

# APPENDIX I

## Legal Status Regarding Dolphin Landing/Trade

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These eleven legislative enactments/ordinances were reviewed and are briefly discussed below. with special reference to their applicability to the dolphin catch.

- National Aquatic Resources Research and Development Agency Act No. 54 of 1981.
- Fauna and Flora Protection Ordinance Cap. 469
- Fauna and Flora Protection (Amendment) Act No. 44 of 1964
- Fauna and Flora Protection (Amendment) Act No. I of 1970.
- Fisheries Ordinance Cap 212 and Amendments.
- Fisheries (Regulation of Foreign Fishing Boats) Act No. 59 of 1979.
- Fisheries (Regulation of Foreign Fishing Boats) Act No. 37 of 1982.
- Maritime Zones Law No. 22 of 1976.
- Chank Fisheries Cap. 213
- Pearl Fisheries Cap. 214
- Whaling Ordinance Cap. 215

### 1. National Aquatic Resources Research and Development Agency Act No. 54 of 1981.

It is designed for research, development and management of 'aquatic resources', which are all living and non-living resources in or beneath the medium of water and which, when subject to the sovereignty, jurisdiction or control of Shri Lanka, are termed 'National Aquatic Resources'. Identification of aquatic resources is one of the Agency's functions; the Agency has powers to conduct research for, and to render technical services to, the Ministry of Fisheries.

The declared purpose of the Agency seems ideally designed for the study of aquatic resources in general and for the study of dolphins in particular. This Act, however, does **not** specify any species of aquatic animal **nor** does it provide for the control of the taking, killing etc. of fish or aquatic animals or dolphins.

### 2. Fauna and Flora Protection Ordinance

"The protection of the fauna and flora of Ceylon" is the purpose of the Fauna and Flora Protection Ordinance, Cap. 469 of the Legislative Enactments. The Ordinance declares certain areas as Strict Natural Reserves. National Parks, Nature Reserves, Jungle Corridors, Intermediate Zones and Sanctuaries. Entry into, and activities in, some of these areas are totally prohibited, in others, controlled by permits or licences, and, in yet others, totally free. 'Animal' includes 'fish' and 'wild animals': i.e., any animal other than a domestic animal (s.1 1). 'Fish' is, however, not further described or defined anywhere in the Ordinance.

Various species of animals, birds, beasts, elephants etc. are enumerated and provision is made. specifically, in substantive sections in the Ordinance, prohibiting the taking, killing etc. of such animals. Clear prohibitions are placed, leaving no room for doubt or argument. e.g. sections 3.5.6.7.x and **so on. Dolphins are completely left out.** This position is not altered by the amendments to the Fauna and Flora Protection Ordinance, introduced by Act 44 of 1964 and Act 1 of 1970.

### 3. Fisheries Ordinance

The Fisheries Ordinance, Cap. 212 is intended "to amend and consolidate the law relating to Fisheries and to the taking and protection of fish in Ceylon waters. to provide for the registration of fishing boats. for the better regulation of the fishing industry and for purposes incidental to or connected with the matters aforesaid".

'Fisheries' as such is not defined and Ceylon waters must today be construed, not as the three-mile limit of old, but as the 300 mile limit in operation after the Maritime Zones Law. No. 22 of 1976.

Section 5 of the Fisheries Ordinance provides for the taking of fish in Ceylon waters on a fishing licence. Though licences and registration are mentioned, there is nothing in the sections concerned to indicate any prohibitions or restrictions on the taking and killing of fish or any species of fish.

Sections 12 to 19 exhaust the part of the Ordinance intended for the "protection of fish" : but this protection has not extended to the making of any provision against the taking, killing etc. of fish.

Section 33 provides for the making of regulations for general purposes, but since there is no specific or substantive section of the Ordinance giving the right to restrict or prohibit the taking, killing etc. of fish, a regulation for such purposes cannot be made and, if made, would be ultra vires the powers in the Ordinance.

Section 35 of the Ordinance does define 'fish'; 'fish' means any variety of marine, fluviomarine or fresh-water fishes, crustacea or mollusca, and includes every aquatic animal which derives its sustenance wholly or mainly in water, but does not include

- (a) chanks - Cap. 213,
- (b) pearl oysters - Cap. 2 14,
- (c) whales - Cap. 2 15, or
- (d) any reptile for the time being included in Schedule I to the Flora and Fauna Protection Ordinance - Cap. 469.

While whales are specifically excluded, dolphins, which are ejusdem generis with whales, are not mentioned. It might be therefore argued that dolphins could be brought in under that portion of the definition which states that every aquatic animal deriving sustenance from water is included. As whales are specifically excluded, it does not seem logical to take in dolphins as a species ejusdem generis with an excluded species. It may be easier to classify dolphins with other "aquatic animals" and so take them in. It is, however, not conceivable why, if dolphins were intended to be taken in, dolphins were not specifically mentioned when, at the same time, whales are specifically excluded. The clue to it may be in the fact that when the Fisheries Ordinance came to be first enacted in 1940, dolphins were not a problem, or a known problem, and were therefore left out of consideration, unlike, whales, which have been exclusively covered under the Whaling Ordinance, in response to worldwide concern for whales threatened by the whaling industry.

#### 4. Fisheries (Regulation of Foreign Fishing Boats) Act No.59 of 1979

This Act has been enacted to "regulate, control and manage fishing and related activities by Foreign Fishing Boats in Sri Lanka waters; and to provide for matters connected therewith or incidental thereto".

Foreign fishing boats (being boats other than local fishing boats -s.28) can fish in areas of Sri Lanka waters specified in a permit and at seasons specified in such permit (s.6). The Director of Fisheries was originally the authority for implementing the Act. but by Act 37 of 1982 amending Act 59 of 1979. "Secretary" was substituted for Director.

In granting permits the Secretary may attach special conditions which, however, are not specified (ss.8 and 9) and may also cancel or suspend such permits (s.10). Species of fish or other aquatic animals are not specified. Section 16 makes contravention of conditions an offence. But there is no substantial provision that the taking, killing etc. of fish or any variety of fish is prohibited.

Act 59 of 1979 also introduced another definition of "fish" (s-28 ): FISH means any aquatic animal, whether piscine or not and including any shell-fish, crustacean, mollusc, holothurian or aquatic mammal, also its young, fry, eggs or spawn. "Any aquatic animal, whether piscine or not", is

extensive enough to cover dolphins. No excluded species are mentioned. However, the Act itself does not contain any section making the taking, killing etc. of any aquatic animal, whether piscine or not, lawful or unlawful except on a permit.

It is doubtful whether the Secretary has power to specify species of fish. Section 8 of the Act subjects permits under section 6 to "prescribed" conditions within the discretion of the Secretary. The conditions he may think fit to attach are themselves subject to certain circumscribing limits with regard to the period for which the permit is issued, the area of fishing, the methods employed and the type of gear that can be used by the boat (s.8). Species of fish are **not** mentioned.

In the circumstances, though the definition of fish in Act 59 of 1979 seems sufficient to cover the case of dolphins, the absence of any specific prohibition or restriction as to dolphins prevents any action being taken against their taking, killing etc.

### *SUMMARY*

To summarize the position, there is no existing legislation which **specifically** restricts or prohibits the taking, killing etc. of dolphins. If total prohibition is contemplated, it is best to do so by a provision in the Fisheries Ordinance, or in any other legislation designed to handle the matter, clearly and specifically prohibiting the taking, killing etc. of dolphins. Where the intention is not to have a total prohibition but to introduce some degree of control over fishing activities, provision may be made by a section in the legislation clearly stating that the taking, killing etc. of dolphins (with or without mention of other species) is prohibited **except** on a permit or licence issued on certain terms, e.g. as to payment, areas of fishing, days of fishing, modes of fishing, fishing gear which may be used etc.

It is suggested that these matters be provided for either by suitable amendments to the Fisheries Ordinance or by new legislation enacted for the purpose, for which the Legal Draftsman should be consulted. It is also suggested that the prohibitions or restrictions should be made applicable to both local and foreign fishing boats.

## APPENDIX II

### World Review of Capture and Utilization of Dolphins

#### INTRODUCTION

Dolphins are caught the world over as incidental catches during fishing operations and as targeted catches of **some** fisheries. Incidental catches are reported from large-scale industrial fisheries as well as from small-scale fisheries, using gillnets, purse-seines etc, while harpooning is widely used in fisheries targeting dolphin. Dolphins caught as by-catch of large-scale industrial fisheries are often not utilized whereas those caught by both targeted and non-targeted small-scale fisheries find various uses, including human consumption.

#### *Dolphin by-catch from industrial fisheries*

Large-scale, high seas driftnet fishing for tuna and squid is a relatively new phenomenon. The world's largest driftnet fisheries operate in the North Pacific. Fleets from Japan, Taiwan and Korea, totalling some 640 vessels, fish for squid using driftnets 45-50 km in length. Several hundred Japanese and Taiwanese vessels fish with large-mesh driftnets for tuna (mainly albacore) and billfish in the South Pacific. Taiwan began to operate high seas drift gillnetters from the mid- 1980's for albacore and squid in the North Pacific Ocean and for albacore in the Indian Ocean.

Small cetacean species which are known to be taken in large numbers in the North Pacific driftnet fisheries include the Northern Right Whale Dolphin (*Lissodelphis borealis*), Pacific Whitesided Dolphin (*Lagenorhynchus obliquidens*) and Dall's Porpoise (*Phocoenoides dalli*). The Japanese North Pacific driftnet fishery for salmon is reported to have incidentally killed 10,000-15,000 Dall's Porpoises a year, during fishing operations in the late 1970's (Ohsumi, 1990). Mortality is estimated in the hundreds of thousands a year for some seabirds. Leatherback, Loggerhead and Green Turtles are also caught incidentally in the North Pacific driftnet fisheries.

International monitoring of high seas driftnet fisheries began in 1989 with placement of US and Canadian observers on Japanese driftnetters fishing for squid in the North Pacific. The Japanese North Pacific driftnet fishery for squid, in 1990, was estimated to have caused the deaths of over 270,000 sea birds, 26,000 marine mammals and about 400 turtles (Anon 1992a). It has been shown that populations of the Northern Right Whale Dolphins and the Pacific Whitesided Dolphins have suffered declines as a result of these fisheries.

Approximately one quarter of the world's tuna catch (2.5 million tonnes in 1988) is taken from the Eastern Tropical Pacific Ocean (ETP). The most economically important tuna species in this area is the Yellowfin (*Thunnus albacares*), which is often found in association with various species of dolphins. Tuna fishermen have taken advantage of this association and have caught tuna by setting their purse-seine nets on highly visible herds of dolphins. Since the early Seventies (1973 to 1990), over 1.25 million dolphins have been incidentally killed in purse-seine fishing for Yellowfin Tuna in the Eastern Tropical Pacific Ocean (De Master et al, 1992). The Spotted Dolphin (*Stenella attenuata*) is the major dolphin species taken by the purse-seine fishery for Yellowfin Tuna in the ETP. The Spinner Dolphin (*S.longirostris*) and the Common Dolphin (*Dolphinus delphis*) are also taken. In addition, the Striped Dolphin (*S.coeruleoalba*) and the Fraser's Dolphin (*Lagenodelphis hosei*) are occasionally caught.

Until the 1970s. the tuna fishery in the ETP was dominated by the U.S. fleet and an average of 100,000 dolphins a year were estimated to have died as incidental catches during purse-seine operations in 1960-1972. The number of U.S. purse-seiners in the ETP tuna fishery decreased from an average of 45 vessels a year in the mid-1980s to 10 vessels in 1992. During recent years, several Latin American nations have developed large tuna fleets. Since the mid- 1980s. they have accounted for most of the catch of tuna and the most mortality of dolphins. The Inter-American Tropical Tuna Commission (IATTC) estimated that the total kill for 1990 was 52,000-56,000 dolphins, of which 5083 were attributed to the U.S. fleet (Anon, 1992b).

### *Dolphin catches in small-scale fisheries*

Small-scale fisheries in many parts of the world are also reported to catch dolphins as by-catch. Targeted fisheries also exist for a variety of uses, including human consumption. For example:

Gillnets are used all around the coast of India. Consequently, unknown numbers of small cetaceans are caught and killed incidentally. The five main species involved are the Indo-Pacific Humpbacked Dolphin (*Sousa chinensis*), Bottlenose Dolphin (*Tursiops truncatus*), Spinner Dolphin, Common Dolphin and Finless Porpoise (*Neophocaena phocaenoides*). The Finless Porpoise and the Common Dolphin have been reported to be accidentally taken in the shore seine fishery off Goa, India. The carcasses of these animals find their way into market places along with the fish (Thomas 1983).

Dolphin flesh is used as bait in the expanding shark fishery along the east coast of India (Rao, 1990). Dolphins taken by gillnet and harpoon are also being used as bait in shark fisheries along the southwest coast of India (Lal Mohan, 1991). Dolphin meat is also sold for human consumption in Kochi (Cochin). Consumption of dolphin meat is also reported from Lakshadweep (the Laccadive Islands) where the inhabitants of some islands catch dolphins, either by harpooning or by driving them into shallow lagoons (Mankifen, 1983).

There is a long history of subsistence take and incidental kill of small cetaceans in coastal fisheries of several West African nations — particularly Mauritania, Senegal and Ivory Coast. The species involved include the Common Dolphin, Bottlenose Dolphin, Spinner Dolphin, Atlantic Spotted Dolphin (*S. frontalis*), Clymene Dolphin (*S. clymene*), Roughtoothed Dolphin and Indo-Pacific Humpbacked Dolphin (Anon 1989c).

A harpoon fishery for small cetaceans has long existed around Japan, with Dall's Porpoises amongst the target species. The annual take of Dall's Porpoises has been around 10,000 in the late 1970s and early 1980s. In 1986, fishermen took 13,406 Dall's porpoises in Japanese waters. This jumped to 41,455 in 1988, apparently to make up for the shortfall of whale meat brought about by decreased whaling. In response to concern expressed by the International Whaling Commission, the Japanese reduced the take of Dall's Porpoises to 29,000 in 1989 (Ohsumi, 1990).

- Small cetaceans are also killed incidentally in gillnets and seines and harpooned in many places along the central and northern coasts of Brazil. They are used for shark bait, for human consumption and as a source of 'love charms'. Harpooned dolphins are also used as shark bait in a fishery in northeastern Venezuela (Anon, 1990a). Small cetaceans are also killed in the gillnet fisheries in northern Argentina. In southern Argentina, dolphins are taken incidentally in crab nets, but harpooned for crab bait. Dolphins and porpoises are also harpooned for use as bait in the Chilean crab fishery, along with fur seals, Sea Lions and other wild life. The abundance of at least one dolphin, the Commerson's Dolphin (*Cephalorhynchus commersonii*), may have been drastically reduced. A wide variety of small cetaceans are taken incidentally in gillnets and deliberately in seines and by harpoon and landed at several fishing ports in Peru for human consumption (Anon, 1992a). The recent catch of dolphins in the directed fishery in Peru is reported to exceed 10,000 in some years.

Bottlenose Dolphin and other species of dolphins are captured in a 'drive fishery' and other fisheries in Taiwan and sold for human consumption within the country (Anon, 1989c).

- The western Mediterranean population of Common Dolphin (*Delphinus delphis*) seems to have declined precipitously in recent years. Possible causes for this apparent decline include pollution, overfishing of food resources, unregulated direct exploitation in Spain and other indirect catches in Spain, France and Italy (Anon 1989c).

Maldivian fishermen have traditionally used dolphin meat as bait to catch Tiger Shark, whose oil is used for painting boat hulls. The dolphins caught by harpooning are allowed to rot for a day or two before being used as bait (Anderson. 1992).

In addition to targeted catch and incidental fishery-related mortalities, dolphins are also reported to be killed in anti-shark nets deployed for swimmer protection. The anti-shark nets off bathing beaches may have removed as much as 30-35 per cent of the local population of Bottlenose Dolphins off Southern Natal, in South Africa, during 19X0-85 (Anon 1989c). Orcaella and Sousa are the two cetacean species most frequently caught and drowned in shark nets set off northeastern Australian waters for swimmer protection (Heinshom. 1983).

#### *Population studies and impact of fishery-related mortalities*

Having low reproductive rates, dolphins are considered very vulnerable to consistently high mortalities. The mortality of dolphins associated with fishing operations is recognized as a major threat to many of their populations. The assessment of the biological impact of the fishery-related dolphin mortalities on their populations has been hampered by the lack of information of abundance, population dynamics and stock structure of these cetaceans. However, there is a great deal of investigation going on in many places on the subject of dolphin by-catch in commercial fisheries. Among the most active areas of investigation are the tuna/dolphin fishery of the ETP and the driftnet fishery of the North Pacific. The South-West Fisheries Center (La Jolla, California) was involved in the investigation of the dolphin by-catch problem with the tuna-dolphin issue in the ETP. Since 1977, the IATTC is heavily involved in this work, which includes estimating dolphin abundance and fishery-induced mortality as well as programmes to reduce such mortality. The NMFS is responsible for assessing the status of those dolphin stocks taken incidentally by the tuna purse-seiners in the ETP.

Over 90 per cent of the studies on dolphin interaction with fisheries have been conducted by the US (NMFS) and IATTC. Basically, three methods have been used in these studies. namely;

- Observer programmes on board commercial fishing vessels:
- Research vessel surveys: and
- Aerial surveys

One of the objectives of the IATTC programme is to estimate the incidental mortality of dolphins caused by the international fleet.

Estimates provided by IATTC since 1979 indicate that mortality for 1990 (53-55,000) is significantly less than that of 1986 (124-129,000). This is attributed to improved fleet performance reduction in 'dolphin sets', increase in 'dolphin sets' with zero mortality. reduction in the proportion of night sets etc. (Hall and Boyer. 1991).

Estimates of dolphin abundance in the ETP have been made by NMFS and IATTC on the basis of observations made from either research vessels or fishing boats. Other methods of estimating abundance, such as mark-recapture experiments or other source of data (e.g. sightings from aerial surveys) have proved inadequate for this purpose. The best available estimate of the average total population of Common. Spinner. Striped and Offshore Spotted Dolphins in the ETP in 19X6-1900 is slightly over 8,000,000 (Anon, 1992b).

Incidental mortality of dolphins in the ETP tuna fishery since 1950 is reported to have affected the abundance of stocks of Spotted and Spinner Dolphins (Smith, 1983) and, possibly, of Common Dolphins (Hall and Boyer. 1990) However, based on an analysis of smoothed abundance indices. all stocks of ETP dolphins that interact with the tuna fishery have been shown to be more or less stable since 1985. The only exception to this conclusion is that the southern stock of offshore Spotted Dolphins may have increased during this period (Buckland et al. 1992). De Master et al. (1992) has reviewed the status of these species, relative to stock structure, current population size. levels of fishery-related mortality and trends in abundance. and found no evidence of any signifi-

cant changes in abundance for any of these species since 1985. It is, however, stressed that better knowledge of recruitment rates and migration patterns of dolphins and better stock identification of individuals are needed for accurate assessment of population trends.

#### *Regulation/management of dolphin mortalities*

Consequent to the recent worldwide concern over dolphin mortalities in both large and small-scale fisheries, a variety of regulatory/management mechanisms have been introduced in many parts of the world to address this issue.

The first and the most far-reaching regulations to eliminate or reduce incidental dolphin deaths during fishing operations were taken by the U.S. The Marine Mammal Protection Act (MMPA) was passed in 1972 in response to the public outcry over the depletion of whale populations, the incidental killing of hundreds of thousands of dolphins in the Yellowfin Tuna purse-seine fishery and the slaughter of Harp Seal pups in the northwest Atlantic.

An annual dolphin mortality quota of 20,500 for the U.S. fleet in ETP was initiated in 1981. With the reduction in the size of the U.S. fleet and an increase in the fishing effort by the remaining fleet on nondolphin-associated tuna, the number of dolphins killed in 1990 was estimated at 5083, down 60 per cent from the estimated kill of 12,643 in 1989 (Jackson, A.R., 1991).

The U.S. MMPA was amended in 1988 and very strict new measures introduced for the protection of dolphins in the ETP tuna purse-seine fishery. One amendment prohibits import of Yellowfin Tuna or Yellowfin Tuna products from nations fishing in the ETP with tuna purse-seine but which do not have regulatory and enforcement programmes comparable to those of the U.S. and which have kill rates of dolphins well in excess of the U.S. fleet (Anon, 1989a).

Since early 1989, all nations initiating exports of Yellowfin Tuna to the U.S. were required to meet the new regulations under the amended MMPA. Intermediary nations, that fail to ban imports into their country of Yellowfin Tuna from an embargoed nation; were also not allowed to export Yellowfin Tuna to the U.S. (Anon, 1989b). In early 1990, the three biggest companies in the U.S. tuna industry announced that they would not buy or sell fish caught using methods that kill or injure dolphins (Anon, 1990 b).

The U.S. has thus embargoed imports of Yellowfin Tuna from twenty countries where processors use tuna that has been caught by methods harmful to dolphins (Anon, 1992c). The ban on the importation of Yellowfin Tuna into the U.S. from Spain was rescinded in February 1989 following Spain's conformance with the U.S. marine mammal regulations (Anon, 1989b). On an appeal made by Mexico, a tribunal of the Geneva-based General Agreement on Tariffs and Trade (GATT) in late 1991 ruled that one country may not impose sanctions on products that are taken outside its territorial jurisdiction. If GATT's General Assembly ratifies the decision, the U.S. must comply by amending the 19-year-old protection act and dropping the tuna import ban (Kronman, 1991).

The provision under the MMPA, which allowed continued incidental take of marine mammals, is due to expire in October 1993. Draft proposals issued by the NMFS for a set of new regulations include a proposal to set absolute quotas for the number of animals that can be killed — for any reason — for each marine mammal species. These quotas are to be based on a concept called Allowable Biological Removals (ABR). Quotas would be determined by factoring in three variables: minimum population estimate, maximum net productivity and a recovery factor (Campbell, 1991).

A number of other countries operating tuna purse-seinrrs and high seas driftnetters have followed the U.S. in imposing regulations to reduce fishery-induced dolphin mortalities. Ecuador has passed legislation in 1990, banning its fleet from purse-seining for tuna associated with marine mammals. Mexico, Panama, Vanavatu and Venezuela have also prohibited their fleets from making late sets (called 'sundown sets') that result in the dolphin release procedure occurring in darkness.

In mid- 1991, Mexico announced a dolphin protection programme that will not significantly reduce the country's tuna catch. This programme included setting maximum allowable mortalities for each vessel, action against vessel captains reporting excessive mortalities and regular gear inspection to reduce mortalities caused by equipment malfunctions (Anon, 1991a).

The Vanavatu Government in late 1990 introduced measures to reduce the dolphin kill rates in its ETP purse-seine fleet. These included regulations that the vessels must have trained crew and must use gear which aid in reducing dolphin mortality rates (Anon, 1991b).

Venezuela is reported to have reduced incidental marine mammal deaths over the past four years by 95 per cent — from 100,000 to 4000 a year (Anon, 1992c).

Countries with fish canning industries and countries which import canned fish have also adopted measures to restrict sale of fish (particularly tuna) caught in association with dolphins.

Tuna canners in Thailand, following the U.S. lead on this issue, have announced that they will not purchase, process or sell any tuna caught in association with dolphins (Anon, 1990c).

Australia announced its intentions to implement 'dolphin safe' measures for canned tuna by 1992. Once the law is enforced, all cans of tuna in Australia must carry a label saying that the contents are either 'dolphin safe' or caught by a method that is not harmful to dolphins.

Restricting the use of port facilities and conditional use of such facilities are also amongst measures adopted by countries to ensure reduced incidental mortality of dolphins. Since September 1990, Trinidad has banned driftnetters from using its port facilities, making it difficult for driftnetters to tranship their catches in Trinidad (Anon, 1990d). Mexico has implemented several new regulations since June 1987, designed to control the transshipment of tuna and to ensure that vessels are adequately equipped with gear to limit incidental dolphin mortality (Anon, 1988).

In recent years, a number of other countries also have amended their existing legislation related to marine mammals, or introduced new legislation with the aim of reducing incidental dolphin mortalities. For example;

- All cetaceans have been recently included in Schedule I of the Indian Wildlife Protection Act of 1972. The sale of cetacean products is prohibited, under penalty of up to two years in prison and a fine.

The Conservation Law of the Republic of China (Taiwan), enacted in June 1989, was amended in August 1990 when all cetaceans were added to the list of protected species (Anon, 1991c).

The Peruvian Government in November 1990 implemented national legislation prohibiting the taking and trading of cetaceans in Peruvian waters (Anon, 1992a). However, except in a very few locations, the ban has apparently been ineffective and cetacean meat is regularly offered for sale at public market places in Lima, at roughly US\$ 1.60 per kg (beef is about double this price).

In Australia, the Commonwealth Whale Protection Act 1980 prohibits the killing, injuring, taking or interfering with cetaceans (whales, dolphins and porpoises) by all persons within the Australian Fishing Zone (AFZ) and by Australians anywhere in the world.

#### ***Technical developments for reducing dolphin mortalities***

In addition to bans, quotas etc, there have also been technology oriented developments to achieve the lowest possible dolphin catch rates in fishing operations. The IATTC assisted vessels of the international tuna purse-seine fleet with dolphin safety panel alignments and dolphin safety gear



inspections. Since 1970, the NMFS has been involved in research aimed at reducing incidental dolphin mortality in the U.S. tuna purse-seine fishery (Coe et al, 1991). Phase I of the programme, which spread over a decade, was focussed on immediate development of methods and gear to achieve the lowest possible dolphin kill rates using standard purse-seine methods. Development of alternative fishing systems which do not entail the capture of dolphins when harvesting the associated Yellowfin Tuna is the goal of Phase II. Net and vessel handling, so as to minimize net-configuration problems, were of primary importance along with the development and improvement of effective rescue and release techniques. The remarkable reduction in the annual estimated dolphin mortality in the U.S. tuna fleet from 315,000 animals in 1970 to 16,900 animals in 1980 is partly attributed to such developments.

Drifting fish-aggregating devices (FADS) are being deployed in the ETP in a joint venture between the IATTC and the NMFS of U.S. (Anon, 1991d). The goal of this project is to evaluate the capacity of artificial floating objects to attract and aggregate mature Yellowfin and Bigeye Tuna in areas where they are usually associated with dolphins, or in areas where naturally occurring floating objects are scarce. If successful, FADS are expected to enhance fishing opportunities by supplementing or replacing catches of dolphin-associated tuna and thus reduce dolphin mortalities in purse-seine operations.

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