

Nomination to have 'Death or injury to marine species following capture in the lethal shark control programs on ocean beaches' listed as a Key Threatening Process under the Environment Protection and Biodiversity Conservation Act, 1999

Title of Proposed Key Threatening Process

Death or injury to marine species following capture in the lethal shark control programs on ocean beaches

[Note: Shark Control Programs refers to both the beach meshing (nets) and drumlines]

Description of the Threatening Process

New South Wales (NSW) and Queensland (QLD) are the only two states in Australia which have shark control programs. Worldwide, and apart from Australia, shark control programs exist in only one other country, at KwaZulu-Natal in South Africa. These programs are designed to reduce the populations of potentially dangerous sharks and thereby lower the likelihood of a shark attack. Nets and / or baited drumlines are set off beaches along the coastline with the purpose of intercepting (and culling) sharks on their feeding and territorial runs up and down the coast. In NSW the shark control program relies solely on beach meshing to achieve this goal while QLD employs both mesh nets and baited drumlines. Contrary to popular belief neither act as a protective barrier for swimmers by enclosing the beach, and indeed many of the sharks killed in nets in NSW have been caught on the beach side of the net (Australian Marine Conservation Society (AMCS), 2001).

Mesh netting was introduced to Sydney beaches in 1937, Wollongong and Newcastle in 1949 and the Central Coast in 1987. Today 49 beaches covering approximately 200 kilometers of coastline between Newcastle and Wollongong are netted. NSW uses what is called a 'pulse fishing operation', whereby the nets are set for approximately 50% of the time between September to April. During the winter months of May to August, these nets are removed from the water completely (QLD DPI 2001). The nets are set parallel to the shore, have a length of 150 meters, depth of 6 meters and a mesh size of 50-60 cm. The nets are set in approximately 10-15 meters of water with the bottom of the net resting on the ocean floor (Draft Recovery Plan for Great White Sharks, (DRPGWS) 2000). Beach meshing is carried out by private contractors who are required to mesh each beach a minimum of thirteen times per month. Each net must be left to fish for a minimum of 12 hours on weekdays and 48 hours on weekends. It is general practice to join two nets together thereby meshing a beach twice on the one day (Krogh and Reid, 1996).

Queensland has used both mesh nets and baited drumlines since the beginning of its Shark Control Program in 1962. Shark gear is now in place on 84 beaches along the QLD coastline, and consists a mixture of nets and drumlines (QLD DPI, 2001). Baited drumlines consist of a float or series of floats moored by an anchor. Attached to each float is a stainless steel cable supporting one or more hooks with a 3 inch gape (Paterson, 1986). Baited drumlines are designed to target

dangerous shark species and reduce by-catch. The nets used in the QLD shark control program have a mesh size of 25cm and are 186m long (Paterson, 1986). Initially the nets were set to rest on the ocean floor. However this practice was ceased as many rays were caught in the low lying nets which in turn attracted sharks, causing costly damage to the nets. Today the nets average a depth of 6.4m (Paterson, 1979). The QLD shark control program can be divided into ten areas, where each area consists of several beaches. At each of these beaches there are usually 1-3 nets used and up to 6 drumlines (Gribble.N.A et al, 1998). A mixture of nets and drumlines is not always used, for example at Point Lookout drumlines have been used solely since 1979 (Gribble.N.A, et al, 1998). In comparison to the NSW shark control program, shark gear in QLD remains in the water the entire year round, and is not removed during the winter periods as it is in NSW waters (QLD DPI, 2001).

Meeting the Criterion

Background

In a review of the QLD Shark Control Program sent out for public consultation in December 2001, the Queensland Department of Primary Industries states "*The risk of shark attack is extremely low. For example, it is much more likely that swimmers will die in an accident getting to the beach than by a shark attack at the beach*". The review goes on to say that despite such a reality, it is the issue of a potential shark attack that poses the most fear in the beach visitors.

One of the main concerns with the NSW and QLD shark meshing programs is the significant toll the programs have on non-target species or by-catch. There are three sharks considered responsible for nearly all shark attacks, the white shark (*Carcharias taurus*), the bull shark (*Carcharhinus leucas*) and the tiger shark (*Galeocerdo cuvier*) (Last and Stevens, 1994). Yet for every one of these potentially dangerous sharks caught in the beach meshing programs unacceptably high numbers of non-target marine animals are killed. A number of the non-target species caught, injured and drowned in these programs are protected as threatened species under legislation including, the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act, 1999); the NSW *Threatened Species Conservation Act, 1995*; the NSW *Fisheries Management Act, 1994*; and, the QLD *Nature Conservation Act, 1992*.

In NSW between 1995 and 2000, 13 white sharks, 8 tiger sharks, and no bull sharks were caught. Over this same five year period 717 other marine animals have been killed in the nets. Therefore for every potentially dangerous shark caught 35 marine animals have been killed (AMCS, 2001). The by-catch in the QLD shark control program is equally concerning. During the first 15 years of the program (1962/63-1977/78) 468 Dugongs, 2654 Turtles, 317 Dolphins and 10, 889 Rays were caught (Paterson, 1979). In 1992 initiatives began to reduce the by-catch in the QLD program. Indeed the data on bycatch since 1992 does illustrate both a drop in the numbers of each species caught and an increase in the percentages of animals released alive (Gribble *et al*, 1998). However, while the changes since 1992 are encouraging the fact remains that the numbers of non-target species caught and killed in the QLD shark control program every year remains unacceptably high.

HSI has obtained the data on the species caught in the QLD and NSW Shark Control Programs, which can be provided to the Threatened Species Scientific Committee for review upon request.

In 1998, HSI submitted a nomination to have beach meshing recognised as a "Key Threatening Process" in Schedule 3 of the *Endangered Species Protection Act 1992*. The Endangered Species Scientific Committee (ESSS) disputed the claim by HSI that beach meshing is unselective stating 'demersal gillnets are highly selective, such that a difference of 1.25cm (in mesh size) can have a profound effect on the species and size of shark captured.' However, the fact that such a high number of non-target animals die in the nets is testimony to the contrary. The environmental cost of the by-catch in these programs is significant and must be weighed against any gains in safety.

Shark meshing was introduced to Sydney beaches to protect bathers following a series of fatal attacks off Sydney beaches and in Sydney Harbour (Krogh and Reid, 1992). The perceived success of the NSW program and fatal shark attacks at Noosa Heads and Mackay in December 1961 prompted the introduction of the QLD Shark Control Program in 1962 (Paterson, 1979). As stated above, the argument that the NSW and QLD shark control programs increase swimmer safety is based on the idea that when the populations of potentially dangerous sharks are reduced so too will the probability of being attacked. Indeed those who support the programs use the fall in shark attacks since the introduction of each program as proof of their success. The statistics on shark attacks do demonstrate a dramatic fall in attacks. In NSW there were 27 attacks in the years immediately prior to the commencement of the program, which fell to 3 in the subsequent 50 years (Krogh and Reid, 1992). In QLD the annual average frequency of 1.5 attacks over the years 1919 - 1962 has fallen to only one since the program's beginning (Paterson, 1986).

While impressive, these figures on shark attacks in fact exaggerate each program's effectiveness. Over the study period shark populations have come under many threats which have reduced population numbers significantly. Therefore, any objective analysis of the efficacy of the programs must take into consideration the distorting effects these additional threats – especially commercial and game fishing – have had on overall shark populations. Additionally, it was recognised in the recent Commonwealth publication, "Draft Recovery Plan for Great White Sharks" (December 2001) that changes in some industry practices have also contributed to the fall in shark attacks.

"When shark control activities were introduced, other activities now banned, such as abattoirs discharging offal into the ocean, could have led to a higher incidence of shark attacks." (DRPGWS, 2001 ,)

There were also shore whaling stations in Southern QLD and at Byron Bay in NSW that processed 7423 humpback whales between 1952 and 1962. It is very likely the closure of these whaling stations would have contributed to the observed fall in shark attacks in both QLD and NSW (Paterson.R.A, 1986).

The QLD program has been criticised for its use of baited drumlines as they are suspected to actually *attract* sharks. Paterson has defended the use of drumlines on this count but only by noting that beach nets are just as likely to attract sharks. Tiger sharks, Whaler sharks and Great White sharks have been found feeding on meshed animals including dolphins and dugongs (Paterson, 1989). Therefore the goal and justification for the QLD shark control program - to increase swimmer safety by lowering the frequency of interactions between sharks and swimmers,

is thrown into serious question by these two points. The safety measures offered by the NSW shark control program must also be questioned when one considers the fact that 35% of the sharks caught in the shark nets have been found on the beach side of the net (AMCS, 2001).

Additionally, there is no follow up research undertaken on the individual species, (eg. sharks, turtles etc), which are caught in the nets and released as to whether or for how long they survive after being entangled in the nets or hooked on the drumlines.

Shark meshing is an outdated practice. It addressed public fears at the time it was introduced. In the last five decades the public's ecological awareness and understanding has grown to replace the fear and hysteria that once came from ignorance. In addition human impact on the environment has increased substantially since the introduction of the program. A program in response to a relatively small threat - shark attack is less likely to occur than being struck by lightning - with such a high ecological cost is no longer acceptable. The fact that one of the target species, the great white shark, is listed under national law as Vulnerable to extinction yet continues to be targeted, and the shark control programs have contributed to the unfavourable conservation status of species such as the harmless yet critically endangered Grey Nurse Shark and highly threatened species of marine turtle is testimony to the practice of shark meshing being both archaic and inappropriate.

(A) Listed species, population or ecological community considered to be adversely affected.

▪ **Sharks**

The impact of the shark control programs, not only on species that are harmful to humans such as the Great White Shark, but on benign species such as the Grey Nurse Shark, not to mention other marine species such as turtles, whales and rays, is recognised in Australia's Draft National Plan of Action for the Conservation and Management of Sharks (2002). Actions requiring an assessment of the programs and evaluations of benign methods of shark control have been included and responsible authorities must consider adopting those 'methods which are found to be at least equally effective as the current lethal methods'.

Great White Shark (*Carcharodon carcharias*)

- ♦ **Vulnerable** ~ Commonwealth ~ EPBC Act, 1999
- ♦ **Vulnerable** ~ TAS ~ Threatened Species Protection Act 1995
- ♦ **Protected** ~ WA ~ Wildlife Conservation Act 1950
- ♦ **Vulnerable** ~ Worldwide ~ IUCN Redlist 2000
- ♦ **Protected** ~ All Australian States under Fisheries legislation

-DRPGWS, 2001

It has been acknowledged throughout its range in Australia and at many levels of government that the survival of the species *Carcharodon carcharias* is under threat. The species was listed as Vulnerable under the *Endangered Species Protection Act, 1992* (ESP Act, 1992) due to its population decline, susceptibility to non-natural sources of mortality and our limited understanding

of the ecology of the species (DRPGWS, 2001). This acknowledgment of a less robust population must be remembered when we assess the significance of the beach meshing program on the remainder of the species, calling for a very cautious management approach which relies heavily on the precautionary principle.

Whilst little is known about the species' life history due to their rarity, enough is known to realise they are particularly vulnerable to human sources of mortality. The species has a low natural mortality rate, individuals are long lived, have a late reproductive maturity (9 years for females and 11 years for males) and are therefore naturally relatively low in abundance. These characteristics translate into a species which is not only particularly susceptible to non-natural sources of mortality but very slow to recover from any such threats (DRPGWS, 2001).

Beach meshing catch data is one of the main sources of data from which assessments of likely population size are made. The records show a dramatic decline in the species population size. In the first 20 years beach meshing records were kept in NSW there was an annual average of 13 Great Whites caught. This figure has dropped to an annual average of 4 individuals over the last 10 years (NSW Fisheries). These figures indicate a decline in the order of 75% on 1970 levels. It should be noted here that this decline in numbers occurred as shark meshing intensity *increased*, suggesting the population size has fallen even more dramatically than the catch data shows. In NSW the number of catches in the three major netting areas showed a reduction to about a quarter of the 1972-73 catch by 1989-90. This trend has also been observed in QLD (DRPGW, 2000). During the first 20 years of the shark control program, 20 Great Whites were caught on average in the nets every year. This has fallen dramatically with an average of only 10 sharks having been caught in the last ten years (DRPGWS, 2001). The fall in catch rates for both the QLD and NSW programs in recent years can not be used to support the argument that the programs have little impact on the species' population, but rather are illustrative of both of the programs' contribution to lowering the Great White population.

When HSI made its 1998 nomination to have beach meshing listed as a Key Threatening Process, the ESSS rejected claim that the process adversely effects the Great White. The ESSS based its rejection on the argument that beach meshing was not one of the major causes of decline in the species; these major causes were instead alleged as being commercial, sport and spearfishing.

In response HSI believes firstly that some of the past causes of population decline are less important than the current barriers to recovery, now that sport and spearfishing for Great White sharks has been banned, shark control activities have been identified as one of the threats to the species which contributed to the decline and which continue to be a threat to the recovery of the species. (DRPGWS, 2001).

Secondly, any attempt to reject the significance of a threat on the basis that others appear to have a higher relative impact is a misleading simplification. Despite these objections when the data is actually analysed beach meshing appears to have indeed been 'one of the major causes of decline'. The Commonwealth Draft Recovery Plan for the Great White Shark (December 2001) states that 'the degree to which beach meshing is impacting on White Shark populations is unknown although the decline in captures suggests it is significant'.

Recreational fishing was recognised by the ESSS in the rejection of HSI's 1998 nomination as a major cause of decline, however beach meshing has and continues to have a greater negative impact on the species population. Between the years 1960 and 1995 recreational fishing reported a total of 183 great white sharks killed, an annual average of 5.2 (DRPGWS, 2001). Over this same period the NSW shark control program caught a total of 343 great white sharks, an annual average of 9.8 sharks, just under twice as many sharks (NSW Fisheries). Since the introduction of legal protection for the great white the threat of recreational fishing has fallen, with the annual average reported take between 1980 and 1990 being 1.4 sharks. During this same period NSW beach meshing killed an annual average of 5.9 sharks, an impact four times as great as that of recreational fishing (NSW Fisheries). Therefore beach meshing, at least in NSW is and has always been one of the 'major causes' of great white mortality, with only commercial by-catch causing more deaths.

In addition, to attempt to separate the top major causes of population decline; commercial by-catch, shark meshing and recreational fishing along the lines of significance would require an understanding of the long term impact on the population of each of these causes of mortality. We have neither the catch data for each of the threats or a thorough enough understanding of the ecology of the species to map the impact of each into population trajectories. Moreover, such an approach is unnecessary when we are dealing with what are clearly the most threatening processes. Each represents significant and ongoing threats to the survival of the species and each should be minimised.

Reducing levels of white shark take is also outlined as one of the main goals of the Commonwealth Great White Shark Recovery Team (DRPGWS, 2001). Considering the fact that the great white is a target species of the shark control programs such a goal can only be consistent with the removal of the nets and drumlines or the introduction of a non-lethal alternative.

The 2001 Draft Recovery Plan for Great White Sharks calls for relevant authorities to 'develop and trial non-lethal alternatives to beach meshing and drumlines with a view to phasing out bottom set shark netting programs of shark control'.

It should be noted there exists significant barriers to lowering the other main threats posed by commercial by-catch. Fisherman in some cases are not aware of the species' protected status and the illegality of killing great whites, while some industry participants do not agree with or respect the Vulnerable listing of the shark. There is also a problem with the unselective nature of fishing gear contributing to bycatch levels.

The Great White has experienced a dramatic decline in population numbers and given its life history characteristics, the ability of the species to recover will be slow. The shark control programs have had a prolonged and sustained adverse affect on the species population, indeed this was the aim of the programs and to this end they could be considered successful. However the objective of the Draft Great White Shark Recovery Plan is to "recover White Shark numbers in Australian waters, to a level that will see the species removed from the schedules of the *Environment Protection and Biodiversity Conservation Act 1999*". Certainly as the actions outlined in the plan are put into place, recovery efforts will be hampered and population numbers stunted if the shark control programs continue. Under current circumstances, removal of the shark nets and drumlines presents the most expedient and effective action to promote the recovery of the species.

Grey Nurse Shark (*Carcharias taurus*)

- ◆ **Critically Endangered** ~ East Coast of Australia ~ EPBC Act, 1999
- ◆ **Vulnerable** ~ West Coast of Australia ~ EPBC Act, 1999
- ◆ **Protected** ~ Queensland ~ Fisheries Act 1994 (Fisheries Regulation 1995)
- ◆ **Protected** ~ Western Australia ~ Wildlife Conservation Act 1950
- ◆ **Protected** ~ Tasmania ~ Fisheries Regulations 1996 (General and Fees)
- ◆ **Endangered** ~ NSW ~ Fisheries Management Act 1994 and 1997 Amendments
- ◆ **Vulnerable** ~ Victoria ~ Flora and Fauna Guarantee Act 1988
- ◆ **Vulnerable** ~ Worldwide ~ IUCN Red List of Threatened Species 1996

Recovery Plan for Grey Nurse Sharks, 2001 (RPGNS)

As with the Great White Shark, the population decline of the Grey Nurse Shark over the last several decades has been recognised in law in every Australian state, by the Commonwealth and internationally, with its Vulnerable listing on the IUCN Red List. The Grey Nurse was the first shark to be protected in the world. Recognition of a significant population decline and the critically endangered status on the east coast of Australia once again calls for a very cautious management approach, relying heavily on the precautionary principle.

The Grey Nurse, displaying similar life-history characteristics to the Great White shark is highly vulnerable to non-natural sources of mortality and slow to recover from any population decline. It has a late reproductive maturity- between 4-6 years, it has only two pups per litter and reproduces once every two years. Populations in NSW waters have not recovered since their protection in 1984 (RPGNS, 2001).

Although the population size is unknown, scientists estimate there could be as few as 500 individuals on the east coast of Australia. No more than 292 individuals have been surveyed at any one time during simultaneous surveys up and down the Australian east coast. There are concerns that the numbers have fallen to such a depressed level it is now difficult for individuals to find mates with which to reproduce (RPGNS, 2001).

In response to this desperate situation the east coast population of Grey Nurse shark was upgraded from Vulnerable to Critically Endangered in 2001 under the *Environment Protection and Biodiversity Conservation Act, 1999*, following a successful nomination by HSI. This listing means the species is 'facing an extremely high risk of extinction in the wild in the immediate future' (EPBC Act, 1999).

The coastal distribution of the Grey Nurse and the high degree of site loyalty shown by the species make it vulnerable to capture in the coastal nets.

The QLD and NSW shark control programs have been recognised as one of the main historical causes of decline in Grey Nurse numbers;

"The beach meshing program has been responsible for the capture of substantial numbers of Grey Nurse sharks from the 1950's through to the 1970's" (RPGNS, 2001).

As with the Great White, this threat has not subsided and the beach meshing programs are today acknowledged to be one of the current "major threats to recovery of the Grey Nurse shark" (RPGNS, 2001.). In NSW beach meshing caught up to 36 Grey Nurse sharks per year in the early 1950's. By the 1980's the annual catch had fallen to an average of 3 or less, and over the last decade only 3 Grey Nurse sharks have been caught in the nets. This dramatic fall in catch rates occurred over a period when the shark control effort increased, and so as with the great white shark, these figures are likely to represent an underestimate of the true population decline.

In QLD a similar fall in catches has been witnessed with a total of 90 sharks caught between 1962 and 72, an average of 9 per year, to 21 or 2.1 per year between 1990 and 2000 (DRPGNS, 2001). It should also be noted here that the lower catch-rates for shark meshing in recent years could not be used to support the argument that the programs have little impact on the Grey Nurse population, but are rather an indication of a heavily depleted population.

Other identified major threats to the species are incidental catch in commercial fishing and recreational fishing. The extent of the impact both past and current commercial fisheries have had on the species is unknown. Unfortunately, increasing our understanding of current areas of impact will be slow due to poor recognition and recording of interactions with the species by fisherman. Recreational fishing also has had a very significant impact on the population over the last few decades, and continues to be one of the greatest impediments to the recovery and survival of the species. (RPGNS, 2001). As a consequence of our limited knowledge and the difficulty in monitoring these threats, attempts to both lower catches and see an increase in recording of interactions will be difficult in the short term.

The ESSS rejected HSI's argument in the 1998 nomination, that shark meshing adversely affected the Grey Nurse shark, as it was not the major cause of population decline. HSI believes this is largely irrelevant. Even though the program's impact on the species in the past *has* been recognised as substantial, more importantly it is currently acknowledged as one of the threats to the *recovery* of the species. Certainly if the objectives of Recovery Plans for the Grey Nurse Shark are met, the number of individuals in NSW and QLD waters will increase. However, the continuation of the Shark Control Programs will increase the risk of Grey Nurse Sharks being killed and could potentially cause a further reduction in numbers. Seeing a reduction in take from the beach meshing program by researching non-lethal alternatives and phasing out the nets is one of the goals of the Commonwealth Grey Nurse Recovery Team (RPGNS, 2001). However, the fact that only very small numbers of Great Whites are caught in these programs at present is simply representation of the severely reduced population size, and does not mean that the process is not a threat. Given the Critically Endangered listing under the EPBC Act, the threat these programs pose cannot be ignored.

It should be noted here that the Commonwealth Recovery Plan for the Grey Nurse Shark (2001) makes a number of statements regarding the continued use of the Shark Control Programs including:

- Shark Control activities do impact on Grey Nurse Sharks
- Beach meshing is not selective
- Alternative methods to beach meshing should be trialed

The Recovery Plan (2001) states that 'alternative non lethal methods to beach meshing should be trialed in NSW and QLD...By minimising bycatch and researching alternatives to protective shark meshing nets, the Grey Nurse Shark will benefit, particularly if the population increases. Other non-target species that are captured in the shark nets such as whales, dolphins, dugongs, turtles and rays would also benefit if protective shark meshing nets were reduced'.

It should also be noted that the Commonwealth Recovery Plan for the Grey Nurse Shark considers the take of one individual could constitute a significant impact on the species, due to the critical conservation status that the species holds.

▪ Marine Turtles

Leatherback Turtle (*Dermochelys coriacea*)

- ♦ **Vulnerable** ~ Commonwealth ~ EPBC Act, 1999
- ♦ **Protected** ~ NSW ~ National Parks and Wildlife Act, 1974
- ♦ **Vulnerable** ~ NSW ~ Threatened Species Conservation Act, 1995
- ♦ **Endangered** ~ Worldwide ~ IUCN Red List 2000
- ♦ **Endangered** ~ QLD ~ Nature Conservation Act, 1992
- ♦ **Appendix I** ~ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ♦ **Appendix I and II** ~ Convention for the Protection of Migratory Species of Wild Animals (CMS)

Green Turtle (*Chelonia mydas*)

- ♦ **Vulnerable** ~ Commonwealth ~ EPBC Act, 1999
- ♦ **Protected** ~ NSW ~ National Parks and Wildlife Act, 1974
- ♦ **Vulnerable** ~ NSW ~ Threatened Species Conservation Act, 1995
- ♦ **Endangered** ~ Worldwide ~ IUCN Red List 2000
- ♦ **Vulnerable** ~ QLD ~ Nature Conservation Act, 1992
- ♦ **Appendix I** ~ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ♦ **Appendix I and II** ~ Convention for the Protection of Migratory Species of Wild Animals (CMS)

Loggerhead Turtle (*Caretta caretta*)

- ♦ **Endangered** ~ Commonwealth ~ EPBC Act, 1999
- ♦ **Protected** ~ NSW ~ National Parks and Wildlife Act, 1974
- ♦ **Vulnerable** ~ NSW ~ Threatened Species Conservation Act, 1995
- ♦ **Endangered** ~ Worldwide ~ IUCN Red List 2000
- ♦ **Endangered** ~ QLD ~ Nature Conservation Act, 1992
- ♦ **Appendix I** ~ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ♦ **Appendix I and II** ~ Convention for the Protection of Migratory Species of Wild Animals (CMS)

Olive Ridley Turtle (*Lepidochelys olivacea*)

- ◆ **Endangered** ~ Commonwealth ~ EPBC Act, 1999
- ◆ **Endangered** ~ Worldwide ~ IUCN Red List
- ◆ **Protected** ~ NSW ~ National Parks and Wildlife Act, 1974
- ◆ **Endangered** ~ QLD ~ Nature Conservation Act, 1992
- ◆ **Appendix I** ~ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ◆ **Appendix I and II** ~ Convention for the Protection of Migratory Species of Wild Animals (CMS)

Hawksbill Turtle (*Eretmochelys imbricata*)

- ◆ **Vulnerable** ~ Commonwealth ~ EPBC Act, 1999
- ◆ **Critically Endangered** ~ Worldwide ~ IUCN Red List
- ◆ **Protected** ~ NSW ~ National Parks and Wildlife Act, 1974
- ◆ **Vulnerable** ~ QLD ~ Nature Conservation Act, 1992
- ◆ **Appendix I** ~ Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- ◆ **Appendix I and II** ~ Convention for the Protection of Migratory Species of Wild Animals (CMS)

[Note: Marine turtles have been grouped together because most of the data we do have on catches is not species differentiated. It should be noted here that at least in NSW comprehensive by-catch data has only been kept over the last five years, making analysis of the impact on species such as marine turtles difficult and likely to be an underestimate.]

Once again the above listings under various laws and conventions are indicative of the marine turtles' vulnerability and the resultant requirement that we manage them with caution. The life history characteristics of these species of marine turtle make them particularly susceptible to human induced threats and slow to recover from such threats. A marine turtle may take up to 30-50 years to mature and will not breed every year (DRPMT, 1998). Marine turtles spend most of their life in the sea, are highly migratory, occupy different habitats at different stages in their life and do not nest every year, all characteristics which make population size estimates and management of these species very difficult. As there is no long-term data on marine turtles we are unable to be certain about the impact of the various threats, including the shark control program, on overall populations of these species.

Turtles are one of the largest groups of bycatch in the QLD shark control program. Over the 26 year period between 1962 and 1988, a recorded 3,656 turtles were caught in the program. Marine turtles have been caught in all regions within the QLD Shark Control program (Paterson, 1989), which has been identified in the Commonwealth Draft Recovery Plan as an issue which is 'of concern and should be managed with the intent of reducing mortality.' (DRPMT, 1998 pg85)

While baited drumlines are supposed to reduce by-catch, this has not been the case with the marine turtles. At Point Lookout there has been a particularly high mortality rate on drumlines; Leatherbacks in particular have been hooked and subsequently drowned on the drumline in the fast flowing currents (Paterson, 1989). Baited drumlines are reported to catch loggerhead turtles in particular. This reality is very concerning in light of the fact that the Queensland Turtle Research

Project, managed by Queensland Department of Environment, has sufficient evidence to conclude that East Australian Loggerhead turtle sub-population numbers are so low that the species could qualify for critically endangered status (DRPMT, 1998). Environment Australia acknowledged this heightened vulnerability in the Marine Turtle Draft Recovery Plan;

'The loss of small numbers of east coast loggerhead turtles is not sustainable' (DRPMT, 1998)

Defenders of the QLD program argue the above statistics are no longer reflective of the program's impact. They quote figures on catch and release rates since 1992, when amendments to the program aimed at lowering by-catch began. Indeed since 1992 the program has improved its performance with regard to the percentage of turtles released alive, which has jumped from 35% (1962-1995) to 87% (1992-1996). Those in support of the program also quote the lower annual average catch rate since 1992, comparing the annual average of 119.4 per year between 1962-1995 with 84 per year between 1992-1996. While this drop does initially appear impressive the figures are misleading. Over the last few decades marine turtles both nationally and internationally have undergone a significant decline in numbers. It would therefore be expected that the number caught in the nets in recent years would be significantly lower than earlier in the program, independent of any change in practices. In addition, due to the way the data is presented there appears to have been a sudden drop in catch rates in 1992, the year reforms were initiated. However, this is artificially created as the average of the first data set is inflated by the higher catch rates in the early years of the program and would be greater than the average of any data set, which only included the recent years of the program. Furthermore, although the improved release rate is encouraging, the fact that we do not know the survival rate of the turtles after being caught and released is a concern. Many turtles released alive have sustained serious lacerations through prolonged struggling against either nets or hooks and little is known about the impact this can have upon their survival and reproduction following release (Gribble et al, 1998).

It has been estimated that between 1992-1996 an average of 28.4 Loggerhead turtles were caught per year. Ninety per cent of these turtles were released alive (Gribble et al, 1998). Therefore even after the amendments to the QLD shark control program to lower by-catch the program still causes the death of over 3 Loggerhead turtles every year. This sustained annual toll can undoubtedly be considered a threat to a listed species with such critically low population numbers that a 'loss of small numbers' is unsustainable. The fragility of the Loggerhead population prompted the marine turtle Recovery Team to state the following;

'the lead conservation and fisheries management agencies in each state will make every effort, care and precaution to reduce loggerhead mortality to almost zero' (DRPMT, 1998 page 2).

Low numbers of marine turtles have been caught every year in the NSW beach meshing program (Krogh and Reid, 1996). Between 1950 and 1993 a total of 56 marine turtles were recorded caught in the nets. (1996) There is a set of data on by-catches for the Newcastle region only, over the period 1965/66-1980/81. Between 1965/66 and 1969/70 in the Newcastle region, the annual average catch of marine turtles was 2. This rate increased to 4 in the years between 1972/73 to 1980/81, most likely a product of increased meshing intensity after 1972 (Krogh and Reid, 1992). In 1980/81, 10 marine turtles were caught. The majority of turtles identified have been Green turtles, which are listed as Vulnerable under the EPBC Act, 1999. One Leatherback was identified, also listed as Vulnerable under the EPBC Act, 1999.

NSW by-catch data has been kept since 1995/96. Since this time small numbers of the three listed marine turtles have been caught. In particular, 2 Loggerhead Turtles were caught and killed in the nets in 1996/97 and 1998/99, with one caught and killed in 1997/98. Again, while these numbers may appear low, the fragility of this species population renders such a sustained threat highly significant. Therefore, any casualties of Loggerhead Turtles in the NSW shark meshing program can be taken as evidence of the program having an adverse affect on this listed species.

The paucity of data on both the marine turtles as a group of by-catch and on the take of individual species makes clear conclusions about the impact of the programs on these species impossible. Such an absence of data does not however remove the need to acknowledge the potential threat of the program but rather calls for the employment of the precautionary principle to compensate for such incomplete information. In light of the fact that each of the marine turtle species caught in the shark control programs are listed under state/territory, national and international laws and treaties, the sheer numbers taken in QLD over the life of the program and the numbers still taken, especially of the Loggerhead turtle leaves no doubt about the negative impact the programs are having on the long term survival prospects of these species.

(B) Other native species, population or ecological community that may become threatened as a result of the threatening process.

▪ **Dugong (*Dugong dugon*)**

- ♦ **Vulnerable** ~QLD ~ *Nature Conservation Act 1992*
- ♦ **Vulnerable** ~ NSW ~ *Threatened Species Conservation Act 1995*
- ♦ **Vulnerable** ~Worldwide ~*IUCN Red Book 2000*
- ♦ **Listed Marine Species** ~ *Commonwealth ~ EPBC Act, 1999*

Data from the QLD shark control program has been used to analyse dugong population trends. It is estimated the Dugong population south of Cooktown has experienced such a dramatic decline over the last four decades that the current population is estimated at approximately 3% of the level it was at the beginning of the shark control program (Marsh *et al*, 2001). Dugongs are highly vulnerable to long-term losses as they do not increase by more than five percent per annum, even in optimal conditions (Marsh, 1998). Such a dramatically depressed population combined with a poor ability to recover from a sustained reduction in numbers calls for immediate action.

The recognition of this species as a listed Marine Species and Migratory Species under the EPBC Act, 1999 and under State law, as well as the international obligations that Australia faces with the species listed under Appendix II of the Convention on Migratory Species, clearly illustrates the high sensitivity of this species and the resulting need for a proactive and vigorous management approach. Further to this protection, HSI is currently preparing a nomination to have the Dugong (*Dugong dugon*) listed as a vulnerable species under the EPBC Act.

Dugongs have been caught in all areas where the QLD shark control program operates. Between the years 1962-1977, 468 Dugongs were caught - an annual average of 31.2 individuals. The available data shows the most Dugongs being caught in Townsville. There have been attempts to

reduce the catch here by relocating the nets but this has only been partially successful (Paterson, 1989). Similarly, the reforms in 1992 have had little effect on lowering Dugong mortality. The annual average catch-rate for the years 1992-1996 was measured at less than 4.3 individuals (Gribble *et al*, 1998). While this is a smaller catch-rate than previously recorded, in light of the above figures on population decline it is far more likely this fall is a function of the overall drop in Dugong numbers as opposed to a significant reduction in the impact of the meshing program. There has been an improvement in the percentage of dugongs released alive, from 4.4% in Townsville between 1964-1971 (Paterson, 1989) to 16.7% overall between 1992-1996 (Gribble *et al*, 1998). Although this improvement is encouraging, it still stands that despite attempts to lower mortality 83.3% of Dugongs caught die in the nets. Additionally, there is no data available on post release mortality, so overall death tolls could be far higher.

Five Dugongs have been caught in the NSW shark meshing program between 1950 and 1993. While these numbers may appear to be small they are not irrelevant as the Dugong is very rarely found south of Moreton Bay in Queensland. This catch-rate is therefore likely to represent a high proportion of the Dugongs in the waters off NSW and is further evidence of the significant threat nets pose to Dugongs in the wild (Krogh and Reid, 1996).

While any gains in survival rates are encouraging the fact remains that the shark control programs have had and continue to have an ongoing significant negative impact on the Dugong. Considering this species critically depressed numbers and limited ability to recover from such a small population base, HSI believes the Dugong could become listed as a result of the threat of the shark control programs.

▪ Cetaceans (Whales and dolphins)

Humpback Whales

- ◆ **Vulnerable** ~ Commonwealth ~ EPBC Act, 1999
- ◆ **Vulnerable** ~ NSW ~ *Threatened Species Conservation Act 1995*
- ◆ **Vulnerable** ~ QLD ~ *Nature Conservation Act 1992*

Between 1962- 1995 8 Humpback whales were caught off the Sunshine and Gold Coast, 3 of which were not realised alive (Gribble *et al*, 1998). This figure, while at first appearing small can not be used as evidence the program has not and does not have a detrimental effect on this vulnerable species. These catch rates are more likely to be reflective of a very heavily depleted population, slow to recover from only 500 individuals in 1962 (Paterson, 1979). Concerns for the future impact of the shark program on the species have been aired. 'Any danger to this stock is to be regarded seriously.' (Paterson, 1979). As the numbers increase and there are more humpbacks migrating along the coastline which is obstructed by nets and drumlines it is feared more will be caught in the QLD program (Gribble *et al*, 1998), and the ability of the program to significantly affect the population will be realised. In fact two Humpback Whales being killed in the nets this last winter (2001) has prompted a review of the QLD shark control program by the QDPI.

In the week of the 26th August 2002, a Humpback whale was entangled in the shark control nets off one of the Gold Coast beaches (Palm Beach). Over one week later, the same animal was reported

some distance south off the NSW North Coast, still entangled and towing net, ropes and green flotation buoys, as well as a 25m chain and an anchor – the equipment from the Palm Beach net.

Mr Trevor Long from Seaworld Marine Park commented to Sydney's Daily Telegraph that 'we've got about 4000 whales passing every year. The whale population is increasing about 8 percent a year. So, we're going to see more of these incidents'.

In addition to the stress that the adult whale suffered during its week long ordeal, a baby whale, believed to be the netted whales' calf was found dead near the Gold Coast on Thursday (29th August 2002).

Dolphins

[Note: Dolphins have been grouped together because most of the data we do have on catches is not species differentiated.]

Irrawaddy River Dolphin (*Orcaecella brevirostris*)

- ◆ **Rare** ~ QLD ~ QLD Nature Conservation Act, 1992

Indo-Pacific Humpbacked Dolphin (*Sousa chinensis*)

- ◆ **Vulnerable** ~ NSW ~ Threatened Species Conservation Act 1995
- ◆ **Rare** ~ QLD ~ QLD Nature Conservation Act, 1992

Bottlenose Dolphin (*Tursiops truncatus*)

This species was listed in the 'No Category Assigned' because of insufficient information in the 1996 Commonwealth publication 'The Action Plan for Australian Cetaceans'. This category is assigned when the species is suspected to belong to either the Endangered or Vulnerable listings but there is insufficient information available (Bannister et al, 1996).

Once again insufficient data on dolphin by-catch in the shark meshing programs exists and as such clear conclusions as to the impact on these species are difficult to make. Consequently, given the acknowledged vulnerability of the Irrawaddy River Dolphin and the Indo-Pacific Dolphin and the suspected vulnerability of the Bottlenose dolphin the Precautionary Principle should again be employed when we are assessing the impact of the program on the species.

The QLD shark control program caught 520 dolphins between 1962/63 and 1987/88, very few of which were released alive. This figure is likely to be an underestimate of the real catch rate due to 'clerical omissions between 1962 and 1967' (Paterson, 1989). None-the-less it still equates to an annual average catch of 20.8 dolphins. The species most frequently caught north of Mackay was the Irrawaddy River dolphin, while those caught in Southern QLD included the Bottlenose, Common and Indo-pacific humpback (Paterson, 1989).

In NSW we once again refer to the by-catch data prior to 1995/96 that is available, for the period 1965/66-1980/81 in the Newcastle region. Here an annual average of 5.75 dolphins were caught, none being released alive. Unfortunately this data was not differentiated along species lines.

(Krogh and Reid, 1992). There were a total of 94 dolphins and porpoises caught between 1950-1993. Krogh and Reid have speculated that the majority of the cetaceans caught in NSW are Bottlenose and Common dolphins. (Krogh and Reid, 1996). For these two, grouped together in recent by-catch data between 1995/96 – 00/01, 22 individuals were caught and died, none were released alive.

Significantly, ESSS has expressed concern over the impact that beach meshing has on cetaceans. It has recommended the Commonwealth work with State governments to put appropriate regulations in place to stem the adverse affect of gill netting, in particular beach meshing on these species (DRPGWS, 2001). HSI believes that given the sustained threat the programs continue to pose to dolphins, particularly the Irrawaddy River Dolphin, the Indo-pacific Humpback and the Bottlenose Dolphin these species could become threatened as a result of the continuation of the meshing programs in New South Wales and Queensland. Once again the paucity of data from both programs calls for a significantly more cautious management approach.

▪ Rays

During the years between 1962-1987 a total of 13, 765 rays were caught in the QLD program (Paterson, 1989). Especially high numbers were caught in the early years of the program when the nets were set to the bottom of the ocean (Paterson, 1989). Species caught have included; Devil Ray (*Manta alfredi*), Pigmy Devil Ray (*Mobula diabolus*), Spotted-eagle Ray (*Aetobatus narianari*), Cowtail Ray (*Dasyatis sephen*), Long-tailed Ray (*Himantura uarnak*), Brown Stringray (*Dasyatis fluviorum*) and the Coachwhip Ray (*Himantura granulata*) (Paterson, 1989).

Rays including skates, stingrays, stingarees and various other rays make up the largest group of by-catch in the NSW shark meshing program. At least 2074 rays have been caught between 1950 and 1993, with this number again likely to be an underestimate due to poor monitoring (Krogh and Reid, 1996).

Once again we do not know the impact these large and sustained catches in both the QLD and NSW shark control programs have and continue to have on the species that make up this group. Our limited understanding of their ecology and the high catch rates call for a cautious management approach, relying heavily on the Precautionary Principle.

(C) The reasons why the preparation of a threat abatement plan is considered to be an effective and efficient means of abating the threatening process by the person or persons making the nomination;

The nomination has outlined the impact that the shark control programs are having on both listed and unlisted marine species, a number of which are considered to be critically endangered species. Historical catches and more recent data taken from the QLD and NSW Shark Control Programs shows that the QLD and NSW shark control programs undoubtedly have an adverse affect on species currently listed under the EPBC Act, 1999, a number of which are critically endangered species. Additionally, evidence also points to the potential for these shark control programs to lead to the listing of several other marine species for state and federal threatened species protection.

The nominator is of the firm opinion that a Threat Abatement Plan (TAP) is an effective means by which to coordinate an appropriately strong response to the threat of the shark control programs, with the ultimate goal of such a plan to be the removal of such programs (ie. beach nets and drumlines) from all QLD and NSW beaches.

While we acknowledge that the fear in the community of the risk of shark attack continues, we also acknowledge that the risk of such attacks in reality is small. Allaying public fears would require an extensive education and awareness campaign, which could certainly be included in the TAP for the threatening process. Additionally, recognition of the impact (current and potential), that the shark control (beach meshing) programs are having on protected marine species, and the potential for additional species to be added to the threatened species lists warrants action. A TAP for this threatening process could call for research to be conducted on developing and implementing non-lethal alternatives to the current lethal mechanisms.

CONCLUSION

This nomination shows that death and injury to marine species due to the Shark Control (Beach Meshing) Programs, currently only conducted in QLD and NSW state waters has adversely impacted on species populations in the past, and contributed to their listing as threatened species under various state and commonwealth legislation. The nomination shows that continuation of this process could contribute to species already listed being moved to a higher level of endangerment or hamper current efforts to recover listed threatened species such as the Grey Nurse Shark and Great White Sharks and marine turtles such as the Loggerhead.

The nomination also shows that continuation of the Shark Control Programs could contribute to other species becoming listed as threatened under state and/or commonwealth legislation in the future.

The nominator strongly believes that the Shark Control (Beach Meshing) Programs should be listed under the Environment Protection and Biodiversity Conservation Act 1999 as a Key Threatening Process, and that a Threat Abatement Plan would be the most efficient, feasible and effective means of abating this threat in the future.

DISCLAIMER

This nomination was prepared by Lisa Brown on behalf of Humane Society International. The nominees declare that the information contained within to be true and correct to the best of our knowledge.

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