PROPOSAL FOR INCLUSION OF SPECIES ON THE APPENDICES OF THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

A. **PROPOSAL:** Inclusion of *Diomedea immutabilis* in Appendix II

B. **PROPONENT:** **Government of the Netherlands**

C. SUPPORTING STATEMENT

1. Taxonomy

1.1 Class	Aves
1.2 Order	Procellariiformes
1.3 Family	Diomedeidae
1.4 Genus/species	*Diomedea immutabilis*
1.5 Common Name(s)	Laysan Albatross

2. Biological Data

2.1. Distribution (current and historical)

Restricted to North Pacific. Most breeding pairs on North western Hawaiian Islands, mainly on Midway Atoll and Laysan I. (Harrison 1990). Extirpated colonies on Wake, Marcus Is. Torishima (Izu Group), Johnston Atoll are showing little if any recovery. In 1977 breeding was discovered on Torishima off the Mukojima Is. (Bonin Group) (Hasegawa 1984). Between 1986 - 1992 three small colonies were discovered in Mexican territory, on Isla Guadalupe off Baja California, and on Isla San Benedicto and Isla Clarion in the Revillagigedo islands (Dunlap 1988, Howell and Webb 1992).

The distribution at sea of *D. immutabilis* has been reviewed by Robbins and Rice (1974) Gould and Hobbs (1992) and McDermond *et al.* (1993). After breeding *D. immutabilis* disperse over much of the North Pacific, and they are primarily found over oceanic waters or along the continental shelf break as far north as the Bering Sea and east towards the Pacific coast of North America and Mexico. They are most numerous on the western side of North Pacific, with large concentrations off eastern Japan. During the breeding season the majority of birds are located between Japan, the Aleutians and Hawaii, and are abundant over the area encompassing a few hundred km. around Hawaii. The post breeding northwards dispersal is rapid and they become increasing common in the Gulf of Alaska moving up from the sea of Japan and the Sea of Okhotsk. Abundance off British Columbia reaches a peak in September- October as birds return to colonies in North western Hawaii.

There is evidence which suggests a northward trend in summer distribution with increasing age (Robbins and Rice 1974). In the first winter after fledging, juveniles remain closer to Japan than the adults, more than half the band recoveries from recently fledged young being collected within 300 miles of the east coast of Japan (Robbins and Rice 1974). During the next four summers the average population centre shifts gradually north eastwards towards the waters south of the Aleutian islands, Robbins and Rice (1974) also suggest that calm southern equatorial waters represent an impenetrable barrier to the albatross. McDermond *et al.* (1993 and references therein) note that *D. immutabilis* occur over areas of upwelling, at boundaries between different water masses and at, or seaward of the continental slope.

2.2 Population

Annual breeding pairs - 362 770

The historical trend of *D. immutabilis* populations parallels that of the sympatric *D. nigripes.* Populations were decimated during the turn of the twentieth century by egg and feather collectors and as a result of habitat destruction by rabbits at some of the major colonies (Harrison 1990) during this time tens of thousands of birds were killed and several colonies were extirpated. Localised reductions of *D. immutabilis* populations continued into the twentieth century with construction of US military bases in Hawaii. On Sand I. , Midway Atoll, construction of aeroplane runways and dozens of buildings during the late 1930s almost completely disrupted the breeding grounds, and thousands of albatrosses died as a result of bombings and fires during the warfare of World War II. Following the war, Sand I. became a base for radar planes and between 1959 - 1963, albatross-plane collisions numbered 300 - 400 per year. As result, the US military initiated large scale destruction of nests, eggs and chicks and 54,000 adults were killed between 1955 - 1964. The use of the radar base was discontinued in 1965 and the large scale destruction of the albatrosses and their habitats also ceased.

The increases in the D *immutabilis* populations reflect the recovery process. The estimated world population (breeding pairs) has been reported to have increased at a rate of *2.3* % per year since The 1956 - 58 estimate of 560,000 breeding pairs (1,500,000 total birds) to the 1977 - 1982 estimate of 750,000 breeding pairs (2,500,000 Total birds) (Rice and Kenyon 1962a, Fefer *et al.* 1984 in Gould. and Hobbs 1992. The largest colonies of D. *immutabilis* occur on Midway Atoll. and this population has apparently increased at an average growth rate of 6.0% per year between 1960 - 1990 (Gould and Hobbs 1992) This rate of increase is based on counts of a single marked plot in 1960/61 and from 1987/88 to 1990/9l. On the French Frigate Schoals, the population is estimated to have increased at an annual geometric rate of increase of 4.8%, from 584 pairs in 1956 - 58 to 2,769 in 1990 - 91 (Rice and Kenyon 1962a, Gould and Hobbs 1992). On Laysan Is. the estimated rate of geometric increase has been 3.1% per year (Gould and Hobbs 1992). The inter-annual variation in breeding numbers both within and between colonies is enormous. For example, for the French Frigate Schoals, while 4.8% is the average geometric rate of increase for the different colonies, over the past 4 years, the number of nesting pairs on Tern 1. have increased by 17.2% per year and decreased by 11.5% per year on the outer islands (Gould and Hobbs 1992). Further, annual variation in breeding numbers has been measured on Tern 1. and ranges between - 18% to +42%. Given this degree of variation, within and between colonies, and the different counting methods which have variously been employed, McDermond *et al* (1993) caution that much of the perceived population growth may be an artefact.

D. immutabilis are currently expanding their breeding range as demonstrated by the discovery of breeding pairs on Torishima (Bonin group) in 1977. This represents the first known nesting in the western region of the North Pacific since the turn of the Century (Hasegawa 1984). There are no historical records of breeding in the eastern region of the Pacific, but an increase in their numbers has been recorded off Mexico since the mid 1970s and small breeding colonies now occur on three islands in this region (Guadalupe, Clarion and San Benidicto) Dunlop 1988, Everett and Anderson 1991, Howell and Webb 1992). It is possible that these expansions will persist provided the breeding colonies are afforded adequate protection.

2.3. Habitat (breeding habitat and biology)

Highly philopatric, monogamous and annual breeders. Adults return to the colonies during late October and early November, with males arriving before the females. Breeding territories are maintained over successive years and the pre-egg stage lasts 14 -16 days with the nest building starting only 1- 3 days before the single egg is laid (Rice and Kenyon 1962b). The nests usually consist of a scrape in the sand or humus with sand, twigs and leaves added to form a substantial rim. Nesting usually occurs in vegetated. inland areas. Eggs are laid between late November and mid December, the mean date being 30 November. Incubation lasts 64 days (range 62 - 68, Rice and Kenyon 1962b). Bow sexes share incubation with an average of five incubation spans, beginning with a two day stint by the female (Rice and Kenyon 1962b, Harrison 1990). The second incubation span is usually the longest and averages 23 days, a maximum of 32 days being recorded by Rice and Kenyon (1962b). Hatching occurs between late January and mid February, the modal date being 1 February. Both parents share equally in guarding the chick for about 17 days (range 12 - 24 days), guard spans generally being much shorter than the incubation spans (2 - 6 days, Rice and Kenyon 1962b). The chick stage lasts, on average 165 days and fledglings begin to depart in mid .June. Most fledglings have left the islands by the end of July (Rice and Kenyon 1962b, Harrison 1990).

Breeding success of *D. immutabilis* was measured over a 13 year study at Midway I. between 1960-1973 by Fisher (1975, 1976) and van Ryzin and Fisher (1976). Hatching success averaged 64% (55-73%) and was highly variable between years. The major source of egg failure was due to winter storms which resulted in desertion by the adults. Fledging success (eggs laid lo chicks fledged) ranged between 49 -78% (mean 64%) and the major cause of chick deaths was believed to be the death of one or both parents. Survival of fledglings during departure from the islands was estimated as 90%, the major source of mortality being predation by sharks. Approximately 57% of all fledglings, and 63% of fledglings that successfully departed the breeding islands, survived to 8 years of age, when most birds first begin to breed (range 5 - 16, van Ryzin and Fisher 1976). Forty per cent juveniles survived to modal age of first breeding *D. immutabilis* are highly philopatric, most birds returning to their natal colony to breed (Fisher, 1976). Juveniles start returning to the colonies as 3 - 4 year olds and subadults return between January and March, later in the season than the adults. The annual recruitment rate was estimated to be ca. 14% more than double adult mortality rates (Fisher 1975. 1976).

Survival of breeding birds averaged 95% (therefore mortality =5%) for both sexes (female range: 92 -97%, male range: 91 - 98%) and the breeding life expectancy is estimated to be 16 - 18 years (Fisher 1975). Breeding frequency is considered annual with 90% of adults breeding in consecutive seasons. All failed breeders may nest the next season and 76% of breeders successful in fledging a chick; return to attempt breeding the following year (Fisher 1976). Annual variation in number of nesting birds is high, with ranges between - 18% to +42% recorded for *D. immutabilis* at Tern I. over 11 years (Gould and Hobbs 1992. This may be explained by the factors identified by Fisher (1976) which influence breeding frequency: (1) the available food (2) the monogamous nature of the pair bond; (3) The number and length of the successive pair bonds formed over a period of time, (4) the time required to form each pair bond; (5) the age of the pair bond; (6) the mate's previous experience In breeding; and (7) their success in fledging a chick. As an example, a scarcity of food during the pre-egg period may prevent 50% of the mature breeding population from attempting to nest.

2.4. Migratory patterns

See Distribution

3. Threat data

Determining the major factors influencing current population status of *D. immutabilis* is complex given their history of devastating persecution on land and the dynamics of the threats at sea from longlining and increasing levels of marine debris, following the apparent moratorium of driftnetting.

Since the cessation of land based persecution it appears that while widespread driftnetting occurred. this was the major threat facing the populations. If the moratorium is effective in eliminating this fishing practice, then longlining may well replace driftnetting as the major threat. At this stage however, with no data regarding the magnitude and nature of the *D. immutabilis* - longlining interaction, it is not possible to be more definitive. Further, 'illegal' driftnetting operations persist although the extent and nature of these operations is unknown.

3.1. Direct threats to the population

Driftnetting has been shown to kill hundreds of thousands of seabirds, and in the North Pacific, *D. immutabilis* was one of the major species affected (Northridge 1991; Johnson *et al.* 1992). Concern about the capture of non-target species led to the initiation of monitoring programs in the North Pacific during the late 1980s. In 1989, it was estimated that 13,000 *D. immutabilis* were killed in driftnets targeting squid in the North Pacific (Northridge 1991). In 1990, an estimated 416,464 seabirds were killed by the five North Pacific High Seas drifted fisheries in that year (Johnson *at al.* 1992). Of these, an estimated 17,548 where *D. immutabilis.* Most of these birds (54%, n=9,417) were caught by the Japanese squid fishery, and a further 4,774 (27%) by the Korean squid fishery. The Japanese large mesh driftnet fishery, targeting tuna and billfish, killed an estimated 1,735 (10%) *D. immutabilis,* a similar number to the 1,622 (9%) killed by the Taiwanese squid and large mesh fishery (Johnson. *et al* 1992). Gould and Hobbs (1992) calculated that since 1978, based on the 1990 data, and assuming a stable population, 212,900 *D. immutabilis* have died in driftnets, as. average annual loss to the population of 2.2% per year

A Japanese salmon driftnet fishery operates both in Coastal waters to the Northwest of Japan and From motherships operating on the high seas in the North Pacific and in the Bering Sea. It was estimated that ca 822 *D. immutabilis* were killed per year in the land based fishery and up to 228 per year by the salmon mothership fishery (Jones and DeGange 1991, Northridge 1991; Ainley *et al* 1981, in King 1984) estimated that ca 2,873 *D immutabilis* were killed each year in the Japanese salmon fishery. The dynamics of these fisheries. however, have been changing considerably over the last 40 years and there is very little published information on the capture rates of none target species in the salmon driftnet fisheries (DeGange and Day 1991, Northridge 1991). As with other non-target species, it is clear that seasonal and distributional factors will influence capture rates, and there is no clear understanding of the magnitude of the bycatch, nor the factors involved.

Details of the composition of the *D. immutabilis* population in the area of the high seas driftnetting, in the North Pacific is poorly known, but in a sample of 26 aged birds obtained from a Japanese squid boat in 1989, 17(65%) were immature and 9 (35%) were adults (Gould and Hobbs 1992). This bias towards immature could be a result of the age related differences in distribution as Robbins and Rice (1974) suggested that juveniles tend to remain in more southerly waters than adults, and so coincide with the fishing grounds to a greater degree. It could also be simply a reflection of less experienced birds suffering higher rates of mortality when trying to obtain the prey entrapped in the nets. As stressed by Gould and Hobbs (1992) bycatch rates in these fisheries vary both spatially and temporally, and also with differences in fishing methods and practices, equipment and environmental factors. As a result, after detailed analyses of available bycatch rates in driftnet fisheries, Johnston *et al.* (1992) advise caution when interpreting bycatch rates of marine vertebrates in driftnets.

The impact of high seas driftnet fishing on the *D. immutabilis* population is thus difficult to assess. Although numbers of *D. immutabilis* are increasing after their decimation at the turn of the century,mortally in the high seas driftnet fisheries was reducing the recovery rate by an estimated 0.4 - 1.6% per year, depending on the estimated intrinsic growth rate of the population (Gould and Hobbs 1992).At present the population structure and dynamics of the population are too poorly known for the effects of these catch rates to be assessed (Northridge 1991). The mortality associated with driftnetting in the NW Pacific should, however, diminish as initiatives imposed by the United Nations effectively called for a cessation of these fishing practices after 1992. While this will eliminate one source of direct mortality, it will also eliminate the provisioning of the increased food resources afforded by the driftnets. As there are no data regarding the contribution of scavenged food to the diet of the albatrosses it is not possible to assess the effects of the removal of this source of increased food availability. Cessation of the driftnetting will probably also lead to increases in alternate fishing practices which are also known to kill *D immutabilis* across their range. Longlining is known to kill large numbers of albatrosses in the Northwest Pacific region, with Hawaiian fishermen reporting that "hundreds" are hooked when trying to take the baits during line setting and they are also intentionally killed to reduce loss of catch and damage to gear (Robbins and Rice 1974, McDermond *et al.* 1993). Japanese longliners also report that the Pacific region is an area of high rates of bird bycatch (N. P. Brothers pers. comm). Already the Pacific region is heavily used by Japanese longline fisheries and the more local Hawaiian fleet has trebled in size since 1987 (Bergin and Haward 1991, McDermond *at al.* 1993). There are however no available data to assess the magnitude of the albatross catch rates in the Pacific Ocean. Clearly without this information on the magnitude and age and sex composition of the bycatch, the nature of the interactions, and the abundance and dynamics of the affected populations, the effect of this and other fisheries on the population cannot be assessed.

3.2. Habitat destruction

3.3. Indirect threat

In a study of pollutants of North Pacific albatross Fisher (19?3) found appreciable residues of DDT, DDE and PCBs and measurable quantities of DDD, dieldrin and mercury in the visceral fat of *D immutabilis*.

Ingestion of plastic debris is common in *D. immutabilis* and represents a hazard to both adults and chicks. Chicks may be at greater risk than adults because of their high rates of ingestion and apparently lower frequency of regurgitation Although evidence of direct morbidly as a result of ingestion is rare deaths from dehydration may be related to high volumes of proventricular plastics and resultant decreased food intake (Sileo *et al.* 1990, Sievert and Sileo 1993 in McDermond *et al.* 1993). Necropsies of 137 *D. immutabilis* chicks in 1987 shoved that dehydration was the most common cause of death (Sileo *et al* 1990). The sub-lethal effects of plastic impaction and minor ulcerations may also result in reduced resistance to disease and lowered post-fledging survival (Fry *et al.* 1987). The incidence of plastic ingestion *by D immutabilis* appear to have increased over the last 30 years and the provenance of the ingests (plastic fragments, toys, bottle caps and cigarette lighters) is almost exclusively from Japan (Fry *et al.* 1987). The most likely *source* of the majority of the debris is land-based discharge (Fry *et al 1987).*

Oil pollution may also pose a threat as numerous *D. immutabilis* in Hawaii have been observed covered in oil (Harrison *et al.* 1984, Harrison 1990).

Lead poisoning and vehicle trauma have been identified as major sources of mortality and are directly associated with human presence on some of the breeding locations The lead poisoning resulted from chicks ingesting paint chips and the vehicle trauma occurred in the immediate vicinity of roads. The combined effects of these factors may have a substantial effect on chick survival in localised areas (Sileo *et al* 1990).

Due to their preference for open areas, *D. immutabilis* have been attracted to airfields in the process of their recolonisation of some of the Hawaiian islands. Collisions of these birds with aircraft have lead to the imposition of control measures aimed at discouraging nesting in these areas (McDermond *et al.* 1993).

In populated areas. *D. immutabilis* also die as a result of collisions with buildings, lights and antennae wires (Harrison 1990). Other sources of mortality resulting from introduced factors include predation of eggs,. chicks and adults by dogs *(Canis familiars;* e.g. at Kilauea Point National Wildlife Refuge on Kauai), Polynesian rats *(Ratus exulans;* e.g. on Kure Atoll), and pigs (*Sus scrofa,* e.g. on Niihau) (Moors and Atkinson 1984, Harrison 1990, McDermond *at al.*

1993. On Laysan and Lisianski Is. the introduction of rabbits earlier in the century caused devegetation and habitat erosion which contributed to storm related mortality due to sandstorms (Harrison *et al* 1984). High surf and flooding can also exact a toll during the breeding season, for example in 1969 more than 400 *D. immutabilis* nests were destroyed (Harrison 1990).

Mosquitoes introduced on Midway I. have been implicated in the transmission of avian pox, a viral infection which may cause facial and foot lesions. However, the pox may not be a primary source of mortality as in all chicks necropsied by Sileo *et al* (1990) the pox was a seconds finding seemingly unrelated to the cause of death. Once the chicks fledge the greatest threat they face during departure from their natal colony is predation by sharks which, in June, move inshore from the outer fringes of the reef to patrol the lagoons surrounding the breeding islands (Harrison 1990). Up to 13 fledglings have been recovered from the stomach of individual sharks (Fisher 1975).

3.4. Threat connected especially with migrations

4. Protection status and needs

4.1. National protection status

4.2. International protection status

4.3. Additional protection needs

Although in the past *D. immutabilis* has been more intensively studied than the sympatric *D.nigripes* the recommended conservation measures for the two species are parallel. A suite of conservation measures have recently been recommended by Gould and Hobbs (1992) and McDermond *et al* (1993) and it is probable that some of these are currently being addressed by the United States Fish and Wildlife Service.

Assessments of the impact of factors including introduced predators, avian pox and pollutants should continue to be investigated and measures should be instigated if they are shown to be significant sources of mortality of eggs, chicks and adults.

Given the imposition of the moratorium on Driftnetting in 1993, it is essential to monitor the continuance of this fishery by nations not complying with the UN recommendations. Further, the fishing efforts of longlining fleets must be monitored where possible, both in local waters and on the high seas. Simultaneous with this, the magnitude and nature of the demonstrated interaction with fisheries must be established and if impacts are significant then measures should be sought to eliminate or at least reduce the occurrence of detrimental interactions. Knowledge of the foraging behaviour of the birds is an integral element of this aim. In other areas night setting of longlines has been shown to significantly reduce albatross bycatch (N.P. Brothers pers. comm.) but this measure may not be effective in relation to bycatch of *D. immutabilis* as these birds reportedly feed mainly at night (Harrison *et al* 1984, Harrison 1990). Widescale specialist observer coverage during fishing operations is essential to address the question of fisheries interactions together with cooperation and collaboration between the different agencies and parties involved in fisheries operations and management and seabird conservation

5. Range States

Japan
Mexico
USA

6. Comments from Range States

7. Additional remarks

8. References

See Reference at the very end of this document (pp. 182-187).