspian Gull	*Larus cachinnans*
Yellow-legged Gull	*Larus michahellis*
Armenian Gull	*Larus armenicus*
Slaty-backed Gull	*Larus schistisagus*
Lesser Black-backed Gull	*Larus fuscus*
Gull-billed Tern	*Gelochelidon nilotica*
Caspian Tern	*Hydroprogne caspia*
Royal Tern	*Thalasseus maximus*
Greater Crested Tern	*Thalasseus bergii*
Elegant Tern	*Thalasseus elegans*
Lesser Crested Tern	*Thalasseus bengalensis*
Chinese Crested Tern	*Thalasseus bernsteini*
Sandwich Tern	*Thalasseus sandvicensis*
Cabot's Tern	*Thalasseus acuflavidus*
Little Tern	*Sternula albifrons*

Saunders's Tern	*Sternula saundersi*
Least Tern	*Sternula antillarum*
Yellow-billed Tern	*Sternula superciliaris*
Peruvian Tern	*Sternula lorata*
Fairy Tern	*Sternula nereis*
Damara Tern	*Sternula balaenarum*
Aleutian Tern	*Onychoprion aleuticus*
Spectacled Tern	*Onychoprion lunatus*
Bridled Tern	*Onychoprion anaethetus*
Sooty Tern	*Onychoprion fuscatus*
River Tern	*Sterna aurantia*
Roseate Tern	*Sterna dougallii*
White-fronted Tern	*Sterna striata*
Black-naped Tern	*Sterna sumatrana*
South American Tern	*Sterna hirundinacea*
Common Tern	*Sterna hirundo*
White-cheeked Tern	*Sterna repressa*
Arctic Tern	*Sterna paradisaea*
Antarctic Tern	*Sterna vittata*
Kerguelen Tern	*Sterna virgata*
Forster's Tern	*Sterna forsteri*
Snowy-crowned Tern	*Sterna trudeaui*
Black-bellied Tern	*Sterna acuticauda*
Black-fronted Tern	*Chlidonias albostriatus*
Whiskered Tern	*Chlidonias hybrida*
White-winged Tern	*Chlidonias leucopterus*
Black Tern	*Chlidonias niger*
Large-billed Tern	*Phaetusa simplex*
Inca Tern	*Larosterna inca*

Chilean Skua	*Stercorarius chilensis*
South Polar Skua	*Stercorarius maccormicki*
Brown Skua	*Stercorarius antarcticus*
Great Skua	*Stercorarius skua*
Pomarine Skua	*Stercorarius pomarinus*
Parasitic Jaeger	*Stercorarius parasiticus*
Long-tailed Jaeger	*Stercorarius longicaudus*
Little Auk	*Alle alle*
Thick-billed Murre	*Uria lomvia*
Common Murre	*Uria aalge*
Razorbill	*Alca torda*
Great Auk	*Pinguinus impennis*
Black Guillemot	*Cepphus grylle*
Pigeon Guillemot	*Cepphus columba*
Spectacled Guillemot	*Cepphus carbo*
Marbled Murrelet	*Brachyramphus marmoratus*
Long-billed Murrelet	*Brachyramphus perdix*
Kittlitz's Murrelet	*Brachyramphus brevirostris*
Guadalupe Murrelet	*Synthliboramphus hypoleucus*
Scripps's Murrelet	*Synthliboramphus scrippsi*
Craveri's Murrelet	*Synthliboramphus craveri*
Ancient Murrelet	*Synthliboramphus antiquus*
Japanese Murrelet	*Synthliboramphus wumizusume*
Cassin's Auklet	*Ptychoramphus aleuticus*
Parakeet Auklet	*Aethia psittacula*
Least Auklet	*Aethia pusilla*
Whiskered Auklet	*Aethia pygmaea*
Crested Auklet	*Aethia cristatella*
Rhinoceros Auklet	*Cerorhinca monocerata*

Atlantic Puffin	*Fratercula arctica*
Horned Puffin	*Fratercula corniculata*
Tufted Puffin	*Fratercula cirrhata*

Marine Mammals	
Southern right whale	Eubalaena australis
North Atlantic right whale	Eubalaena glacialis
North Pacific right whale	Eubalaena japonica
Bowhead whale	Balaena mysticetus
Pygmy right whale	Caperea marginata
Gray whale	Eschrichtius robustus
Common minke whale	Balaenoptera acutorostrata
Antarctic minke whale	Balaenoptera bonaerensis
Sei whale	Balaenoptera borealis
Bryde's whale	Balaenoptera edeni
Blue whale	Balaenoptera musculus
Fin whale	Balaenoptera physalus
Humpback whale	Megaptera novaeangliae
Sperm whale	Physeter macrocephalus
Pygmy sperm whale	Kogia breviceps
Dwarf sperm whale	Kogia sima
South Asian river dolphin	Platanista gangetica
Franciscana	Pontoporia blainvillei
Baiji	Lipotes vexillifer
Boto	Inia geoffrensis
Beluga	Delphinapterus leucas
Narwhal	Monodon monoceros
Harbour porpoise	Phocoena phocoena
Burmeister's porpoise	Phocoena spinipinnis

Vaquita	Phocoena sinus
Spectacled porpoise	Phocoena dioptrica
Finless porpoise	Neophocaena phocaenoides
Dall's porpoise	Phocoenoides dalli
Rough-toothed dolphin	Steno bredanensis
Indo-Pacific humpback dolphin	Sousa chinensis
Atlantic humpback dolphin	Sousa teuszii
Tucuxi	Sotalia fluviatilis
White-beaked dolphin	Lagenorhynchus albirostris
Atlantic white-sided dolphin	Lagenorhynchus acutus
Dusky dolphin	Lagenorhynchus obscurus
Pacific white-sided dolphin	Lagenorhynchus obliquidens
Hourglass dolphin	Lagenorhynchus cruciger
Peale's dolphin	Lagenorhynchus australis
Risso's dolphin	Grampus griseus
Common bottlenose dolphin	Tursiops truncatus
Indo-Pacific bottlenose dolphin	Tursiops aduncus
Atlantic spotted dolphin	Stenella frontalis
Pantropical spotted dolphin	Stenella attenuata
Spinner dolphin	Stenella longirostris
Clymene dolphin	Stenella clymene
Striped dolphin	Stenella coeruleoalba
Common dolphin	Delphinus delphis
Long-beaked common dolphin	Delphinus capensis
Fraser's dolphin	Lagenodelphis hosei
Northern right whale dolphin	Lissodelphis borealis
Southern right whale dolphin	Lissodelphis peronii
Commerson's dolphin	Cephalorhynchus commersonii

Chilean dolphin	Cephalorhynchus eutropia
Heaviside's dolphin	Cephalorhynchus heavisidii
Hector's dolphin	Cephalorhynchus hectori
Melon-headed whale	Peponocephala electra
Pygmy killer whale	Feresa attenuata
False killer whale	Pseudorca crassidens
Killer whale	Orcinus orca
Long-finned pilot whale	Globicephala melas
Short-finned pilot whale	Globicephala macrorhynchus
Irrawaddy dolphin	Orcaella brevirostris
Shepherd's beaked whale	Tasmacetus shepherdi
Baird's beaked whale	Berardius bairdii
Arnoux's beaked whale	Berardius arnuxii
Longman's beaked whale	Mesoplodon pacificus
Sowerby's beaked whale	Mesoplodon bidens
Blainville's beaked whale	Mesoplodon densirostris
Gervais' beaked whale	Mesoplodon europaeus
Strap-toothed whale	Mesoplodon layardii
Hector's beaked whale	Mesoplodon hectori
Gray's beaked whale	Mesoplodon grayi
Stejneger's beaked whale	Mesoplodon stejnegeri
Andrews' beaked whale	Mesoplodon bowdoini
True's beaked whale	Mesoplodon mirus
Ginkgo-toothed beaked whale	Mesoplodon gingkodens
Hubbs' beaked whale	Mesoplodon carlhubbsi
Pygmy beaked whale	Mesoplodon peruvianus
Bahamonde's beaked whale	Mesoplodon bahamondi
Cuvier's beaked whale	Ziphius cavirostris
Northern bottlenose whale	Hyperoodon ampullatus

Southern bottlenose whale	Hyperoodon planifrons
Harbour seal	Phoca vitulina
Spotted seal	Phoca largha
Ringed seal	Phoca hispida
Baikal seal or nerpa	Phoca sibirica
Caspian seal	Phoca caspica
Harp seal	Phoca groenlandica
Ribbon seal	Histriophoca fasciata
Bearded seal	Erignathus barbatus
Hooded seal	Cystophora cristata
Grey seal	Halichoerus grypus
Crabeater seal	Lobodon carcinophagus
Ross seal	Ommatophoca rossii
Leopard seal	Hydrurga leptonyx
Weddell seal	Leptonychotes weddellii
Northern elephant seal	Mirounga angustirostris
Southern elephant seal	Mirounga leonina
Mediterranean monk seal	Monachus monachus
Caribbean monk seal	Monachus tropicalis
Hawaiian monk seal	Monachus schauinslandi
Northern fur seal	Callorhinus ursinus
Guadalupe fur seal	Arctocephalus townsendi
Juan Fernandez fur seal	Arctocephalus philippi
South American fur seal	Arctocephalus australis
Cape/Australian fur seal	Arctocephalus pusillus
New Zealand fur seal	Arctocephalus forsteri
Antarctic fur seal	Arctocephalus gazella
Subantarctic fur seal	Arctocephalus tropicalis
Steller sea lion	Eumetopias jubatus

California/Galapagos/Japanese Sea Lion	Zalophus californianus
South American sea lion	Otaria byronia
Australian sea lion	Neophoca cinerea
New Zealand sea lion	Phocarctos hookeri
Walrus	Odobenus rosmarus
Amazonian manatee	Trichechus inunguis
West African manatee	Trichechus senegalensis
West Indian/Florida manatee	Trichechus manatus
Dugong	Dugong dugon
Steller's sea cow	Hydrodamalis gigas
Marine otter	Lutra felina
Sea otter	Enhydra lutris
Polar bear	Ursus maritimus

Gill, F., Donsker, D. (2013). IOC World Bird List (Version 3.3). Available At: http:www.Worldbirdnames.Org [Accessed 5-Feb-2013].
Marine Mammal Commission (2013). http://www.Mmc.Gov/Species/Speciesglobal2.Shtml [Accessed 25 Apr 2013].