Towards Extinction

– The continued unsustainable hunting of small cetaceans in Japan

Environmental Investigation Agency, 2013

Executive Summary

Over a million toothed whales, dolphins and porpoises, commonly known as 'small cetaceans', have been killed in direct hunts in Japan in the last 70 years. Catch limits set by the Government of Japan for 2013 permit the killing of 17,374 small cetaceans. This represents the largest directed hunt of cetaceans in the world. A comprehensive analysis of the available scientific data demonstrates unequivocally that there are grave concerns regarding the sustainability of these hunts.

Nine small cetacean species are targeted in Japan's coastal hunts, which take the form of small-type coastal whaling, hand harpoon hunts and drive hunts. Long before catch limits were introduced, the abundance of favoured species, such as the striped dolphin, began to drastically decline due to overexploitation. 1 As catches reached in excess of 30,000 small cetaceans per year concerns were raised at an international level regarding the unsustainable nature of Japan's hunts. 2 Catch limits were set by the Government of Japan in 1993, however the actual catch numbers have declined to levels below the catch limits in the majority of species targeted by direct hunts. Declining demand for cetacean meat and the increasing economic costs of hunts may be playing a role, but there is significant evidence that a number of the exploited populations are depleted: changes in catch composition, declining abundance trends and reports from hunters of an increased difficulty in filling quotas all point to overexploitation.

Despite the indications of population declines, there appears to have been little monitoring of the status of the exploited small cetacean populations. For many of the species hunted, the last published abundance estimates are based upon surveys conducted more than twenty years ago.

Disregarding clear signals of overexploitation the Government has permitted catches to remain at levels that are unsustainable for eight of the nine target species. 3 Small reductions in catch limits have been made since 2007 but often in prefectures where hunts are no longer occurring.

The Government of Japan provides little transparency regarding the methods it is using to set catch limits but they remain considerably higher than those that would be permitted under management strategies employed elsewhere in the world. In addition there is little or no attention to catch composition or struck and lost rates - the latter remaining unaccounted for in the reported data on numbers killed. Although multiple tools now exist to calculate sustainable levels of marine mammal mortality these are not being employed.

The apparent absence of both up-to-date information on the status of populations and a scientifically rigorous method for setting catch limits displays a lack of responsibility by the Government to ensure the sustainability of small cetacean populations in Japanese waters. Through such conduct the Japanese Government is failing to implement its domestic policies of sustainable utilisation 4 and stipulations of the international conventions to which it is a signatory including the Convention on Biological Diversity.

In 2012 the Society of Marine Mammalogy, a professional society of more than 1,800 scientists from 60 countries expressed their concern regarding the sustainability of the hunts. 5 In 2013, the Scientific Committee of the International Whaling Commission (IWC) again voiced its concerns regarding the sustainability of catches. 6 However the Japanese Government has continued to ignore IWC requests to reduce catch limits, persistently claiming that the IWC does not have competence over small cetaceans. 7

The hunts themselves serve only to provide toxic food products to Japanese consumers, who are largely unaware of the high levels of pollutants these top marine predators typically accumulate. Pollutant concentrations in meat and blubber from the marketplace can reach 85 times the safe limits for consumption of methyl mercury and 140 times the safe limit for PCBs. 8 The Government of Japan's advisory limits remain wholly inadequate to inform or protect consumers – something all the more shocking in light of the recent signing of the Minamata Treaty in Japan.

Decades after concerns first arose, the Government of Japan continues to ignore international pleas to reduce catches, implement a scientific management system and publish up to date population assessments. Burying its head in the sand regarding the inevitable population declines and the health risks to Japanese consumers of whale, dolphin and porpoise products, the Japanese Government maintains a stubborn reluctance to relinquish this archaic industry for which there is declining domestic demand.

The Government of Japan has a responsibility to restore and maintain coastal cetacean species at their former levels, and protect consumers from the consumption of toxic seafood products. EIA urges the Government of Japan to phase out the hunts over a ten year period, by establishing a scientific management programme that targets action on those species most at risk and working with hunters to find alternative livelihoods.

SMALL CETACEAN HUNTS IN JAPAN

Three types of hunts target small cetaceans in Japan's coastal waters: small-type coastal whaling, hand harpoon hunts and the drive hunts. Over the last century these hunts increased in scale and expanded their geographic range, capturing tens of thousands of small cetaceans every year. With the advent of faster motorised boats, hunts became increasingly efficient, resulting in the sequential depletion of small cetacean species in Japan's national waters. In each type of hunt the same patterns of excessively high catches, overexploitation and subsequent declines in catches have been observed, concomitant with biological changes that signal the depletion of targeted populations. Government catch limits have failed to adequately restrict hunts, and continue to permit hunts to operate at unsustainable levels. As catches of favoured species such as the striped dolphin have fallen to unprecedentedly low levels, catches of less desirable species such as the bottlenose and Risso's dolphin have increased and Japan's Fisheries Agency has established quotas for new species.

SMALL-TYPE COASTAL WHALING

Small-type coastal whaling is conducted by small whaling vessels (less than 50 tonnes) which employ a canon below 50mm in calibre. 9 These vessels target Baird's beaked whales, short-finned pilot whales and false killer whales. 10 Hunts occur for the most part within 50 nautical miles of the coast operating from whaling bases in Hokkaido, Miyagi, Chiba and Wakayama. 11

There has been a decline in overall small-type coastal whaling catches in the last decade, largely due to declining catches of both forms of the short-finned pilot whale, particularly those of the northern form. While the Government of Japan has failed to take action, whalers voluntarily deciding to ban hunts of the northern form since 2007. 12 Perhaps because of this, in 2012 the Government authorised an extension of the Baird's beaked whale hunt through an expansion of permitted hunting seasons and an increase in the number of licensed vessels allowed to hunt in the Okhotsk Sea. 13

DRIVE HUNTS

Drive hunts operate with a number of boats working together to locate and drive a group of dolphins towards an enclosed area. Noise created by banging 'trumpets' (long metal poles) on the vessels elicits a strong behavioural avoidance response, allowing fishermen to herd the dolphins over tens of kilometres to shore. 14 Here they are entrapped with nets and may be left, thus confined, reportedly for as many as four days. 15 Once the killing and live-capture begins, the nets are progressively tightened, confining animals into a small space in which they can be caught. Dolphins may be secured by their tail fluke and dragged by boats. Unable to control their surfacing to breathe during this period, dolphins sometimes die during the capture process due to forced drowning. 16

Drive hunts were widespread along the coasts of the Sea of Japan, East China Sea and Pacific from the 14th until the late 19th-early 20th century. 17 However by the mid 20th century villages drive hunts were limited to the Izu coast (Shizuoka prefecture), Taiji (Wakayama), Nago (Okinawa) and Nagasaki prefecture. 18 The underlying causes of this geographical restriction in hunts remain unclear; declines in dolphin populations, declining demand for dolphin products and social changes in local communities are all potential factors. 19

Although the number of villages hunting declined in the 20th century, the efficiency and potential range of hunts expanded, first in the 1920s with the advent of motorised vessels and again in the 1960s with improvements in vessel speed, allowing the capture of greater numbers of dolphins in a smaller amount of time. 20 Drive hunts were able to catch up to 21,000 dolphins annually (1942-1960), with captures predominantly comprised of striped dolphins.

Drive hunt captures peaked in 1959 when 21,953 striped dolphins were captured. Immediately following this catches of this species dropped significantly, by a degree of magnitude which cannot be explained by any decrease in hunting effort. 21 Concomitant with catch declines that progressively extended across multiple prefectures, a decline in catch per unit effort of striped dolphins was observed, as well as a decrease in age of sexual maturity and an increase in the searching range required, all indicating population decline. 22

The introduction of limitations on the number of vessels and the months of drive hunt operation in the 1950s, and catch limits in the 1990s provided too little protection too late, with drive hunts likely causing the complete eradication of the striped dolphin migration in Futo and significant declines elsewhere. 23 In response, when Wakayama catches have exceeded their catch limit the Japanese Government has permitted the transfer of the Chiba and Shizuoka quota for this species to Wakayama and Okinawa, allowing increased exploitation elsewhere in the species range. Hunts are now licensed to occur in two locations, Futo on the Izu coast in Shizuoka prefecture and Taiji in Wakayama prefecture, though only the latter currently conducts hunts.

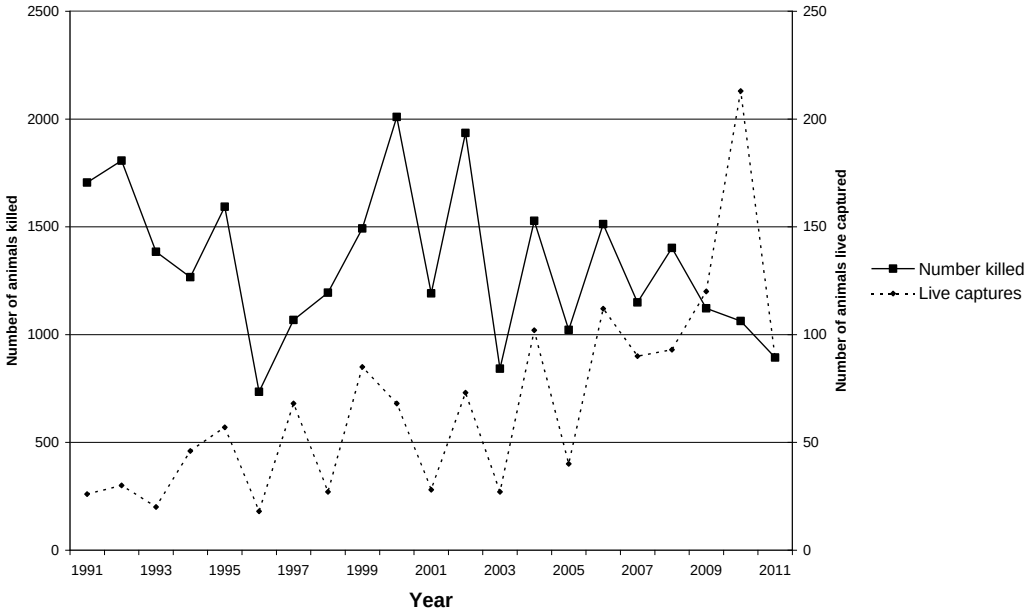
The role of international markets

Drive hunts supply animals both for the live trade and as food products. While 99% of the catches over the last ten years have been for food, the increasing live dolphin trade is highly profitable and likely helps financially sustain the hunts for food in the face of declining demand for dolphin products. Over 1,500 small cetaceans have been captured in drive hunts and sold to aquaria globally over the past 26 years, increasing from around 45 catches per year in 1999 to a mean of 90 per year by 2010 (Figure 1). 24 Live animals fetched between 660,000 and 7,712,000 yen ($8,406 - $98,222) per dolphin between 2002 and 2012. By comparison, a bottlenose dolphin killed for the meat trade will fetch 50,000 yen (~US$500 as reported in 2009) (Elsa Nature Conservancy pers. comm.), less than a tenth of the value of a live dolphin.

International exports have totalled $17.41 million dollars over the last decade (2002-2012), with 347 dolphins transported to 15 different countries. 25 China has been the main importer, buying 220 dolphins (63% of the exports). Sales also occur to aquaria within Japan but the number and value of these is not known. The global aquarium industry body, the International World Association of Zoos and Aquariums (WAZA), advises all WAZA member aquariums not to purchase dolphins which have been captured in the drive hunts.

Despite international criticism of the scale and killing methods of these hunts, the number of dolphins live captured and exported to international aquaria by Japan has increased. Although kills are still an order of magnitude greater than live captures, over the last decade the number of cetaceans killed has gradually declined while the number of live captures has increased (see Figure 1), in line with an increase in international exports. Hence, whilst the majority of drive hunts captures continue to be killed for meat, international markets for live captured animals appear to be playing an increasingly important role in the hunts.

Figure 1: Trends in live captures and kills in drive hunts in Taiji between 1986 and 2010.



HAND HARPOON HUNTS

Hand harpoon hunts involve the pursuit of porpoises, dolphins and small whales at sea until they become exhausted and within reach for hunters to throw hand-held harpoons from the boats (EIA, 2000). Harpooned animals, often live, may then be left attached to flags or buoys while the hunters target additional animals. 26

Of the three types of hunts, harpoon hunts have the longest history, dating from prehistoric times. 27 In the 20th century they became large-scale operations, initially due to the introduction of fast motorised fishing vessels, followed by a second expansion in the 1980s, likely due to a declining whale meat supply following the cessation of Japan's commercial whaling and declining catches from the drive hunts due to over-hunting of striped dolphins. 28

Although eight different species can be taken in hand harpoon hunts, Dall's porpoise are the main target and have historically been hunted at unsustainable levels, with declining catches in recent years. 29 Over 400,000 Dall's porpoises have been killed in the hand-harpoon hunt since the moratorium on commercial whaling was implemented in 1986. Regulation of this hunt has been reported as inadequate, with problems in collation and calculation of catches leading to significant under-reporting of mortalities. 30

CONSERVATION STATUS OF SMALL CETACEANS TARGETED IN COASTAL HUNTS

Cetaceans worldwide now face a litany of anthropogenic threats and those residing in Japan's coastal waters are no exception. Direct hunts alone have killed over a million small cetaceans in Japanese waters in the last 70 years. In addition to the significant levels of mortality from direct hunts, they suffer unknown levels of bycatch mortality in fisheries, habitat loss and degradation, prey depletion through overfishing, anthropogenic noise, vessel strikes, and increased pollutant loads. As such, the ability of populations to withstand the additional mortality caused by direct hunts is likely significantly reduced.

EIA's review of the status and threats faced by Japanese small cetaceans reveals worrying signs of overexploitation and depletion of a number of the local cetacean populations targeted by the hunts.31 Despite such signs, for the majority of species population assessments have not been regularly updated and catch limits remain set at unsustainable levels. For six of the nine species exploited the last population assessments were published more than 20 years ago. Although more recent surveys have been conducted for these species, these covered a much larger survey area and thus do not provide discrete population estimates of the populations exploited by hunts. 32 Effort applied to coastal areas was low, limiting their accuracy and differences in season and survey area prohibit any analysis of population trends. 33

In 2013, EIA carried out a comprehensive analysis of the available data on the nine cetacean species targeted in direct coastal hunts in Japan. The scientific paper was presented to the Scientific Committee of the International Whaling Commission (IWC) in June 2013, and is available at: http://iwc.int/sc65adocs. The following is a summary of the main findings for each species.

Dall's porpoise (*Phocoenoides dalli*)

There is a long history of unregulated exploitation of Dall's porpoises in Japan. This species has long formed the dominant component of the small cetacean catch in Japan, accounting for over 80% of the catches from 1979-2010 (see Table 1).

There are two geographically segregated colour morphs of Dall's porpoises, the dalli-type and truei-type. Eight stocks have been identified, at least three of which are targeted by Japan's hunts. 34 These three stocks comprise one *truei*-type stock that breeds in the Central Okhotsk Sea, a *dalli*-type stock that breeds in the Southern Okhotsk Sea and a third of unknown identity. The *truei* and *dalli*-type porpoises forming the majority of the catch are thought to originate from the Central and Southern Okhotsk sea stocks, respectively. 35 The most recent abundance estimates (see Table 2) are 23% and 18% lower than previous abundance estimates. 36 Abundance estimates are now ten years old and urgently require updating.

The Dall's porpoise hunt dates back to prehistoric time, with commercial hunting commencing in the 1920s and continuing to the present day. For much of this time hunts have been unregulated by catch limits, killing an average of more than 12,000 per year (1963-2011). In the 1980s the hunt expanded both geographically and seasonally. Kills peaked in 1988, with the hunt taking over 40,000 Dall's porpoises in a single year.

37 This has been attributed to a significant growth in demand for porpoise meat outside local hunting areas, generated by a reduction in availability of minke whale meat once the moratorium on commercial whaling was implemented. Catches have since declined steeply (see Table 1) and ceased entirely during 2011 due to the Great East Japan Earthquake and tsunami (see Figure 2). 38 The hunt resumed in March 2012, and approximately 1,200 individuals were landed in Iwate during the November 2012 to April 2013 season. 39

While historic catch levels have been alarmingly high and significantly exceeded sustainable levels, published data have also historically significantly under-reported actual mortalities. 40 Incomplete collation of records and inaccurate calculation of catches, is estimated to have led to under-reporting of mortalities by up to 11,000 animals per year, while failure to take into account struck and lost takes (where the animal is struck by the harpoon but not landed), has been estimated to result in total mortality 10-14% higher than the number landed. 41

Trends in catch composition have indicated a worrying increase in the proportion of mature and lactating females being caught in the Sea of Japan. 42 This removal of mature lactating females further reduces the recruitment potential of the population, and at the same time likely results in the mortality of dependent calves. Given the evidence of female philopatry it poses the additional risk of localised depletion. Although operational months are limited to certain months by prefecture, the Dall's porpoise hunts operate at some locations throughout the year (starting on 1 August and closing on 31 July) and target the species in sensitive breeding and calving periods. 43

Catch limits introduced in 1993 were based on an annual Allowable Biological Catch (ABC) of approximately 4% of the abundance estimate. 44 This method of setting catch limits permits catches much higher than thresholds used to manage cetacean populations in other regions of the world and fails to take into account potentially significant levels of mortality from bycatch or other causes. For example, catch limits for the 2013/14 season are still 4.8 and 4.7 times higher for the *dalli* and *truei*-type than the 'robust' Potential Biological Removal (PBR) threshold, a threshold designed to prevent populations from declining below their maximum net productivity level. 45 The catch limits equate to 4.1% (dalli-type) and 3.9% (truei-type) of the 2007 abundance estimates. If assumptions on population growth rates are correct, allowing a catch of >4% will cause the population to decline to levels approaching zero, and will prevent future recovery. 46

Japanese government scientists have fully recognised the inadequacy of their management approach, stating that "… *the current management procedure, based on only the best values, could fail to manage the stocks at a considerably high probability*". 47 Although there have been repeated calls from the IWC Scientific Committee to reduce catch limits to sustainable levels more than 20 years on this has not occurred. 48

STATUS: Unknown, some stocks may be depleted

Baird's beaked whale (*Berardius bairdii*)

Three populations of Baird's beaked whales are hunted off the coast of Japan, one off the Pacific coast, one in the eastern Sea of Japan and a third in the southern Okhotsk Sea. Abundance estimates for two of the three populations are more than twenty years old – their status is therefore unknown.

Hunting of Baird's beaked whales began around 1600, primarily in the seas around Chiba prefecture in hand harpoon hunts. 49 Hunting by small-type coastal whaling vessels began in the early 20th century and increased sharply following World War II, spreading to Hokkaido, the north-east (Sanriku) coast and to the Sea of Japan. 50 Hunts now occur primarily on the Pacific coast and in the Okhotsk Sea. 51

The IWC small cetacean sub-committee has noted that the current catch level "represents about 1% of the estimated population size and in the absence of an estimate of gross reproductive rate, was unable to determine whether or not the population could sustain the catches". 52 Reiterating previous advice 53, in 2012 the Scientific Committee therefore recommended that: "(1) It is especially important to clarify population structure and geographical boundaries of the stocks off Japan, particularly as long as hunting continues there; (2) Improved and updated abundance estimates are needed for each population, and trends in abundance should be assessed. These needs particularly apply to exploited stocks". 54

The annual catch limit has been increased several times since first introduced in 1983 and currently totals 66 whales (see Figure 3). In 2012, the hunting season and number of vessels licensed to hunt Baird's beaked whales in specific areas was increased. 55 The reason for this increase in effort is unclear as allocated quotas are already largely being filled.

STATUS: Unknown

Short-finned pilot whale (*Globicephala macrorhynchus*)

The taxonomic status of short-finned pilot whales is unresolved. Two geographical forms occur off Japan, known as northern and southern forms. These may represent separate species or subspecies but are currently treated as a single taxonomic unit. 56 If they are separate species, then each may warrant being listed as threatened according to IUCN criteria. 57

Changes in catch composition of northern form pilot whales date as far back as the 1980s, indicating overhunting and population decline. This has prompted the IWC Scientific Committee to state that "it was desirable that no animals be taken until we have a clearer understanding of the status of the stock". 58 Catches continued regardless and recent analyses now indicate a drastic population decline in the 1980s when catches far exceeded the PBR threshold. There has been a slight recovery since but not to former levels and Japanese scientists conclude that whaling may have "seriously depleted the abundance of the north form". 59

The annual catch limit continues to be set above the PBR threshold providing little protection from continued overexploitation. Compensating for the inaction of the Government of Japan, whalers have implemented a voluntary ban on hunting of the northern form since 2007. 60

Catches of the southern form have also declined, reaching their lowest in 2010 (see Table 1 and Figure 4). Current catch limits remain above sustainable levels, risking further population depletion (see Table 2). 61

STATUS: Northern form depleted, status of the southern form unknown.

Risso's dolphin (*Grampus griseus*)

The Japanese drive hunts, small-type coastal whaling and hand harpoon hunts have all regularly hunted Risso's dolphins, both for food and for live captures to supply the aquarium industry.

Catches increased during the 1990s, perhaps in response to the decline in more popular species, with approximately 200-500 Risso's dolphins killed per year (1993-2010) (see Table 1 and Figure 5). Although there have been recent reductions in catch limits they are still almost double (1.9 x PBR threshold) sustainable levels (see Table 2) 62, and remain inadequate to protect the population(s) from depletion. Published abundance estimates of hunted populations are now over twenty years old and urgently require updating. The status of exploited populations is therefore unknown.

STATUS: Unknown

Striped dolphin (*Stenella coeruleoalba*)

For over 100 years striped dolphins have been heavily hunted in Japanese waters in drive and hand-harpoon hunts. 63 Prior to the introduction of quotas, over 159,500 striped dolphins were killed between 1963 and 1992 and it is thought that by the 1990s the Japanese drive hunt "had depleted coastal stocks of striped dolphins to less than 10% of the post-World War II level". 64

On the Izu coast (Futo and Kawana) hunts may have led to the complete eradication of the local striped dolphin population. 65 Declines extend across multiple prefectures; in addition to in the lack of catches in Futo and Kawana, catches in Taiji fell by more than 90% (1980-1991) despite an increase in the number of searching vessels over the same period. 66 Similarly in Chiba, striped dolphins have not been successfully hunted since 1995.

In addition to the long-running decline in catches of striped dolphins, reproductive parameters have changed in a manner consistent with a density decline. A decreased age of sexual maturity, characteristic of a density-dependent response to population reduction has been observed, as well as a decline in catch per unit effort and an increase in the searching range required, all indicating population decline and overexploitation of this species. 67

In response to this overwhelming evidence, the Japanese Government has only made reductions in the catch limit in those prefectures where catches are no longer taking place, imposing no reduction on actual catches. In fact, when Wakayama hunters have exceeded their catch limits the Japanese Government has permitted the temporary transfer of the Chiba and Shizuoka quota to Wakayama and Okinawa, allowing an increase in exploitation of the species elsewhere in its range.

Current catch limits remain 5.3 times higher than the sustainable level based on a PBR threshold, and average actual catches (2007-2011) are 4.4 times the PBR threshold, far exceeding sustainable levels (see Table 2). 68 The published abundance estimates upon which we presume such catch limits are based are now over twenty years old, and with current abundance and population structure remaining unresolved, updated assessments are urgently required.

STATUS: Highly endangered, some populations may be locally extinct

Pan-tropical spotted dolphin (*Stenella attenuata*)

Spotted dolphins are killed in large numbers by drive hunts in Japan. Declines in catches of the pan-tropical spotted dolphin occurred in the late 1980s and early 1990s (see Figure 7). Recently annual catches have continued to decline, alongside which there has been a possible decline in the minimum age of sexual maturity in females and a decline in catch per unit effort, indicative of an abundance decline in the local population(s). 69

Annual catch limits were reduced in 2007, but only in those prefectures where catches are no longer taking place, imposing no reduction on current catches. Despite the signals of overexploitation, catch limits remain considerably higher than any catch attained since 1988 and are far above sustainable levels, being 5.7 times higher than a PBR threshold (see Table 2). 70

Published estimates are now twenty years old and stock structure remains unresolved – further studies are urgently required to assess hunted populations' status.

STATUS: Likely declines in abundance, status unknown.

Common bottlenose dolphin (*Tursiops truncatus*)

The bottlenose dolphin is the main species targeted in the drive hunts for the live capture trade, comprising 76% of the live captured individuals since records of live captures began. 71 They are also killed for consumption and have previously been culled in Japanese waters due to claims of competition with fisheries. In the late 1970s-1995 several hundred were culled annually off Iki Island and the Kii Peninsula. 72

In the 1980s the numbers killed in hunts increased to more than 900 per year, likely far exceeding sustainable levels. Catches have since declined but catch limits remain more than double a PBR threshold (see Table 2 and Figure 8). 73 Meanwhile the Government has failed to publish up to date abundance estimates for the exploited population(s). As with other species, these are now more than twenty years old, and further surveys are therefore urgently required.

STATUS: Unknown

False killer whale (*Pseudorca crassidens*)

Historically the false killer whale appears to have been relatively common off the Japanese coast but with abundance estimates of the population(s) targeted by hunts now more than twenty years old, knowledge of their status urgently requires updating.

Catches were highest in the 1970s and 1980s, peaking at 356 in 1980. As well as being hunted for consumption, they are live-captured and have previously been killed for their depredation of fisheries. Over 900 were culled between 1965 and 1980 around Iki Island in Japan due to interactions with the yellowtail fishery. 74

Following the high number of kills in the 1970s and 1980s catches declined and from 1986 to 1992 did not exceed 100 per year with many years of zero, or near-zero, catches (see Figure 9). Although targeted by all three hunts they are currently captured in relatively small numbers, most likely due to low encounter rates.

Despite catches not even approaching the previous catch limit of 50 per year, the catch limit was increased in 2007 and there is now a total catch limit of 120 for this species (see Figure 9). Such catch limits are clearly far above likely sustainable levels, being 8.6 times the PBR threshold and equating to 5.9% of the abundance estimate (see Table 2). Such levels are particularly irresponsible given that it is a species which typically occurs with low abundance, about which relatively little is known and which may be vulnerable to even low-level threats. 75

STATUS: Unknown

Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)

High catches of several thousand Pacific white-sided dolphin per year occurred in 1983 and 1984. Subsequently catches declined and remained below 50 per year.

Hunts for consumption ceased in 1993 as a quota was not created for this species but live captures continued. In 2007 a new quota of 360 dolphins was established for the species (see Figure 10). 76 This new quota could represent an effort to compensate for declining catches of other species or may also be due to demand for this species by the aquarium industry (Elsa Nature Conservancy, 2007). 77

The current catch limit is slightly higher than the PBR threshold (see Table 2). With abundance estimates now more than 15 years old and with evidence of significant sub-population structure, the status of the population(s) being targeted by Japanese hunts is unknown.

STATUS: Unknown

Table 1: Reported catches by species, 1986-2011 78

Table 2: Recent quotas and catches in relation to abundance data and sustainable thresholds. 79

THE UNKNOWN, NEVER QUANTIFIED IMPACTS OF HUNTING

The officially reported catches of cetaceans in Japanese waters are alarmingly high and are widely considered unsustainable. 106 But added to these reported catches are additional mortalities, never monitored or reported, with likely population-level effects that go beyond individual mortalities. The unknown impacts of stress and social disruption brought about by hunts are likely to reduce survivorship and reproductive success of the remnant populations and impede their recovery. This exacerbates a low baseline rate of recovery that results from odontocetes' life history, social and behavioural characteristics. 107 Many of the populations targeted by Japan's hunts are already showing signs of significant declines in abundance to a point where they may no longer have the capacity to recover.

Undocumented deaths

In the past, published figures have significantly under-reported the landed catches of Japan's small cetacean hunts. Examination has focused on the Dall's porpoise hunt but the incomplete reporting may also extend to catch statistics for other small cetacean species taken by hand harpoon hunts.

In addition to the widespread under-reporting of landed catches, other mortalities are never reported in official figures for any of the three types of hunts. These include struck and lost individuals, deaths of dependent juveniles, and until 1986, live captures, although clearly these all remove individuals from wild populations. In the Dall's porpoise hand harpoon hunt, struck and lost individuals were previously estimated to result in a total mortality 10-14% higher than the number landed 108, whilst in the drive hunt there are known juvenile deaths and those that die 'naturally' in the enclosure, which are discarded and not considered part of the catch. 109

Population level impacts of stress

Individually and cumulatively, Japan's drive, hand harpoon and small-type whaling hunts repeatedly disturb targeted populations. Vessel noise and the pursuit itself are likely to induce stress not only in animals selected for killing but, more significantly for the long-term conservation of populations, also in non-target individuals in the immediate social group, other groups in the wider vicinity of hunts and animals captured and then released. Hunts may therefore induce stress in and disturb and displace non-target individuals over a wide geographic area. 110

The drive hunts in particular regularly pursue dolphins for extended periods of time but ultimately fail to catch them. The pursuit phase may cause stress-induced pathology that can lead to disease and unobserved mortality in animals that are not killed in the hunt. 111 Some animals are also released having been confined and subjected to acute noise and stress. Lethal and sub-lethal stress-induced changes in released individuals add to the known high levels of mortality and may reduce the reproductive potential of remnant populations and their ability to recover from such removals, with potential population level consequences. Due to their relatively old age of first reproduction and low calving rate, odontocete populations can be overexploited by catches of only a few percent of the total population per year, and are less resilient to overexploitation than other species groups. 112 Adding to this, the highly social structure of odontocete

societies means that social disruption caused by exploitation may reduce survivorship and reproductive potential of the remaining population, further impeding their ability to recover. Studies now indicate a lack of strong recovery in other heavily exploited odontocete populations even decades after intense exploitation has ceased. 113

There are therefore multiple factors likely to be impairing the recovery Japan's small cetacean populations, even in the absence of continued exploitation. An up-to-date assessment of the status of exploited species and the development of sustainable catch limits which take into account the multiple anthropogenic and environmental threats these populations are facing and their inherent capacity to recover are urgently required in order to prevent further declines and the potential for localised extinctions.

THE DANGER TO CONSUMERS – MERCURY POISONING IN A SINGLE MEAL

Over the last 100-200 years, concentrations of a number of chemical pollutants have increased dramatically in the marine environment. The toxicological effects of such pollutants pose a global threat to the health and viability of cetacean populations and the health of human populations consuming them. Mercury and persistent organic pollutants (POPs) bioaccumulate and biomagnify in the food chain. 114 As many cetacean species feed at a high trophic level and are long-lived they can accumulate high doses of POPS and heavy metal pollutants to the extent that concentrations of POPs can reach levels 70,000 times higher than background environmental levels. 115 The high pollutant levels that have been documented in Japanese small cetaceans are a further threat to cetacean populations already beleaguered by hunting, but also a significant health threat to the human populations that consume their meat and blubber.

In cetaceans, POPs have been linked to increased rates of cancer, increased first calf mortality, immune suppression and a higher susceptibility to infectious disease. 116 At a population level, they have been postulated to be a primary factor causing population declines and suppressing growth and recovery of populations. 117

The consumption of cetacean products contaminated with high levels of POPs and mercury poses a grave health risk to humans. Ingestion of these toxins have been linked to a range of immunological, cardiovascular and reproductive effects in humans, including impaired foetal neurological development, and an increased risk of Parkinson's disease, arteriosclerosis and diabetes. 118

Levels of pollutants in tissues of small cetaceans from Japanese waters have far exceeded the advisory limits for human consumption, with concentrations of total mercury that are more than 200 times Japan's limit of 0.4 parts per million of mercury (T-Hg ppm); methylmercury that is 26 times higher than the WHO limit of 1.0ppm for large predatory fish and 87 times higher than Japan's limit of 0.3ppm (although this excludes predatory fish); and PCB levels that are more than 75 times higher than Japan's limit of 0.5ppm. 119 Based on samples of boiled whale internal organs that displayed such mercury levels, studies in rats have indicated that, irrespective of chronic effects, a single ingestion of boiled whale internal organs may cause acute intoxication by inorganic mercury. 120

Such high levels of pollutants do not appear anomalous. What is deeply concerning is that across large numbers of samples, average concentrations of mercury exceed advisory limits in all eight species tested. 121

Concern has been raised since the release of radioactive material from Fukushima but there appears to be no monitoring of levels in small cetacean species, although they can bioaccumulate high levels of radioactive elements. 122 The Dall's porpoise is one species whose distribution may overlap with the fallout of radioactive Caesium from Fukushima. Levels in prey species of the Dall's porpoise have exceeded the Government of Japan's safety limit of 100Bq/kg in 2010-2012 and levels in cetaceans could be an order of magnitude higher - studies in the Barents and Norwegian Sea have shown that

concentrations of 137 Cs were 10 fold higher in the harbour porpoise (*Phocoena phocoena*) than in species at the lower levels of the food web. 123 As such it is possible that cetaceans are bioaccumulating very high levels of radioactive elements, presenting a severe risk to consumers, as well as a novel threat to cetaceans. Monitoring of fish, mollusks and crustaceans offshore from Fukushima have shown that the doses received are likely to have reproductive effects and may markedly increase mortality. 124 The levels and impact in small cetaceans remain unknown, with no testing of small cetacean species according to the Government of Japan's online database. 125

An inadequate response – Japan's guidelines and monitoring for pollutants

In reaction to the Minamata disease tragedy, the Japanese Ministry of Health and Welfare set provisional permitted levels of T-Hg and M-Hg in marine foods at 0.4 and 0.3ppm respectively, however these limits are not applied to cetacean products or indeed other predatory fish species that are likely to exhibit high levels. 126 As such, to EIA's knowledge, the sale of highly contaminated meat continues unmonitored and unregulated. Advice on consumption limits is limited to pregnant women and covers only a subset of the cetacean species consumed by Japanese citizens, excluding several species that are known to be highly contaminated. Japan's guidance remains far more limited and recommends far higher levels of 'safe' consumption than that provided to populations that consume similarly polluted cetacean products in other parts of the world. Indeed in the Faroe Islands, medical authorities have recommended that due to the health implications, pilot whale should no longer be consumed at all. 127

Monitoring for health effects in Japan is as inadequate as the advice given to consumers. Evidence of adverse effects from the consumption of polluted cetacean meat is now accumulating from other countries where aboriginal subsistence whaling occurs and includes multiple immunological, cardiovascular and reproductive effects. 128 In 2010, the National Institute of Minamata Disease carried out a study to measure mercury levels in the hair of Taiji residents. The tests showed that average mercury levels in Taiji were higher than the national average, with a number of individuals with levels above the World Health Organisation (WHO) limit for neurological effects (50ppm), something that has not been observed elsewhere in Japan in recent tests. However no action has since been taken to reduce consumption of small cetaceans in Taiji. 129

CONCLUSIONS AND RECOMMENDATIONS

Over a million small cetaceans have been killed in direct hunts in Japan in the last 70 years. Over the decades, a number of problems have been identified with the management of small cetacean hunts in Japan, which remain largely unresolved. This report shows that:

- There is a lack of transparency regarding methods used to set catch catch limits;
- Catch limits for all species examined (i.e. excluding Baird's beaked whale) are set considerably above likely sustainable levels, based on calculations using a PBR threshold (see Table 2), even where this is calculated assuming only moderate exploitation and no other sources of anthropogenic mortality; 130
- With the exception of some populations of Baird's beaked whales and the northern-form short finned pilot whale, abundance estimates have not been regularly updated, with most more than 20 years old whereas best practice requires surveys every eight years**;** 131
- There is a lack of regulation and enforcement of catch limits including extended months of operation when quotas could not be filled and transfer of quotas between prefectures when catches have exceeded local limits;
- There has been incomplete collation of catch data, and no regular reporting or estimates of struck and lost rates or other known mortalities.

The Government of Japan claims to support a policy of sustainable utilisation of marine resources and stipulates that fisheries should be based on sustainable principles. 132 As a signatory to the international Convention on Biodiversity (1992), Japan is committed to take measures to ensure the conservation and sustainable use of biodiversity. The Government of Japan justifies supporting cetacean hunts on the grounds of "sustainable use of marine living resources" and "the principle of science-based management of resources". 133 Despite such claims and commitments, the Government of Japan continues to set catch limits at levels that are highly unsustainable and has failed to carry out adequate monitoring of populations which are being exploited.

In expert international fora such as the IWC Scientific Committee and the Society of Marine Mammalogy, concerns have been raised on numerous occasions over the status of populations targeted by Japan's hunts. 134 Japan has failed to respond, claiming only that the IWC does not have competence with regards to small cetaceans.

The continued use of an outdated method for calculating catch limits, or for some species perhaps no scientific method at all, as well as the lack of up-to-date published abundance assessments undermines the sustainable management stipulated in Japan's domestic laws and the international laws to which it is a signatory. With the exception of only one species, quotas continue to be set above sustainable levels. 135 Even the warning signs of overexploitation and population decline that have been observed in four of the nine species hunted have not stimulated adequate adjustment of quotas or prompted reassessment of populations' status. There are multiple causes for concern regarding the likelihood of recovery of Japan's small cetacean populations, even in the absence of continued exploitation. Management must become more precautionary if further declines are to be prevented.

An up-to-date assessment of the status of exploited species and the development of a scientific management approach which takes into account the multiple anthropogenic and environmental

threats these populations are facing and their inherent capacity to recover is urgently required in order to prevent further declines and the potential of localised extinctions.

EIA urges the Government of Japan to:

- Respond to IWC requests and immediately suspend hunts of species showing the most severe signs of over-exploitation, in particular the Dall's porpoise, northern form of the short-finned pilot whale and striped dolphin;
- Conduct an up-to-date assessment of the status of all species taken by hunts, including studies of population structure;
- Collect and publish data on struck and lost rates, bycatch, hunt effort and reproductive status, sex and age composition of catches;
- Monitor targeted small cetacean populations for stress-induced impacts and the effects of social disruption;
- Reform the management strategy to bring it in line with modern international conservation management strategies, taking into account other mortalities such as struck-and-lost individuals, bycatch and other environmental/anthropogenic threats. This should be based upon up-to-date knowledge of population status and intrinsic recovery rates;
- Introduce independent observation of landed catches of all hunts and enforce any breaches with penalties;
- Establish and enforce time and area restrictions on hunts in order to protect cetacean species during sensitive breeding and calving periods;
- Conduct and publish long-term monitoring studies of pollutant levels in cetaceans;
- Phase out all small cetacean hunts over a ten year period, starting with those populations most at risk and those demonstrating the highest levels of pollutants.