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

A. PROPOSAL: Include Irrawaddy dolphin *Orcaella brevirostris* (Owen in Gray, 1866) on CMS Appendix I

B. PROPONENT: Government of the Philippines

C. SUPPORTING STATEMENT

1. Taxon

1.1	**Classis**:	Mammalia
1.2	**Ordo**:	Cetacea
1.3	**Familia**:	Delphinidae
1.4	**Species**:	*Orcaella brevirostris* (Owen in Gray, 1866)
1.5	**Common name(s)**:	English: Irrawaddy dolphin French: Orcelle Spanish: Delfín del Irrawaddy German: Irrawadi Delphin Myanmar: Labai Indonesia: Pesut Malaysia: Lumbalumba Cambodia: Ph'sout Lao: Pha'ka Philippines: Lampasut

2. Biological data

2.1 Distribution

Dolphins of the genus *Orcaella* were recently split into two species, the Irrawaddy dolphin *Orcaella brevirostris*, occurring in five freshwater systems and estuarine waters of Southeast Asia including a geographically isolated population in Malampaya Sound, Palawan, Philippines, and extending west across the Bay of Bengal and south along the east coast of India to Vishakhapatnam, and the snub-fin dolphin *O. heinsohni*, occurring in the coastal waters of northern Australia and southern Papua New Guinea (Beasley *et al.,* 2005). The following account only addresses *O. brevirostris*.

Freshwater populations of Irrawaddy dolphins occur in three river systems - the Ayeyarwady (formerly Irrawaddy) of Myanmar (formerly Burma), Mahakam of Indonesia, and Mekong of Cambodia, Lao PDR and Vietnam - and two partially isolated brackish or freshwater lakes - Chilika of India and Songkhla of Thailand. All five freshwater/brackish populations of Irrawaddy dolphins are believed to be demographically isolated from members of the species occurring in marine waters. The downstream range extents of the riverine populations are about 180, 500 and 1000 km from the sea in the Mahakam, Mekong and Ayeyarwady rivers,

respectively, and only a few strandings and no sightings of Irrawaddy dolphins have been documented along adjacent coastlines within 80 km of both Chilika and Songkhla lakes (Smith *et al.,* in press-a).

Based on a visual boat-based survey conducted in December 2002 of the entire length of the Ayeyarwady River (1,788 km of continuous trackline in the main channel and 202 km in side channels), the current dry-season distribution of the Irrawaddy dolphin population is believed to be limited to a 398-km river segment located between Mingun (about 8 km upstream of Mandalay and 970 km from the sea) and Bhamo (about 88 km downstream of the river's origin at the confluence of the Maykha and Maylikha tributaries). The results of this survey indicated a range decline of 488 km in river length (or 56.7%) compared with the historical distribution reported by Anderson (1879).

During 14 extensive surveys of the entire potential range of dolphin distribution in the Mahakam River, from the delta to rapids located ca. 600 km upstream of the mouth and including all tributaries in between, 98 sightings of Irrawaddy dolphins were confined to a 300 km segment of the main river between Muara Kaman (ca. 180 km from the coast) and Datah Bilang, Belayan, Kedang Rantau, Kedang Kepala, Kedang Pahu and Ratah tributaries, and Melintang and Semayang lakes (Kreb and Budiondo, 2005; Kreb *et al.*, 2005).

Based on 249 days (1044 hours) of boat-based surveys conducted along 13,200 km of linear river length during 2001 – 2005, the current range of Irrawaddy dolphins in the Mekong is believed to be generally limited to a 190-km segment between Kratie (about 500 km upstream of the river mouth in Vietnam) to slightly upstream of the Lao PDR/Cambodia border at Khone Falls, which physically obstructs farther upstream movement (Beasley *et al.*, in press). Based on interview surveys conducted by Baird and Mounsouphom (1994) dolphins are believed to have been once fairly common in the Sekong River and its tributaries as far upstream as the Kalaum District (approximately 950 km upstream of the river mouth in Vietnam). Recent interview surveys indicate dolphins now rarely ascend the Sekong River and its tributaries. No dolphins have been reported in Tonle Sap Great Lake since 1997 (Baird and Beasley 2005). In the Mekong mainstem, Irrawaddy dolphins are now rarely found south of Kratie except occasionally during the wet season (June to October) when some animals probably follow fish migrations downstream. During a survey of almost the entire length (224 km) of the two main distributaries of the Mekong River (Tien and Hau Giang) in April 1996, Smith *et al.* (1997a) were unable to find a single dolphin. A more recent survey of the Mekong River in Vietnam was conducted in May 2005 (Beasley *et al.*, 2005b). A total of 486 km were searched during 42 hours. No dolphins were sighted. Although no dolphins have been recorded alive in the Mekong River of Vietnam during recent years, one dolphin was accidentally caught in a set bag net in April or May 2002 in Vam Nao of the Phu Tan District, An Giang Province (Chung and Ho, 2000), and another dolphin in October 2005 in Vinh Xuong Commune of the Tan Chau District, An Giang Province (adjacent to the Cambodia border) (Beasley *et al.,* 2005b).

In northern and eastern Borneo of Malaysia and Brunei, Irrawaddy dolphins have been recorded in coastal waters near Muara Island, in Sandakan and Kuching Bays, and in the mouths or lower reaches of the Brunei, Sarawak, Rajang, Kinabatangan, Baram, and Batang Rivers (Weber, 1923; Banks, 1931; Gibson-Hill, 1950; Mörzer Bruyns, 1966; Pilleri and Gihr, 1972, 1974; Dolar *et al.*, 1997; Beasley and Jefferson, 1997; Beasley, 1998).

The only records from southern Borneo in Indonesia, outside of the Mahakam River (see above), are second-hand reports from the Kumay and Kendawangan river mouths (Perrin *et*

al., 1996; Rudolph *et al.,* 1997). The species has been recorded in the Belawan Deli River of northeastern Sumatra, Rajang River, Sarawak, Belitung Island and Cilacap of southern Java, Surabaya of northeastern Java, Ujung Pandang or Makassar of Sulawesi, and Biak Island and in various river mouths of the southwestern coast of Irian Jaya (Mörzer Bruyns, 1966).

During three surveys of the entire Malampaya Sound, Philippines (total area 231 km^2), one each in the pre-monsoon, monsoon and post-monsoon seasons, Irrawaddy dolphins were observed only in the inner portion (total area 134 km^2) (Smith *et al.*, 2005). The Irrawaddy dolphin population in Malampaya is the only one known of the species in the Philippines and the nearest area where another population of Irrawaddy dolphins is known to occur is northern Borneo, some 550km to the south (Smith *et al.*, 2005).

Irrawaddy dolphins occur in marine waters of Cambodia along the coast of the Koh Kong Province, Kompong Som Bay and Raem National Park (Perrin *et al.*, 2005). The species occurs in nearshore waters of Thailand, in the the Gulf of Thailand at the mouths of the Chao Phraya, Mae Nam Chin, Chanthaburi and Pattani Rivers, and was reported by fishermen to also occur in Phang Nga Bay and in certain areas of the the Andaman Sea (Chantrapornsyl *et al.*, 1996). In Myanmar, the only records of Irrawaddy dolphins in the Bay of Bengal are from the semi-enclosed bay offshore the Kyaukpyu and Tennasarim river mouths in the Mergui Archipelago in the far south of the country (Smith, 2006), in the Ayeyarwady Delta (Smith *et al.*, in press-b) and in the lower reaches and estuaries of the Myebone, Kalidan, and Kyaukpyu Rivers along the Rakhine (Arakan) coast in the far north of the country (Smith *et al.*, 1997b). In Bangladesh, Irrawaddy dolphins occur in waterways of the Sundarbans Forest (Mörzer Bruyns, 1971; Kasuya and Haque, 1972) - mainly in the western and downstream portions during the dry season, which are characterized by higher salinity and lower turbidity compared with the upstream and eastern portions (Smith *et al.*, 2006) and along the coast near Cox's Bazaar (Haque, 1982) - offshore of mangrove forests near Chittagong (Smith *et al.*, 2001), and offshore of the Sundarbans and Meghna River mouth.

The species is found in Chilika Lake or Lagoon in Orissa, India (Annandale, 1915; Dhandapani, 1992). The outer channel supports about 65% of the entire dolphin population while the central and southern sectors support the remaining individuals (Pattnaik *et al.,* in press). Although there are published records of the species between Vikshakhapatnam to Calcutta (Owen, 1869; Cobbold, 1876; Ellerman and Morrison-Scott, 1951; James *et al.*, 1989), there is no recent information about its current range along the coast of northeastern India.

2.2 Population

Statistically rigorous abundance estimates are available for only a few portions of the species' range: 77 (CV 27.4%) in Malampaya Sound, Philippines (Smith *et al.*, 2004a); at least 125 (95% CI = 114-152) in the Mekong River (Beasley *et al.*, in press); 70 (*CV* = 10%; 95% CL = 58-79) in the Mahakam River, Indonesia (Kreb *et al.*, in press); 58-72 in the Ayeyarwady River, Myanmar (Smith *et al.*, in press-b); 62-98 in Chilika Lake, India (Pattnaik *et al.*, in press)**;** 5,383 (CV=40%) in freshwater affected coastal waters of Bangladesh (Smith *et al.*, 2005); and 451 (CV=9.6%) in waterways of the Sundarbans mangrove forest of Bangladesh (Smith *et al.,* 2006).

Probable declines in the number of individuals can be inferred for several populations. For small cetaceans generally, it is recommended that yearly removals (due to entanglement, boat collisions, live-captures, etc.) should not exceed 1-2% of the population size (Wade, 1998) –

the lower bound being more applicable to very small populations that are already vulnerable to extirpation due to demographic, genetic, and other factors.

The Irrawaddy dolphins of Malampaya Sound was first estimated in 2001 (Smith et al, WWF-Philippines, 2002) at 60.4 individuals (CV = 25.7%). Aquino et al (WWF 2006) estimated the population at 20.06 (CV = 77.6%) individuals. The survey also documented the presence of calf indicating continuous reproductive activity. Matillano (WWF, 2007) tallied dolphin mortality from 2001 to 2007 at thirty four (34) individuals.

For the Mekong River, using an estimate of four deaths per year as the annual incidental catch rate (calculated from the mean number of carcasses recovered and determined to have died from gillnet entanglement by Beasley *et al.* (2002) and Beasley (unpublished) during 2001-2003), the kill represents 5.8% of the population, according to the best estimate of abundance (69) made during surveys conducted in the same years.

The Mahakam population has been subject to a mean annual mortality rate of greater than 10% in recent years, with the majority of deaths attributed to gillnet entanglement (Kreb *et al.*, in press).

In Songkhla Lake circumstantial evidence from sighting rates indicates declining numbers, a conclusion reinforced by the high mortality experienced by the population (as evidenced by the large number of recorded deaths – 43 between January 1990 and December 2003; Beasley *et al.*, 2002; Smith *et al.*, 2004) in relation to its extremely low (although precisely unknown) population size.

Considering that the small sizes of these populations already make them vulnerable to extirpation from demographic variability, inbreeding depression and catastrophic environmental and epizootic events, the current rate of removals will almost certainly lead to extirpation within a short time (decades, at most).

2.3 Habitat

Irrawaddy dolphins are adapted to relatively rare ecological conditions – deep pools of large rivers and nearshore marine environments (including appended lakes) with freshwater inputs (see reviews in Stacey and Leatherwood, 1997; Stacey and Arnold, 1999; Smith and Jefferson, 2002). The geographically isolated Philippine population is patchily distributed within the inner portion of Malampaya Sound. Their existence in the area is heavily entwined with that of the communities surrounding the Sound particularly with fishery activities (Aquino et.al.,WWF, 2006).These habitats are subject to intensive and increasing development and use, which could result in population displacement and extirpation.

2.4 Migrations

No information is available on the long-range movements of Irrawaddy dolphins, but sighting data from waterways of the Sundarbans mangrove forest in Bangladesh show clear seasonal movements in response to changes in freshwater inputs, with the species moving seasonally along a south-west/north-east axis following the salinity gradient. Irrawaddy dolphins occur in the adjacent section of the Sundarbans forest in India but their condition is unknown. Movement across national borders is known to occur in the Lao PDR/Cambodia transborder pool of the Mekong River.

3 Threat data

3.1 Direct threat to the population

Irrawaddy dolphins have been documented accidentally caught in fishing nets in almost all areas where they have been studied, including all five of the freshwater populations (Smith *et al.*, in press-a). The most detailed information on bycatch comes from the Mekong River where, of the 15 deaths confirmed to be have been caused by humans in 2001-2005, 13 or 87% were due to gillnet entanglement (Beasley *et al.*, in press). Based on reports from local fishermen and the retrieval of eight carcasses between 1995 and 2005, Kreb *et al.* (in press) documented 48 deaths of which 66% occurred as a result of gillnet entanglement in large mesh (10 –17.5 cm) gillnets. Mortalities have also been recorded in drifting gill nets targeting elasmobranchs in coastal waters of Bangladesh (Smith *et al.*, 2005) and bottom-set nylon gillnets used for catching crabs in Malampaya Sound (Smith *et al.*, 2004).

Beasley *et al.* (2002) listed 28 records of dolphins that stranded in Songkla Lake between January 1990 and April 2001. At least 13 of these were judged to have died from net entanglement, based upon the presence of net scars on the carcass or the reports of local fishermen. Of the total strandings, at least nine were neonates (i.e., one meter in length or smaller). Since that report, 15 additional strandings have been recorded, including nine calves (four of these in February 2003 and two in December 2003) and a pregnant female (Smith *et al.*, 2004). Several of those 15 animals were believed to have been killed accidentally in gill nets and fish traps set for sea bass, the carcasses having been discarded and then drifting ashore.

Smith *et al.* (in press-b) recorded a total of 5,701 fishing gears in the main channel of the Ayeyarwady River during November-December 2002. Gill nets accounted for the majority of fishing gears (53.5%). Gill nets were also the most widespread gears in terms of their distribution throughout the river, and there was a significant positive relationship between gill net encounter rates (i.e., number of gears observed each day) and downstream progress on the survey. The fact that gillnets were present in higher frequencies in areas where dolphins were reported to occur historically but were not observed during the 2002 survey implies that these fishing gears may be at least partially responsible for the range decline of the species.

During interviews conducted during 2005, fisheries officials, fish contractors and local fishermen from the Ayeyarwady reported that electric fishing represents the greatest threat to the dolphins due to the risk of electrocution. Several fishermen stated that fish catches had declined substantially since electric fishing became widespread several years ago and that dolphins now avoided certain areas because they were afraid of being shocked (Smith *et al.,* in press-b). Electric fishing is popular in the Ayeyarwady because the equipment is relatively inexpensive (and the battery can be used in the home for other purposes), needs little maintenance (unlike nets, longlines, bamboo traps and fishing fences which require constant repair), and results in relatively large catches with little effort (Smith *et al.*, in press-b). Electric fishing has been cited as being responsible for the largest number of recent known deaths of the baiji *Lipotes vexillifer*, a "critically endangered" dolphin in the Yangtze River of China, and has come to be regarded as the main anthropogenic threat to the survival of that species (Zhang *et al.*, 2003).

Identified threats to the Irrawady dolphin's survival in the Philippines include fishery by catch, habitat degradation, and possibly prey depletion (Dolar, 1999). Majority of the cause of

death is fishery by-catch. This was confirmed by a study on the CPUE of fishing gears implicated with dolphin mortalities (Gonzales and Matillano, WWF, 2007) states: The distribution of fishing gears shows that almost all of the areas of the Inner Sound are occupied by the seven gears related to Irrawaddy Dolphin conservation and describes how narrow is the swimming path left for the dolphins to move around freely in the Inner Sound. There is only a slim chance that the dolphin could not encounter a net, while navigating in the water column. With current fisheries and Irrawaddy Dolphin interaction and other circumstances: 1) increasing number of Irrawaddy Dolphin mortality, 2) increase in kinds of gears associated with the mortality, 3) increasing efforts of Irrawaddy mortality-associated fishing gears, and 4) co-occurrence of Irrawaddy mortality-associated fishing gears and identified Irrawaddy Dolphin sighting areas , the future of the Irrawaddy Dolphin population seemed uncertain, while hope lingers because fishermen still observe young Irrawaddy Dolphins wandering around the Inner Sound.

3.2 Habitat destruction

Many dams have been proposed that may adversely affect the channels inhabited by Irrawaddy dolphins in the Mekong River Basin. Of greatest concern are the large run-of-the-river dams (dams without a reservoir that generally preserve a relatively natural flow regime) proposed for the Mekong mainstem near Stung Treng and Sambor (Perrin *et al.,* 1996; also see Mekong Secretariat, 1995). In the Sekong River system, at least two dams have been proposed tens of kilometers below the reported upstream limit of the Irrawaddy dolphin. Dolphins are also threatened in the Sekong system by the proposed Xakaman and Xepian/Xenamnoi dam projects. This last project would divert almost all of the flow from the Xepian River to a reservoir behind another dam on the Xenamnoi River (Baird and Mounsouphom, 1997). According to Öjendal *et al.* (2002) dams that will probably be constructed in the Se San/Sre Pok watershed, which comprises a network of tributaries that converge (together with the Sekong River) with the Mekong and provide about 10% of the total flow at Stung Treng, Cambodia, include the Se San 3 (located in Vietnam about 50 km from the Cambodian border and 20 km downstream of Yali Falls (with a generating capacity of 260 MW at an estimated cost of US$ 320 million),,Se San 4 (located in Vietnam about eight km from the Cambodian border (with a generating capacity of 300 MW at an estimated cost of US $338 million) and the Upper Kontum (located in Vietnam in the Dak Nghe tributary of the Sesan River upstream of Yali Falls). In addition to dams in the Se San/Sre Pok of Vietnam, a number of projects have been proposed in this river basin downstream in Cambodia, including the Lower Se San 2 and Lower Sre Pok 2, but these are unlikely to be built in the near future (Öjendal *et al.,* 2002). The only dam currently in place in the Se San/Sre Pok watershed is at Yali Falls, Vietnam. This dam was completed in 2001 and is 65 meters high with a 64.5 km^2 reservoir. It generates 720 MW of electricity and is believed to have cost about one billion US dollars (Öjendal *et al.,* 2002). Serious declines in fisheries followed closure of the dam due to reduced and erratic flows during the dry season and changes in the overall morphology of the river downstream. Proposed navigation improvement schemes in the Mekong River, which entail blasting the pool-riffle sequences that compose dolphin habitat, would also probably lead to a dramatic decline, if not extinction, of the Irrawaddy dolphin population due to the elimination or severe degradation of their deep pool habitat (Smith *et al.*, in press-a).

At the northern tip of Songkhla Lake a small connecting channel to the Gulf of Thailand previously existed but was blocked by a dam constructed in 1955 to support irrigation of surrounding agricultural fields. The reduced salinity in the northern portion of the lake, which

is the only area available for dolphins to inhabit due to habitat loss in the middle and southern portions (see below), has dramatically affected the species composition and overall catches of fisheries in the lake with unknown effects on the dolphins and their prey. Blockage of the northern channel has also probably reduced freshwater flushing in the lake and therefore exacerbated already existing problems of sedimentation and high pollutant loads from expanding agriculture and aquaculture activities (Smith *et al.,* in press-a).

In waterways of the Sundarbans mangrove forest the dependence of the Irrawaddy dolphins on relatively deep waters and large-small channel confluences suggests that the animals may be particularly susceptible to potential habitat loss from sedimentation caused by declining freshwater supplies (Smith, 2005). Water is abstracted from the Ganges-Brahmaputra-Meghna basin (which is the primary source of freshwater flow for the Sundarbans) by an extensive network of at least 20 high dams and 21 low-gated dams (barrages) and lost to evaporation from reservoirs and open canals and seepage to recharge groundwater supplies that are generally declining due to intensive extraction by tube wells (Smith and Reeves, 2000, Smith *et al.*, 2000). The problem of declining freshwater supplies to the Sundarbans Delta will become a much greater threat to dolphins if India proceeds with a collection of large-scale, inter-basin water transfer projects which will involve additional dam construction and diversion of water from rivers within the Ganges-Brahmaputra-Meghna system (Smith *et al.*, in press-a).

Deforestation and mining of gold, sand and gravel introduce and redistribute large quantities of sediments, causing major changes to the geomorphologic and hydraulic features of rivers and marine appended lakes that allow them to support dolphin populations. A total of 890 gold mining operations were recorded in the Ayeyarwady River during a dolphin survey in 2002, including 180 operations within the extent of dolphin occurrence. These operations, including large boat dredges (15.8%) and hydraulic land blasters (13.4%), were generally located in areas of reduced current, above and below defiles and near channel convergences – the same areas that constituted the preferred habitat of Irrawaddy dolphins (Smith *et al.*, in press-b). Although no large-scale gold mining operations occur in the Mekong mainstem, gold mining dredges operate in the Sekong River where dolphins have been reported occasionally to occur. Operations also exist on smaller tributaries, such as the Kampi River which flows into the Mekong close to an area of core dolphin distribution (Beasley *et al.*, in press).

Increased sedimentation resulting from deforestation in surrounding watersheds has resulted in declining water depths in Songkhla, Chilika and Semayang Lakes. The latter water body is appended to the Mahakam River and previously supported dolphins throughout most of its breadth. Now it contains suitable habitat only in a small area near the channel connecting it with the mainstem (Kreb *et al.*, in press). Between 1992 and 1997 the maximum depth of Chilika Lake declined from 3.4 to 1.4 meters and the accumulation of sediments led to shrinkage of the opening channel and a dramatic decline in salinity. A new channel dredged in the northern portion of the lake in 2000 has apparently mitigated at least some of the problems caused by sedimentation (Pattnaik *et al.*, in press).

A source of habitat loss and population fragmentation in several areas has been the proliferation of fixed fishing gears. In the middle and southern portions of Songkhla Lake about 27,000 *Sai nong* or sitting traps (two wings composed of small mesh nets suspended between bamboo poles, each about 100m long, deployed in a V-formation, with a large trap at the apex) and 13,000 *Sang sai* or barrier traps (closely spaced bamboo poles, sometimes with

a net suspended in between, starting from the shore and extending 200-300 m out with traps placed periodically along its length) create more than 8000 km of linear barrier in multiple rows. These fishing structures are left in place year-round and restrict dolphin movements such that their habitat is substantially reduced and the potential for demographic interaction with individuals in the Gulf of Thailand is eliminated (Smith *et al.*, 2004). Fixed fishing gears also occupy most parts of Semayang Lake and limit dolphin movements to a narrow, dredged channel that is subject to intensive vessel traffic (Kreb *et al.*, in press).

During a survey in the Mekong Delta, Smith *et al.* (1997a) observed several dozen stow nets, each one stretching 200-400 m, and over 10 rows of gillnets laid out so that they stretched across nearly the entire channel with only small openings to permit vessel traffic. These authors speculated that the effective blockage of the delta by these nets may at least partially explain the lack of dolphin sightings during a comprehensive survey in the Mekong River of Vietnam conducted in 1996.

3.3 Indirect threat

During a survey in December 2004 of the Ayeyarwady River between Mandalay and Bhamo, 61 samples of fish muscle tissue were collected (51 of *Ompok* sp. and 10 of *Crossocheilus burmanicus*). The mean mercury concentration for the *Ompok* specimens was 182 ng/g (SD = 96, range = 82-684), and for the *C. burmanicus* samples was 30 ng/g (SD = 18, range = 15-75). Although these levels are not dramatically elevated, the measured concentrations were high enough to give reason for concern about their potential effects on piscivorous wildlife and humans. Three of the *Ompok* samples (5.8%) were above the 300 ng/g limit established for human consumption by the United States Environmental Protection Agency and one sample was above the 500 ng/g standard set by the World Health Organization. It is important to note that these criteria are human-based and assume that fish are only a small portion of an individual's diet. The United States Fish and Wildlife Service is currently defining a mercury concentration effect level for the prey of piscivorous wildlife, and it will probably be set at around 100 ng/g (Darell Slotton, personal communication). Forty nine of the *Ompok* samples (or 96% of the total) were above this level. This is significantly higher than the levels recorded for *Ompok* fish during an investigation in 2002 investigation when only one out of 26 (or 4% of the total) samples of *Ompok* tested for mercury was above 100 ng/g (Smith *et al.,* in press-b).

3.4 Threat connected especially with migrations

The lack of information on movement patterns of Irrawaddy dolphins makes it difficult to directly connect realized and potential threats to migrations but plans for dams and proposed navigation improvement schemes (see above) would undoubtedly interfere with upstream and downstream movements of the species in the Mekong River. In Songkhla Lake and the mouth of the Mekong River, the extremely high density of fixed fishing gears also eliminates any possibility of movements in or out of these water bodies.

3.5 National and international utilization

Removal from the wild for live display is an additional threat to the species. These removals have the same effects as accidental or deliberate killings on the viability of wild populations. The charismatic appearance of Irrawaddy dolphins and behavioral characteristics they exhibit in the wild (e.g. spitting water, spyhopping, fluke-slapping, etc.) make them especially

attractive for shows and display in dolphinariums. The commercial motivation for capturing Irrawaddy dolphins is also high due to the ability of the species to live in freshwater tanks, which avoids the high cost of water quality systems necessary for maintaining a saline environment.

Sixteen Irrawaddy dolphins were captured from Semayang Lake (Tas'an and Leatherwood, 1984; an appended water body to the Mahakam River; 6 in 1974 and 10 in 1978). Six more Irrawaddy dolphins were removed from the Mahakam River and exported to the same aquarium in 1984 (Wirawan, 1989). The first known live-capture of Irrawaddy dolphins in Cambodian waters occurred in 1994 (Perrin *et. al.*, 1996). In January 2002, at least eight Irrawaddy dolphins were captured by local Cambodians. No credible population assessments were conducted prior to any of the captures discussed above.

Another form of use is dolphin watching in the wild. Irrawaddy dolphins are the subject of nature tourism programs in the Mekong River and Chilka Lake. Although this form of tourism has in some cases been promoted as a substitute for captive displays, in the latter two situations, there is concern among scientists that collisions with dolphin watching vessels and the habitat disturbance caused by this activity may threaten the viability of these populations.

4 Protection status and needs

4.1 National protection status

Directed taking of cetaceans is prohibited in Bangladesh, India, Laos, Malaysia, and Thailand. The legal status of Irrawaddy dolphins in Indonesia, Myanmar and Timor Leste is unclear. In Cambodia a new fisheries law and royal decree will provide protection to all cetaceans. In Vietnam all cetaceans are protected by a decree of the national assembly but this is not generally enforced. Some cetaceans are given legal protection in the Philippines but as of 2002 Irrawaddy dolphins are not included in the list of species (Perrin *et al.*, 2005).

Although a few areas where the species occurs have been designated as protected, little has been done to conserve dolphin habitat. Malampaya Sound was proclaimed a protected seascape in 2000, but this is the lowest possible prioritization given to a protected area. Portions of Irrawaddy dolphin habitat in the Sundarbans Delta of Bangladesh and India are included within Protected Forests and World Heritage Sites, but no specific provisions have been implemented for conserving dolphins or their habitat. The Cambodian Department of Fisheries has drafted a Royal Decree for protection of Irrawaddy dolphins in the Mekong River, which includes the designation of eight protected areas (5721 hectares) in a 190 km segment of the river above Kratie. In December 2005, the Department of Fisheries, Myanmar, announced the establishment of a protected area for Irrawaddy dolphins in a 74-km segment of the Ayeyarwady River between Mingun and Kyaukmyaung. Protective measures in the area include requiring fishermen to immediately release dolphins if found alive and entangled in their nets and prohibiting the catching or killing of dolphins and trade in whole or parts of them and the use of electricity fishing and gill nets that obstruct the water-course, are more than 300 feet long, or spaced less than 600 feet apart (Smith *et al.*, in press-b).

4.2 International protection status

Irrawaddy dolphins are listed by the IUCN as "data deficient" although the IUCN is currently reassessing the status of the species. Five geographically isolated populations: Ayeyarwady, Chilika, Mahakam, Mekong, Songkhla and Malampaya (see above) have been Red-Listed as "critically endangered." The species was included in CITES Appendix I in response to concern about the potential for international trade in live specimens to adversely affect wild populations.

4.3 Additional protection needs

The Action Plan for the Conservation of Freshwater Populations of Irrawaddy Dolphins (Smith *et al.*, in press-c) noted that multiple-use protected areas will play a key role for conserving freshwater populations of Irrawaddy dolphins. Protected areas could be a particularly effective conservation tool due to the fidelity of the species in freshwater systems to relatively circumscribed areas, which aids effective management. Priority areas for protected area status include: (1) in the Mekong River, nine deep pool areas between Kratie and the Lao PDR-Cambodia border totaling 5,632 ha; (2) 10-20 km segments in the Mahakam River, at the Kedang Pahu tributary mouth at Muara Pahu Town, the mouths of the Kedang Kepala and Kedang Rantau, and the Pela tributary including the southern portion of Semayang Lake; (3) in the Ayeyarwady River, segments between the Taping river confluence at Bhamo to the upstream end of the second river defile at Sinkan (36 linear km), the downstream end of the second river defile to Tagaung (165 linear km), and the downstream end of the third river defile at Kyaukmyaung to Mingun (74 linear km); (4) in Songkhla Lake, the middle portion of upper Thale Luang and (5) in Chilika Lake, the area between Magamukh and the outer mouth.

The Action Plan for the Conservation of Freshwater Populations of Irrawaddy Dolphins also provided details on strategies for mitigating bycatch that included (1) establishing core conservation areas where gillnetting would be banned or severely restricted; (2) promoting net attendance rules and providing training on the safe release of entangled dolphins; (3) initiating a program to compensate fishermen for damage caused to their nets by entangled dolphins that are safely released; (4) providing alternative or diversified employment options for gillnet fishermen; (5) encouraging the use of more benign fishing gears by altering or establishing fee structures for fishing permits to make gillnetting more expensive while decreasing the fees for non-destructive gears; and (6) experimenting with acoustical deterrents and reflective nets.

5. Range States[1]

BANGLADESH, Brunei Darussalam, Cambodia, INDIA, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, PHILIPPINES, Singapore, Thailand, Timor-Leste, Viet Nam.

6. Comments from Range States

[1] CMS Parties in capitals.

7. Additional remarks

8. References

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