

Conservation Management Plan for freshwater (sub)populations of 'critically endangered' Irrawaddy Dolphin

Plan prepared by Uzma Khan, Somany Phay, Danielle Krebs, Lindsay Porter and Fernando Trujillo (in collaboration with WWF Cambodia, WWF Myanmar, Yayasan Konservasi RASI and WWF Indonesia)

EXCERPT FROM THE REPORT OF THE SCIENTIFIC COMMITTEE (SC69B) FOR ATTENTION OF CONSERVATION COMMITTEE:

9.2.6 Riverine populations of Irrawaddy dolphins

A CMP proposal, developed by the Fisheries Administration Department of the Government of Cambodia, WWF International and Yayasan Konservasi RASI of Indonesia, includes three 'Critically Endangered' (IUCN Red List) riverine subpopulations of the Irrawaddy dolphin (*Orcaella brevirostris*): (1) Ayeyarwaddy River (Smith, 2004); (2) Mekong River (Smith *et al.*, 2023); and (3) Mahakam River (Jefferson *et al.*, 2008). All populations number less than 100 individuals and are declining primarily because of fishery bycatch. The proposed CMP aims to build collaboration between the three range countries, Cambodia, Myanmar and Indonesia. Each are supportive of a collaborative effort to better understand the status of Irrawaddy dolphins in their waters. The Committee welcomes the presentation and commends the proponents for the extensive work conducted. Concerns were raised on the commitment of at least two governments. An intersessional correspondence group was established to track progress on acquiring the necessary documentation representing formal agreement by the range states to support the CMP before it is considered at IWC69.

Attention: SC, CC, CG, G, ICG

*The Committee **commends** Cambodia, Myanmar and Indonesia for their efforts to develop a CMP for three riverine populations of Irrawaddy dolphins and **endorses** the scientific and technical aspects of this proposal. This endorsement is provisional with the understanding that the government of Cambodia and at least one other range state demonstrate a formal commitment to this CMP before IWC69.*

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9th April 2024

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EXECUTIVE SUMMARY

The IUCN Red List includes three ‘critically endangered’ riverine subpopulations of the Irrawaddy dolphin (*Orcaella brevirostris*). These subpopulations are distributed in the Ayeyarwaddy River, Mekong River and Mahakam River. These subpopulations of the Irrawaddy dolphin are small and their decline is primarily because of fishing practices, mostly illegal. This Conservation Management Plan aims to build collaboration between the three range countries of these subpopulations to tackle this most pressing challenge through improvement in protected area management, engaging communities in patrols and promoting co-management, providing alternative means of livelihoods to reduce the pressure of fishing and promoting sustainable fishing practices and building coexistence between local communities and dolphins. Besides this there are components of public awareness and tackling some of the other threats by vessel traffic and forest loss. The CMP will continue monitoring populations and mortality and understanding the causes of mortality. The participating countries are supportive of a collaborative effort to save the species and share experiences and learnings. The governments (Cambodia and Indonesia) agreed in Islamabad to tackle the threats from fishing practices (2022) and to take forward the Asian river dolphin CMP to address the threats from fishing practices. Considering the practicalities associated with managing implementation, this CMP focuses on the freshwater subpopulations of the Irrawaddy dolphin in three countries. This CMP has been mutually developed by WWF, Yayasan Konservasi RASI, Fisheries Administration Department, Government of Cambodia.

INTRODUCTION

The IUCN Red List presently includes assessments of three Asian freshwater cetacean species – the Indus river dolphin (*Platanista minor*) Ganges river dolphin (*Platanista gangetica*), and baiji (*Lipotes vexillifer*)¹. The latter unfortunately concerns the most recent extinction of a river dolphin species: the Yangtze River dolphin, or baiji, which at the time of the last assessment (Smith et al., 2017) had not been sighted since 2002. Additionally, the list includes one freshwater subspecies of the narrow-ridged finless porpoise (*Neophocaena phocaenoides*) – the Yangtze finless porpoise (*N. p. asiaeorientalis*), representing the only freshwater population of a porpoise species in the world. There are in the red list three freshwater subpopulations of the Irrawaddy dolphin (*Orcaella brevirostris*): the Irrawaddy River, Mekong River and Mahakam River subpopulations.

Table 1 Summary of all freshwater species/subspecies and populations of small cetaceans, including their distribution, population estimates

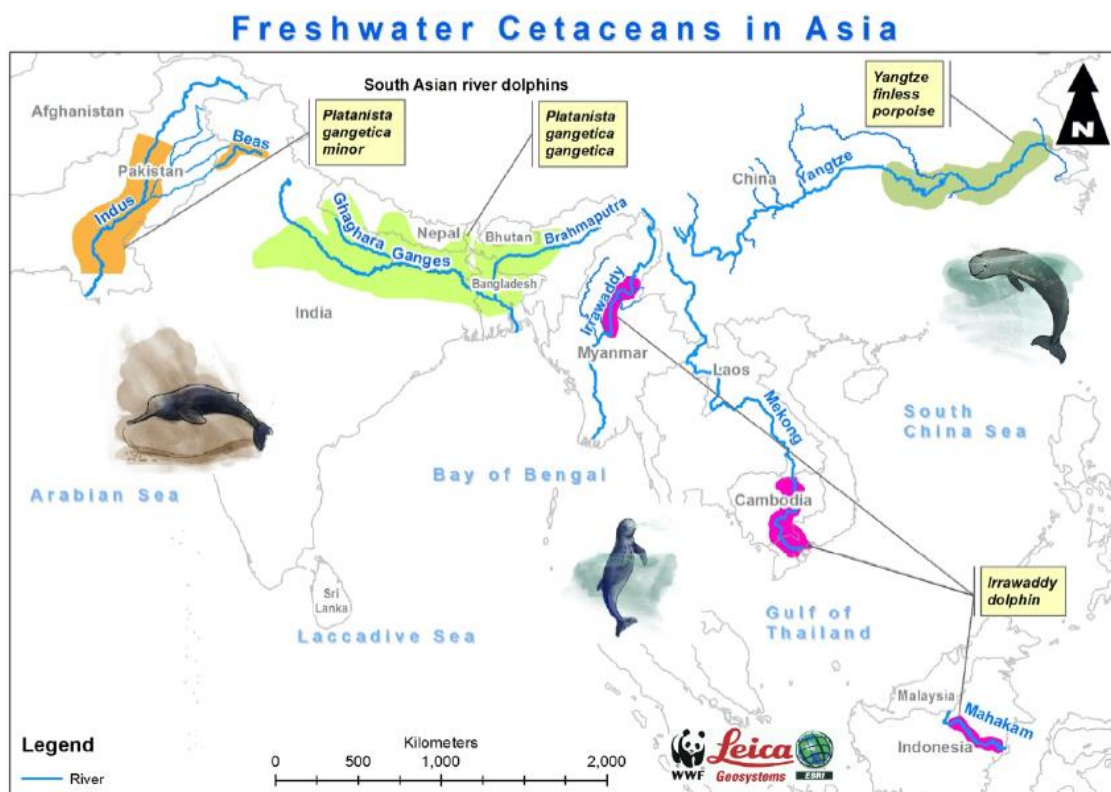
Species/ subspecies	Irrawaddy Mekong	Irrawaddy Mahakam	Irrawaddy Irrawaddy	Ganges dolphin, India	Ganges dolphin Nepal	Ganges dolphin, Bangladesh
Scientific name	<i>Orcaella brevirostris</i>	<i>Orcaella brevirostris</i>	<i>Orcaella brevirostris</i>	<i>Platanista gangetica</i>	<i>Platanista gangetica</i>	<i>Platanista gangetica</i>
Subpopulation range	Cambodia	Indonesia	Myanmar	Ganges river	Ganges tributaries	Brahmaputra and Karnaphuli rivers
River stretch	121 km	420 km	400 km	Ganges and its tributaries (across 3 states), Brahmaputra	Western: Karnali, Mohana (43 dolphins), Sapta Kohsi (9 dolphins)	Karnaphuli, Sangu, Meghna, and numerous other major and small rivers
Sub-population numbers (year)	89 (2020) 92 (80-106) and (2017),	3-4 extensive surveys/ year/yearly: 69 (2016), 72 (2017), 71 (2018), 72	69 (2017), 76 (2018)	3500 - 4000 (no precise survey), 2015 survey in Uttar Pradesh counted 1272	28 (Paudel <i>et al.</i> 2017, 2015), 45 (Government of Nepal)	225 (Sundarbans) 125 (Karnaphuli and Sangu), 197 (Brahmaputra)

¹ Taxonomy and nomenclature used here is based on determinations made by the Society for Marine Mammalogy’s Committee on Taxonomy (see <https://www.marinemammalscience.org/species-information/list-marine-mammal-species-subspecies/>).

Species/ subspecies	Irrawaddy Mekong	Irrawaddy Mahakam	Irrawaddy Irrawaddy	Ganges India	dolphin, Nepal	Ganges dolphin, Bangladesh
		(2019), 63 (2020), 65 (2021), 62 (2022), 67 (2023) (RASI data)				
Previous assessments	80 (2015) 85 (2010)	2 surveys per survey year; biannual surveys: 84 (2005), 80 (2007, 2010), 81 (2012), 80 (2014)		No country wide survey, data from different states	37-42 (Paudel <i>et al</i> 2015)	
IUCN status	Red List	Critically endangered	Critically endangered	Endangered	Endangered	Endangered
CMS	Appendix I, II	Appendix I, II	Appendix I, II	Appendix I, II	Appendix I, II	Appendix I, II

Species/ subspecies	Indus Pakistan	dolphin	Indus India	Finless Porpoise China
Scientific name	<i>Platanista minor</i>		<i>Platanista minor</i>	<i>Neophocaena asiaeorientalis asiaeorientalis</i>
Subpopulation range	Indus river		Beas river	Yangtze river
River stretch (name and length or area)	Indus (Jinnah - Kotri Barrage, about 1300 km)		185 km	Middle and lower mainstem of Yangtze and two adjacent lakes – Dongting and Poyang
Sub-population numbers (year)	1987 (2017)		5-11 (2018) ²	1012 (total in 2017-18) – 445 in the mainstem of Yangtze, the rest in Dongting and Poyang lakes; 100 in semi-natural reserves. 1,249 accordingly to the survey of 2022, data released by the Ministry of Rural Affairs, Government of China. Improvement in population number with 23% increase, 1249 (2023)
Previous assessments	2001 (1200), 2006 (1600-1750), 2011 (1452)			1045 (2012), 1012 (2017)
IUCN Red List status	Endangered		Endangered	Critically endangered
CMS	Not listed		Not listed	Appendix II

² <https://www.wwfindia.org/?17361/Indus-River-Dolphin-Survey>



Map 1: Freshwater cetacean in Asia

Despite the government of Cambodia establishing the Mekong river dolphin protection and management zone in 2012, with strict law enforcement in place to ban gillnet and multi-hook long line use within the core zone, local communities intended to drop fishing gears such as gillnets and multi-hook long line in the river to collect fish for their livelihood. Their perception also considered that the most destructive fishing technique is electric fishing and this is likely the main cause of dolphin mortality. The Irrawaddy dolphin in the Mekong in Cambodia is facing high mortality. Although included in the 2020 abundance estimate, 25 dolphins that were photo identified in 2017 were not resighted in the 2020 estimate. Later in 2022 three of them were photographed, and the 22 missing dolphins are now considered dead. Additionally 11 dolphins died in 2022 (7 calves, 4 adults), and six in 2023. We haven't confirmed whether the mortality cause was related to electric fishing gear, while gillnets and multi-hook long line contributed to approximately 42% of total mortality between 2020-2023 data.

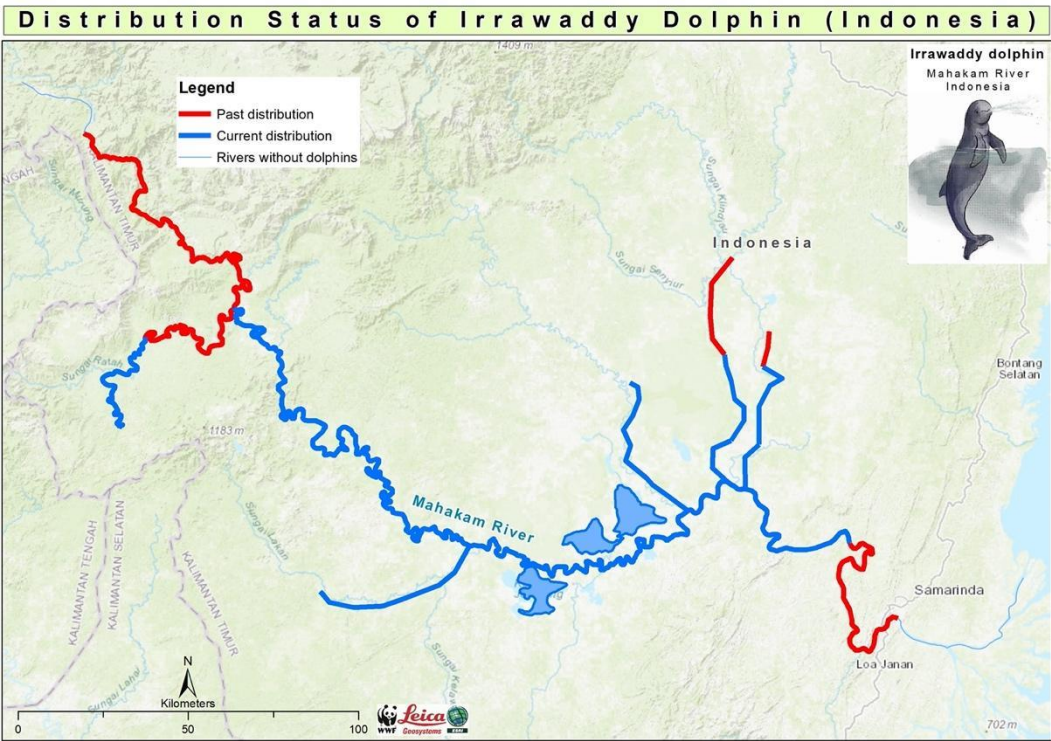
The Irrawaddy dolphin is an iconic species of the Ayeyarwady River Landscape in Myanmar. There are an estimated 79 Irrawaddy dolphins divided among three braided river sections separated by narrow defiles. As estimated in 2020, the Bhamo (upstream) river section (36 km) supports an estimated 14 individuals that do not occur within a protected area. The Mhale/Shwe Ku (central) section (119 km long), which was declared as a protected area in 2018, supports an estimated 37 individuals. The Mingun/Kyauk Myaung (downstream) section (72 km long), which was declared as a protected area in 2005, supports an estimated 28 individuals. However, the dolphin population is facing a high risk of extinction due to habitat degradation and increasing threats that stem from human activities, such as the indiscriminate use of gillnets, electric fishing, and pollution from gold mining and human settlements upstream of their habitat area. Unfortunately, the military coup February 2021 in Myanmar has created a challenging situation for dolphin conservation, as there is no effective law enforcement in place to protect this endangered species, additionally many conservation organisations ceased their activities subsequently.

As a response to this situation, the conservation approach has shifted towards increased engagement with local fishing communities who would take charge in monitoring the dolphins and to protect them from threats, as a collective conservation effort. Since September 2022, WWF Myanmar have

started the “Dolphin Guardian Initiative” with 12 local fisher at 7 communities at Irrawaddy Dolphin Protected Area 1 and 2, Northern part of Ayeyarwady River and successfully established a local monitoring network with the aim of promoting community engagement in dolphin conservation and obtaining real-time information concerning dolphin status, mortality rates, and threats.

The Irrawaddy dolphin in the Mahakam River, its tributaries and lakes have been officially protected since 1990 and are the mascot species of East Kalimantan Province. The Mahakam River dolphin population is restricted to a river stretch of 420 km. The population has endured a gradual decline from an estimated population of 84 individuals in 2005 to 62 individuals in 2022. Actually the population decline seems to slow down as in 2023 67 individuals were estimated with reduced mortalities of an average of 4 dolphins to one individual in 2022 and 2023. Although the downward trend in mortality since 1995 is not significant, the deaths from gillnet entanglement began to slowly decline significantly. This may be partially due to the large-scale efforts of pinger use starting since July 2020 and slowly increasing its use over time with 254 at present in use by 179 fishermen that successfully secured nets from fish depredation leading to zero gillnet entanglements in these nets. The mean annual mortality rates of 4 dolphins per year is unsustainable based on the respective lower potential biological removal (PBR) values (i.e. 0.13 and 0.67) for both minimum and best population sizes estimates of 67 individuals with recovery factors (FR) of 0.1 and 0.5, respectively. 70% of all known deaths with known causes are caused by gillnet entanglement. Annual births are between four and seven individuals with a mean of 5 newborns. Moreover, a dolphin ranger initiative started in 4 sub-districts (10 rangers) in the, since 2020, protected area at district level and since August 2022 effectively protected under the Ministry of Marine Affairs and Fisheries. These rangers have monitored the PA since 2000 until 2003, three times a week to record illegal fishing activities and dolphins’ occurrences, mortalities and births. The patrol has now been continued only in one sub-district due to funding shortage. RASI also launched sustainable aquaculture projects to help fishers who agree to stop illegal fishing activities including electrofishing. Conservation work also involves awareness raising in local communities and schools is led by RASI as well as providing aid for local communities to engage in alternative livelihood income generating activities. RASI is also monitoring the population and the water quality of its habitat every quarterly month and has established a photo-identification database. Finally, RASI helped the government in the protected areas identification and management plan development. Current challenges are the increase of coal barge traffic in the dolphin habitat causing concern of underwater acoustic disturbance and associated stress as well as increased risk of collisions.

Map 2: Irrawaddy dolphin past and current distribution in the Mahakam River, Indonesia



Map 3: Irrawaddy dolphin past and current distribution in the Mekong River, Cambodia (will be slightly updated as the Irrawaddy dolphin is now extinct in Laos).





Map 4: Irrawaddy dolphin past and current distribution in the Ayeyarwaddy River, Myanmar

(b) Information on known and suspected threats to the population

Ongoing and increasing anthropogenic changes to freshwater ecosystems are putting river dolphins at ever greater risk. The primary cause of direct mortality is entanglement in gillnets, and this is generally regarded as the most immediate human-induced threat. All freshwater cetaceans are legally protected in their range states, but Asian range states are among the most densely populated countries in the world, with rapidly growing economies. All river dolphins and porpoises live in basins with growing human population pressures and share their habitat with local communities, which also depend on freshwater for sustenance. The unsustainable extraction of resources, e.g., fish, timber, riverside vegetation, sand, water, etc., is relentless due to economic and political priorities, and coordination among or between countries to address environmental conservation is either missing or inadequate. The constantly growing demand for water, linked as it is to security concerns, makes river basin conservation especially complex and challenging (Khan, 2018).

1.2 OVERALL OBJECTIVES OF THE CMP

Objective 1: Strengthening national fisheries policies and legal framework.

Outcome 1.1: By 2030, the revision of fisheries legislation to prioritize the conservation and protection of Irrawaddy dolphins include mesh size/material, sustainable practices, bycatch mitigation (season- or location-based closures), and technological interventions in fishing activities.

Outcome 1.2: Monitoring of trends in population abundance & mortality and understanding the causes of the Irrawaddy dolphin in the three rivers (Ayeyarwaddy, Mekong and Mahakam)

Outcome 1.3 By 2026, vessel guidelines developed and approved by the government

Objective 2: Building harmony and coexistence between river dolphins and fishers.

Outcome 2.1: Review of the river dolphin bycatch mitigation strategies for different species and different basins.

Outcome 2.2: Use existing indigenous and expert knowledge to devise sustainable fishing methods, tailor made for each river to safeguard dolphins from fishing gear mortalities

Outcome 2.2: Implement alternative livelihood programs (such as agriculture, livestock, apiculture, and tourism) to reduce fishing pressure or during fishing closure seasons to control illegal fishing activities.

Outcome 2.3: Provide nature-based solutions (such as **aquaculture**) to build community resilience to climate change and reduce dependency on wild resources.

Objective 3: Awareness, enhancing knowledge and databases

Outcome 3.1: By 2026, build a database to monitor river dolphin mortality due to fisheries and categorize them according to the type of net.

Outcome 3.2: By 2026, make data available on fish catches (quantity and quality).

Outcome 3.3: Build capacity through knowledge exchange and training in monitoring mortality, using pingers, and conducting necropsies and sample analysis to understand the causes of mortality and potential disease aspects.

Outcome 3.4: Consultative meetings and workshop to ensure implementation of standards for palm oil sector to safeguard the Mahakam river from soil erosion and agro-pollutants.

Outcome 3.5: Research conducted and expert knowledge sharing on the impacts of underwater acoustic noise from large-sized vessels, particularly in the Mahakam River.

Objective 4: Establishing habitat connectivity through area-based conservation measures and effective protection measures

Outcome 4.1: By 2026, improve the management of at least four protected areas (Irrawaddy dolphin-Mekong, Irrawaddy dolphin-Mahakam, and Ayeyarwaddy River -Myanmar) by implementing effective standards Conservation Assured River Dolphin Standards (CA|RDS) and network of community based guardians.

Outcome 4.2: By 2028, establish co-management areas with communities (such as fish reserves and fish refuges) to support community livelihoods and habitat connectivity to deliver on the Kunming Montreal Global Biodiversity Framework (KM-GBF)

Outcome 4.3: By 2030, guidelines for vessel transport approved by the government agencies and implementation in Mekong and Mahakam rivers.

LEGAL FRAMEWORK

In Cambodia the Irrawaddy dolphin is one of the 58 Endangered Fisheries Species listed in the Royal Government's sub-decree on 'the Types of Fisheries and Endangered Fisheries Product'. In the first two decades of the 21st century, regular, systematic surveys have been conducted in the Mekong which has generated a series of abundance estimates, all below 150 individuals. These point estimates show a decline from 127 in 2005 to 93 in 2007, 85 in 2010 and 80 in 2015. Documented adult mortality was caused primarily by entanglement in gillnets, but it was generally agreed that the cause(s) of the recorded high calf mortality required additional, pathological investigation. The Government of Cambodia created the "Commission for Conservation and Development of Mekong River Dolphin Eco-Tourism Zone(DC)³" in 2006 to help the Fisheries Administration (FiA) stop the ongoing decline of Mekong dolphins. Under the landmark 2012 "Kratie Declaration on the Conservation of the Mekong River Irrawaddy Dolphin" the DC, FiA, and WWF-Cambodia agreed to implement a joint strategy for Mekong dolphin management and conservation. The Declaration specifies management and research recommendations that have been updated and used as the basis for conservation efforts.

In 2009 the Management Plan for the Ayeyarwady Dolphin Protected Area was prepared by the Myanmar Department of Fisheries in collaboration with the Wildlife Conservation Society (WCS). The dolphin population in the Ayeyarwady River consists of about 75-80 individuals, inhabiting a stretch of about 400 river kilometres. Two areas are legally protected for Irrawaddy dolphins in the Ayeyarwady, one spanning 74 river kilometres at the far downstream portion of the population's range and the other spanning 119 river kilometers in the middle portion of its range.

Scientific research and conservation work in Indonesia were spearheaded and are still actively implemented by Yayasan Konservasi RASI, a national NGO which has been working in the area for almost two decades on population assessment, threat reduction, and community engagement. Irrawaddy dolphins in the Mahakam River have been nationally protected since 1990 yet obtained its first protected area at district level only in 2020 and at the national level in 2022 under the Ministry of Marine Affairs and Fisheries (MMAF) Decree Number 49. The area is 42,667.99 ha in size and is divided into three zones, namely: 1) core zone (1,081.28 ha) including 30 fish spawning areas, limited utilization zone (30,695.74 ha), 3) other zone 10,890.97 ha) consisting of a) rehabilitation zone (2,732.08 ha), b) large ship traffic lane zone (385.72 ha, c) zone according to the characteristics of the Area (7,773.17 ha). This decree was issued after an initial reserve decree was issued by the regent of Kutai Kartanegara District Number 75, in 2020. Around 90% of the population is found in the protected area based on three-monthly or quarterly surveys conducted each year since 2017 covering the entire distribution range. An Indonesian management plan focused on threat reduction and community engagement and was developed by Yayasan Konservasi RASI in collaboration with the recently installed management body (BPSPL) and the MMAF, and obtained a decree in 2023 issued by the Directorate General of Management of the Marine Environment (under the MMAF).

CMP SWG and WWF Global River Dolphin Rivers Initiative team submitted a paper to the IWC in SC/68B/CMP/10 in 2021 to put forward a case that a Conservation Management Plan (CMP) for Asian river cetaceans will help in fostering conservation in the region while building regional cooperation. This was discussed during the Trinational workshop on the Irrawaddy Dolphin 1st to 4th December 2020, and it was suggested that the best way to take this ahead would be a 'threat-based approach', interacting regularly with the IWC's Bycatch Mitigation Initiative.

³ The Commission for Conservation and Development of Mekong River Dolphin Eco-Tourism Zone that was under the management authority of the Council of the Ministers, was dissolved and transferred to the Ministry (MAFF). MAFF created a Commission under its Proclamation in 2019.

WWF organized a workshop in October 2022 with government representatives and partner organisations in Islamabad, Pakistan to build consensus of the Asian range states to adopt the approach of a threat-based CMP under IWC to address the threats from fisheries. Government representatives from Bangladesh, Cambodia, Indonesia, Nepal, and Pakistan agreed to work together. The workshop signed ‘the Islamabad Recommendations’ to formulate a Conservation Management Plan (CMP) with broad recommendations on the key components of a CMP.

WWF has taken the Commissioner of Cambodia to IWC on board. The Commissioner of Cambodia has agreed to represent the range countries’ key progress and on-going challenges facing the conservation of the freshwater dolphins in Asia, to subsequent meetings of the IWC, for an information update and more effective support and interventions. The Commissioner of Cambodia, once taking formal approval from the Minister, will begin coordinating with the other governments of the range countries, while most of the partners are in place; for example WWF offices in Cambodia, Myanmar, Yayasan Konservasi RASI, Indonesia. This process is already underway, as WWF offices are currently leading river dolphin conservation projects in range countries, and there are various conservation programmes, supported by governments being implemented at varying scales.

GOVERNANCE

3.1. Coordination of a CMP

3.1.1. Steering Committee

Each country will nominate its candidates for the Steering Committee. This committee will constitute government representatives from the range states and by representatives from the IWC. The committee will have a coordinator as an ex-officio member of the Committee. This committee will have the following ToRs:

1. Provide a focus to, and monitor the delivery of, the CMP.
2. Provide guidance to, and encourage conservation actions by, the range states.
3. Report and respond, as appropriate, to requests from range states, IWC and other international fora regarding the CMP.
4. Facilitate the exchange and sharing of information.
5. Report to the IWC through the Conservation Committee.
6. Oversee the work plan of the Coordinator.
7. Manage any funding provided by the IWC to implement the CMP.

3.1.2. Coordinator

Uzma Khan from WWF’s River Dolphin Rivers Initiative will play the role of a Coordinator. So far she has been playing this role and generally coordinating the efforts with the Asian Region. As the process moves ahead we will work out if a full time coordinator is required. However, it is requested that IWC SWG CMP could advise us on the funding support to cover some of the travel budget necessary finalisation of the finer details of this CMP and coordination between the three countries.

3.2 Timeline for a CMP

Stages of the CMP
Endorsement of the Scientific Committee, IWC
Formation of the Steering Committee
Refinement of the CMP
Approval of the relevant Ministry in Cambodia
The Government of Cambodia formally forms a bilateral agreement with the Government of Indonesia
Stakeholder consultative meeting organised by the Coordinator to refine the workplan and agreed actions
Detailed work plan approved by the participating partners and Government of Cambodia and Indonesia
Proposal developments and fundraising
Continued implementation of the existing conservation work in more collaborative way

SCIENCE

4.1 Biology, Status and Environmental Parameters

Mekong River, Cambodia

Irrawaddy dolphins were historically distributed throughout a large section of the Mekong River system, stretching from the south where the Mekong meets the South China Sea in Vietnam to Tonlé Sap (Great Lake) in the northwest and upstream to just past the Laos-Cambodia border at Khone Falls. At present the dolphins inhabit only a 180-kilometer section of the river in the northeast of Cambodia including a very small section in Laos below Khone Falls. Within the current distribution there are nine deep pools which constitute the dolphins' primary habitat.

The Irrawaddy dolphin in Cambodia is a protected species and its conservation in the Mekong is guided by the Cambodian Mekong Dolphin Conservation Strategy, produced by the Cambodian Ministry of Agriculture Forestry and Fisheries. This conservation strategy was created after scientific studies of dolphin abundance monitoring, habitat protection and law enforcement initiatives and it is updated regularly – most recently in 2017.

Law enforcement is critical to the conservation strategy and is primarily carried out by the River Guard program. There are currently 72 river guards comprising fisheries officers, police officers, and local community members. The river guards operate out of 15 posts along the Mekong. The highest priority of the River Guard program is to confiscate illegal gillnets. The river guards removed an average of more than 102,000 meters of gillnet annually from 2015 to 2019. They had removed close to 69,000 meters to date in 2020 (January to October) at the time of the workshop, which was already an increase over the 2019 total of 67,000 meters. The increase in confiscations from 2019 to

2020 was likely related to the economic hardship from the current coronavirus pandemic, which led to increased illegal fishing as an alternative income source. In addition to gillnets, the river guards confiscate long-lines with multiple hooks, and the number of long-lines removed has significantly increased since 2016 (4,485 in 2016, 14,775 in 2017, 38,650 in 2018, 48,682 in 2019, also see slide no 9 of the Mekong presentation available in Annex 4). The river guards also arrest people caught electrofishing. A total of 44 people have been arrested for electrofishing since 2015, of which 39 were sent to court. Essential equipment for the river guards such as boats, boat engines, and walkie-talkies have been provided with support from multiple donors including the Cambodian government, WWF and Tiergarten Nürnberg/Yaqu Pacha.

Dolphin abundance is estimated by visual surveys. Individual dolphins can be identified and tracked based on the unique characteristics of their dorsal fin. The population declined from 200 dolphins estimated in 1997 to 93 dolphins estimated in 2007. Since 2007, the population appears to have stabilized, and the most recent estimate in 2020 was 89 individuals (95% confidence interval = 78-102 individuals). While modeling of abundance from 2020 surveys provided a point estimate within 3 dolphins of the 2017 abundance estimate, given the large confidence interval and the fact that 25 identifiable dolphins have disappeared since the 2017 survey, it is difficult to define a trend at this time.

One concern is the age structure of the population, with 73% of the dolphins thought to be more than 20 years old. The estimated lifespan of Irrawaddy dolphins is estimated to be 27 to 30 years (Stacey & Leatherwood, 1997). Therefore, with the high mortality of calves and juveniles, the population seems to be aging and this remains a challenge. The numbers of dead dolphins as well as the probable causes of death are recorded to gain insights into current threats. A regular necropsy program to analyze the cause of death has been in place for several decades and this program has confirmed the risk to adults and juveniles of fishing gear entanglement. However, the high unexplained mortality of calves is an ongoing cause of serious concern, although it is lower compared to 2007 and before, but the majority of the dead dolphins still include calves.

The WWF program and its partners have also focused on community outreach to raise awareness about dolphins and educate the community on issues related to dolphin conservation. Village meetings, school visits, and cooperation with monks has helped spread valuable information about dolphins. The WWF program operates on the assumption that by supporting people with alternative food sources, such as aquaculture, vegetable gardens, and chicken rearing, the stress on dolphins and the river ecosystem from unsustainable fishing can be reduced (Khan & Willems, 2020).

Conservation of the Mekong ecosystem, including the dolphin population, is a transboundary problem and therefore collaboration with Laos would be desirable, particularly when it comes to protecting the few dolphins residing in the Laos/Cambodia transboundary pool; these had once numbered 22 (Ryan, 2012) and declined to 7 or 8 (Ryan et al 2011), but now number only three. Such collaboration with Laos is important not only for the dolphin population but also for the overall health of the river system. The construction of dams in Laos, such as the Don Sahong Dam located about 1.5 kilometers from the border, has had significant impacts on the river downstream in Cambodia.

Ayeyarwady River, Myanmar

The Ayeyarwady River is an iconic free-flowing river in Myanmar. The river has high biodiversity and is vital to local communities. There are an estimated 79 Irrawaddy dolphins divided among three braided river sections separated by narrow defiles. As estimated in 2020, the Bhamo (upstream) river section (36 km) supports an estimated 14 individuals that do not occur within a protected area. The Mhale/Shwe Ku (central) section (119 km long), which was declared as a protected area in 2018, supports an estimated 37 individuals. The Mingun/Kyauk Myaung (downstream) section (72 km long), which was declared as a protected area in 2005, supports an estimated 28 individuals. Direct count abundance surveys, which have been conducted annually since 2011, indicate a relatively stable aggregate population over this period. Dolphin mortality has been monitored since

2009. Eight deaths were recorded in 2020, which is the highest single-year number on record. It is thought that the apparent increase in mortality in 2020 is a result of increased fishing due to the economic challenges related to the Covid-19 pandemic.

Unique to the Irrawaddy dolphins of Myanmar is a human-dolphin cooperative fishery. Cooperative fishing is a mutualistic relationship between Irrawaddy dolphins and cast-net fishermen. The dolphins herd fish into the fishing nets, increasing the fisher's catch, while the dolphins benefit by catching fish escaping the net. The main threats to Irrawaddy dolphins are bycatch in gillnets, pollution from gold mining, and electrofishing. According to annual surveys, gold mining no longer occurs inside of protected areas. However, it still occurs outside of protected areas. Gillnets over 100m long are prohibited. Electrofishing, which occurs more frequently here than in the Mekong and Mahakam, is illegal because it may kill dolphins and reduce the abundance of their prey (Thomas et al. 2019).

Since 2005 the Myanmar Department of Fisheries and the Wildlife Conservation Society have worked in partnership to conserve dolphins. Their conservation activities include supporting enforcement and monitoring patrols, community engagement/awareness and population surveys. There is a 2009 Management Plan for the Ayeyarwady Dolphin Protected Area.

The mortality rate of Irrawaddy dolphins increased significantly in 2020. The Ayeyarwady River is heavily used for its ecosystem services. Illegal and unsustainable fishing, a lack of fisheries management, and limited capacity to enforce regulations are major issues. Other issues include risk of injury and mortality of the dolphins due to boat traffic, and habitat degradation and loss due to dredging, resource extraction, and pollution. Considering the current political situation and the military coup, the conservation work is very limited, WWF-Myanmar has formed a network of dolphin guardians who have been trained to monitor dolphins and maintain community liaison to curtail illegal fishing and have awareness sessions.

There is considerable support in Myanmar on social media, primarily Facebook, for the conservation of Irrawaddy dolphins. The 'Save Irrawaddy Dolphins' online campaign by the Nature Advocacy Group has over 17,000 followers.

Mahakam River, Kalimantan, Indonesia

Similar to the other two riverine populations, the Irrawaddy dolphin population in the Mahakam River, Kalimantan, Indonesia is Critically Endangered (IUCN Red List). The population is fully protected by Indonesian law since 1990. The Mahakam River is 980 kilometers long and has five tributaries and three large lakes. The Irrawaddy dolphin population inhabiting the Mahakam is estimated to have become isolated from other populations for ~ 300,000 years (157,000-505,000 years) and the population has two unique genetic haplotypes compared to samples from other freshwater populations or in Indonesia from coastal populations (Budi, 2018). The population's range has decreased significantly from its historical distribution (until the early nineties) from 90 km from the mouth until the rapids at 600 km from the mouth in the Mahakam River down to an area between 420 km from the mouth and 180 km from the mouth in the main river. Until 2010 two 'core' areas were used by the dolphins, the first one being located between 180-210 km from the mouth including confluences of tributaries and lakes and the second located at 300 km from the mouth but the latter has lost significantly in importance. Before 2010, dolphins could be found at a daily basis in the Muara Pahu confluence irrespective of water level, but now dolphins only move upstream during the low water levels following fish migrations (*Thynnichthys vaillanti* and *Osteochilus repang*). Since then, the western core area became degraded due to nearby palm oil agriculture and its impacts on fish spawning habitat and consequently depleted the fish stocks themselves. The levels of heavy metal pollution in the river are considered very high. Other major threats are from gillnet fishing and electrofishing with gillnet entanglement contributing for 70% of known death causes. Coal mines operate close to the river, causing pollution from runoff, and

necessitate large ships to travel through this one critical habitat, resulting in channelization, noise and strike risk.

Population abundance was monitored during 1997-2002 using transect methods while since 2005 photo-identification methods have been used. The most recent population estimate is 67 individuals (2023 survey), a slight decrease from 84 individuals in 2005. Birth rate has been monitored since 2017 and an average of four to seven new calves have been documented annually (mean is five newborns). The documented mortality rate averages four individuals annually. Causes of deaths were known for 76% of cases. The number one cause of death was gillnet entanglement causing dolphins to drown (70%). The second leading cause of death of known causes is being hit by a coal barge and speed boat (9%) while 7% died as a result of known and probable poisoning of prey resources. Vessel strikes are the next greatest cause at 9%. Of all deaths, the age range is known for 95% of cases and only of 35% of cases the gender is known. However, for the last 6 years this known gender percentage is greater (78%) because the pesut stranding network response is faster. 72% of the pesuts that died were adults, 21% were calves and 7% were juveniles. Specifically, for 45 by-catch cases where the gender or age class was known, the gender was composed for 60% of females and 40% of males, while 67% represented adults, 24% calves and 9 % juveniles. The age profile of dolphins in the Mahakam is not known. Calf mortality is not thought to be high in the Mahakam. It would be beneficial to better understand the age demographics within the Mahakam dolphin population.

Necropsy was performed 15 times since 2009 until 2024 including 6 newborns. Of the 9 adult necropsy cases, in 8 individuals part of gillnets were found in the throat or stomach, sometimes occupying the most part of the stomach. A recent decrease in mortality (2022-2023) of one dead dolphin per year is largely attributed to awareness efforts with fishermen and community members, experience at disentangling dolphins from nets, rescuing stranded dolphins from swamps and applying acoustic pingers to nets at a large -scale since July 2020 with at present 254 pingers being deployed. A special prototype pinger was developed to deter dolphins only at a minimum distance so that they would not be excluded from important feeding areas and tested during 4 trial studies. Nets with pingers experienced zero entanglements. Since 2002, 7 individuals have been rescued from swamps while 11 dolphins have been safely released by fishermen from gillnets.

Several sponsors supported five teams of 10 community river guards in the Mahakam between 2020-2023, who conducted patrols three times per week to prevent illegal fishing and monitoring dolphin occurrences and report newborns. In 2024, only one patrol team (2 rangers) is continuing the patrols due to lack of current funding. Considering that these guards do not have the power to enforce any laws, the patrols can only record the use/occurrence of electrofishing and other illegal activities and share the information to law-enforcers. It is a great tool though, to show the effectiveness of law enforcement operations in time (trends). There is little information on the impact of electrofishing on the dolphins, but one calf has certainly been killed by this type of fishing. As gillnets are not illegal in the Mahakam River, this gear cannot be confiscated, however, the guards have reported nets that were placed in a dangerous way (not parallel to shore but across the river) and based on these reports RASI has approached the village chiefs and requested that these nets be removed at three locations. Guards also identify which gillnets are not yet guarded by pingers and perform interviews with the fishermen and provide them with pingers.

The recently issued Protected Area management plan bans gillnets 1) of mesh-sizes larger than 4cm (one-side), 2) of unbreakable thread, 3) placed with 1km radius of confluences, 4) placed perpendicular to shore, 5) gillnets with smaller mesh sizes in the dolphin habitat may only be used if guarded by a pinger. The PA Management Plan also bans fishing gear that monopolize or are considered unsustainable and provide regulations for aqua-culture. It also regulates boat traffic and dolphin watching activities inside the PA. One of the national action plan (in process) measures related to gillnets making an inventory of all gillnet fishers inside the PA and reducing gillnet related entanglements. This inventory is expected to be useful in efforts to provide these impoverished

fishers with alternative, non-entangling gear, or assisting them in engaging in sustainable aquaculture. RASI has done a study where it seems that gillnet fishers target certain fish species using large-mesh size nets, other gear (fish traps *bubu*, *pengilar*, *jebak*) seems to be more profitable (higher yields). In addition, based on interviews with 165 gillnet fishermen, 97% agreed for an alternative gear change when the ban on large-mesh size nets come into effect. However, the small fish that are often targeted by small-mesh size nets are commercially less attractive. These fish are then bought very cheaply, and often they are only used to supplement the fishers' income as they also grow crops.

Clearly, however, the first step will be to identify viable alternatives and ensure their availability and reduce gillnet-related entanglements. This will include reducing the number of gillnets. RASI, the local district fisheries service and the district representatives are also working on law revisions, including a ban on gillnets in the PA. Until then, regulations will be proposed that include a strict enforcement of the current legal 2-4 cm mesh size gillnets with breakable nylon threads (not from stronger materials) and not placed within 1 km radius from confluences as these represent important dolphin feeding areas (Kreb & Budiono, 2005). Also, with these regulations may come along a program in which the large mesh size gillnets may be returned for alternative gear (fish trap, long line) that do not by-catch dolphins but are equally or even more profitable. The small gillnets from fishers who indicated that dolphins often destroy their nets and/ or 'steal' fish from their nets may be equipped with pingers to help prevent this.

RASI is now working at the village level to obtain community agreements and map conservation zones within the buffer habitat surrounding the existing PA that combined form essential habitat for Pesut Mahakam and/ or its fish stock. The government notified Pesut Mahakam Essential Ecosystem Habitat as a protected area, including a total area 221,299 ha that has just been signed by the governor. The indicative map of Pesut habitat that also includes peat swamp habitat is one of 14 maps of proposed essential ecosystems identified within East Kalimantan including habitats for the following: orangutan, proboscis monkey, freshwater crocodile, limestone, peat swamp, mangrove lowland forest. The decree of this indicative map will make it more difficult for the authorities to issue permits for new or expansion of concession areas.

The Mahakam dolphins are treasured by the community and there is strong motivation for their conservation. Education programmes at schools have helped raise awareness of the dolphins and the threats they face. There are efforts to promote aquaculture and other alternatives to fishing.

RASI has conducted pinger trials on the Mahakam, and has found that they may be an effective tool for keeping dolphins away from fishing gear and potentially becoming entangled. The pinger study shows that when the pinger is on, dolphins occur more frequently in zones with an estimated radius of 10-20m from the pinger than in zones of 0-10m (Kreb et al., 2021). Conversely, when the pinger is off, dolphins surface more in the estimated 0-10 m zone than in the 10-20 m zone. Observations of behavior indicate that dolphins never appear to forage in the 0-10 m zone when the pinger is on even though they do forage in the 0-10 m zone when the pinger is off. Foraging activity continues at distances of 20m or further more when the pinger is on. Activities in the 0-10m range when the pinger was on predominantly involved fast travel and to a much lesser extent slow travel and play. So even though dolphins may still occur within 0-10 m of the pinger, their frequency of occurrence was significantly less and no feeding behaviour was observed or acoustically detected (further acoustic research is needed as it was only done during two days). The pinger trials have been very successful and now all fishers in the Irrawaddy dolphin core habitat use pingers independently while constantly reporting to Yayasan Konservasi RASI which also provides technical backstopping.

4.3 Attributes of the Population to be Monitored

The three populations have been monitored, mark-recapture of photo-identified individuals has been used for estimating abundance of Irrawaddy dolphins in Mekong and Mahakam rivers. One advantage of photo-identification is that it can also provide information on survival and recruitment rates, movement of individuals, as well as abundance. Mark-recapture abundance estimates have been generated for Irrawaddy dolphins in the Mahakam (Kreb, 2004, Kreb et al., 2024b (submitted) and Mekong Rivers (Ryan et al., 2011). Both rivers represent a situation in which the dolphin population is small, and individuals can be identified using photo-ID. Regular monitoring has taken place there for over twenty years, starting in 1997. The majority of the individuals in the population are known by unique marks on their dorsal fins, and documentation of mothers and calves using photo-ID during regular surveys allowed researchers to determine that the mean annual birth rate was 7,4% of the population size, and systematic reporting and identification of dead animals generated a mortality rate of 5,9% of the population per year (Kreb & Budiono., 2024). In 2023, the Mahakam dolphin population was estimated to consist of 67-68 individuals, with an average birth rate of five newborns per year (2017-2023) and a documented average mortality rate (1995 – 2023) of an average of four dolphins per year, which corresponds well to the static population size documented (personal communication with Dr Danielle Kreb, 2023).

5.THREATS, MITIGATION MEASURES AND MONITORING

5.1 Identification of Threats

Actual/potential threat	Cause or related activity	Evidence	Impact on population	Priority	Mitigation	Responsible Party
Bycatch	Fishing activities	Strong - Since 1980s, 13 species have been listed as ‘critically endangered’ in the IUCN Red List and bycatch is the key threat to 11 of these (Brownell et al., 2019)	High mortality (strong evidence has been recorded across range countries, and recent electrofishing trends likely will increase the impact on the population). 66% of Irrawaddy. 11 dolphins died in 2022 (7 calves, 4 adults), and four more 2023 and three in 2024 (WWF unpublished data)	High	Law enforcement, Gear modification, Use of innovative technologies (pingers), alternative livelihoods/diversity of livelihood, sustainable fishing practices, fishing season closures Protected Areas management effectiveness	River Guardian – Myanmar (WWF and communities) River Guards – (Fisheries Administration Department, Government of Cambodia) River guards, Alternative strategies, gear modification (Yayasan Konservasi RASI, BPSPL, Fisheries Service, local communities)
Habitat reduction	Construction of water infrastructure, embankments	Strong - The Don Sahong dam in Laos eventually caused extinction of the Irrawaddy dolphin in the transboundary pool.	Restriction in the range, more vulnerability to threats from fishing, loss of diversity	High	Ban has been placed on the construction of dams in the lower Mekong, however it is important to keep a close eye on any upcoming water infrastructure projects that can potentially cause damage to the subpopulations.	
Vessel strikes and acoustic underwater noise	Collision with the coal barrages in Mekong and Mahakam			Medium	Guidelines development for barges	Yayasan Konservasi RASI
Pollution	Agriculture run off based economies, effluents from agriculture and industries is pour directly in the watercourse	Various studies have shown how industrial effluent is increasing heavy metal levels in the Ganges and Ravi rivers (Paul, 2017; Hamid et al., 2016). Heavy metals such as cadmium and lead, which are derived impurities in copper-based pesticides or herbicides associated with palm oil industries as well as coal-mining, are polluting the core areas used by dolphins in Mahakam tributaries (Kreb & Budiono, 2018). High levels of PCB, DDT, aldrin, dieldrin and many	Evidence is weak to demonstrate the impact on dolphins but these pollutants have been seen in the tissue samples of dead dolphins in the Mahakam and Mekong. It is still debated whether the mortality of calves in the Mekong is linked to bioaccumulation.	Medium	Working with palm oil sector and district government to implement standards, awareness meetings in Mahakam	RSPO, WWF, East Kalimantan government

		other organochlorides have been detected in the blubber of Ganges dolphins in India (Kannan et al 1993).				
Dredging and sand mining		Sand and gravel mining are common in all river basins in Asia, and this can contribute to bank erosion and disrupt the balance between sediment flow and deposition, with impacts on fish breeding habitat.	Mining also disrupts river formation as sediment is more likely to be deposited where the mining occurs, causing channels to adjust in response. Sometimes mining also involves hydraulic land blasting (Smith et al., 2007), which impacts both riparian habitat and sediment.	Low	Assessment of threats and mapping	WWF Myanmar

5.2 MITIGATION MEASURES AND MONITORING

This section should include identified mitigation measures to address key threats and how the mitigation measures will be monitored. For example:

5.1 Entrapment in Set Nets

Undertake the following mitigation measures (MIT-01, 02, 03) and the following monitoring measures (MON-01, 02) to facilitate the conservation of species A in the area designated XYZ. Undertake the following public awareness raising measures PACB-01, 02 to promote the conservation of species A in the area designated XYZ.

5.2 Entanglements in Other Types of Fishing Gear

1. Actions

These form the key component of any CMP and once there is an approval by the Ministries in Cambodia and Indonesia:

Action	Country	Institution	Tentative timeline
Population abundance trends and mortality monitoring			
Continue population abundance surveys and mortality monitoring – photo identification and direct counts (MON)	Cambodia	Fisheries Administration Department and WWF Cambodia	Six monthly
photo identification and direct counts (MON)	Indonesia	Yayasan Konservasi RASI/ BPSPL	every month quarterly
Direct counts (MON)	Myanmar	River Guardian/WWF Myanmar	Six monthly
Acoustic monitoring for low density area (particularly side channels)	Cambodia	Fisheries Administration Department and WWF Cambodia, Chinese Academy of Science	Annual
Monitoring of threats			
Continue monitoring of threats (MON)			
Fishing (illegal nets, electrofishing)	Indonesia, Cambodia and Myanmar	WWF Cambodia, WWF Myanmar, Yaysan Konservasi RASI and WWF Indonesia	

Action	Country	Institution	Tentative timeline
Palm oil plantation, pesticides/fertilizers use and impacts (MON)	Indonesia	Yayasan Konservasi RASI and WWF Indonesia	
Mapping of threats from mining, particularly essential mineral (MON)	Myanmar	WWF Myanmar	
Study the underwater noise and dolphin acoustic and behavioral reactions from heavy ship traffic	Indonesia	best be done by international Ph.D student and local graduate and M.Sc students under guidance of YK-RASI	
Improving protected area management and effectiveness			
River guards programme and refining the patrols to focus on core habitat/pools (MIT)	Cambodia	Fisheries Administration Department	
Dolphin guardian programme, extending to cover the three protected areas (MIT)	Myanmar	WWF-Myanmar	
Dolphin river guards program, activating the 4 other patrol teams to cover the entire protected area	Indonesia	Yayasan Konservasi RASI and WWF Indonesia	
Implementation of Conservation Assured River Dolphin Standards(MIT)	Indonesia	Yayasan Konservasi RASI and WWF Indonesia and involving PA management authority (BPSPL) and MMAF	
Implementation of Conservation Assured River Dolphin Standards (MIT)	Cambodia	Fisheries Administration Department	
Community managed fish reserves (MIT)	Cambodia, Myanmar and Indonesia	Yayasan Konservasi RASI and WWF Indonesia and involving PA management authority (BPSPL) and MMAF	By 2026
Reducing bycatch			
Continue the use of pingers and scale up (MIT)	Indonesia	Yayasan Konservasi RASI and WWF Indonesia	
Provide alternative dolphin-safe fishing gear to replace gillnets > 4 cm in mesh size (one side)	Indonesia	Yayasan Konservasi RASI and WWF Indonesia	

Action	Country	Institution	Tentative timeline
Collect existing indigenous and expert knowledge to develop a manual of sustainable fishing methods, tailor made for each river to safeguard dolphins from fishing gear mortalities (RES & MIT)	Indonesia, Cambodia and Myanmar	Yayasan Konservasi RASI and WWF Indonesia, Fisheries Administration Cambodia, WWF Cambodia, Myanmar	
Alternative livelihoods			
Assessment to understand appropriate alternative livelihoods (knowledge sharing, lesson learnt) (MIT)	Indonesia, Cambodia and Myanmar		2025
Initiate alternate livelihood programme based on the above (aquaculture, apiculture, poultry and livestock, agriculture etc) MIT	Indonesia, Cambodia and Myanmar	Yayasan Konservasi RASI and WWF Indonesia, Fisheries Administration Cambodia, WWF Cambodia, Myanmar, possibly Red Cross, FAO	2025

6. STAKEHOLDER ENGAGEMENT, PUBLIC AWARENESS AND EDUCATION

The Irrawaddy dolphin has been a priority species for the IUCN Cetacean Specialist Group, and its conservation has been guided by an expert group comprising of members of the IUCN Cetacean Specialist Group; the Wildlife Conservation Society, Chicago Zoological Society, the Marine Mammal Commission, and WWF etc. The CMP will continue to engage with the experts to guide the implementation. This CMP will provide support to engage with corporate sector for example in Indonesia awareness raising of palm oil companies to source the palm from countries which follow the standards as prescribed by the local government and/or RSPO – Roundtable on Sustainable Palm Oil. Tourism in Cambodia in Kratie (Kempi pool, Mekong River) is a huge attraction and an opportunity to engage with wider groups. Establishing a financially sustainable mechanism (wildlife credits) that directs a portion of the revenue generated from Kampi pool tourism (dolphin sightings) can be explored through public engagement and awareness. This CMP will continue engagement with educational institutions to collaborate for non-invasive research and children for awareness

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APPENDICES

Annex A. Legal Position of River Dolphins in Asia

National Laws pertaining to river dolphins	Irrawaddy Mekong	Irrawaddy Mahakam (Pesut)	Irrawaddy Myanmar	Ganges dolphin, India (Susu)	Ganges dolphin Nepal	Ganges dolphin, Bangladesh	Indus dolphin Pakistan (Bhulan)	Indus dolphin (India)	Finless Porpoise China
Legal Protection									
Which department is responsible for river dolphin protection/conservation?	Fisheries Administration	Ministry of Marine Affairs and Fisheries for the PA and Ministry of Environment and Forestry for the species protection	Department of Fisheries	Ministry of Wildlife and Forest	Ministry of Forest and environment		Wildlife and Fisheries departments		
Is the above department also responsible for habitat conservation? E.g. Ramsar sites, rivers?	NO	yes	Yes	No, that is the Ministry of water resources	YES		In Punjab there is Protected Areas Act 2020 which has provision for wetlands as category of protected area which specifically mentions Ramsar Convention		
Which department and law is responsible for fisheries management?	Fisheries administration	Ministry of Marine Affairs and Fisheries for the PA and Ministry of Environment and Forestry for the species protection	Fisheries department Freshwater Fisheries Law Ayeyarwady Dolphin Management Plan Regional freshwater laws/ regional sanctuaries declared for all fish species and hilsa juveniles	Ministry of fisheries; and state level fisheries policies	Ministry of agriculture and livestock cooperatives (fisheries is largely ignored), Nepal Fisheries Development policy approved (wise use, conservation, water pollution)		Sindh Fisheries Department Punjab Fisheries Department, KP Fisheries Department		
Are these two departments (if applicable) separate, or under the same parent department?		separate		No, collaboration is increasing due to Project Dolphin	different		Same parent department in Punjab, in KP different ministries so no formal coordination		
Please name the act/law which protects the dolphins species?	1. the law on fisheries 2. the sub-decree on “Creation of the Mekong Dolphin	Species protection: UU. No 5, 1990 and Number P.106/MENLHK/S	1991 freshwater fisheries law (need to be revised!)	Indian Wildlife (Protection) Act 1972 under Schedule-I,	National Parks and Wildlife Conservation Act 1973/ Aquatic	1990 protected species act; 2020 fisheries act	Sindh Wildlife (<i>Protection, Preservation, Conservation and Management</i>)	Indian Wildlife Protection Act, 1972, Biological Diversity Act 2002	Article 341 of the Criminal Law of the People's

National Laws pertaining to river dolphins	Irrawaddy Mekong	Irrawaddy Mahakam (Pesut)	Irrawaddy Myanmar	Ganges dolphin, India (Susu)	Ganges dolphin Nepal	Ganges dolphin, Bangladesh	Indus dolphin Pakistan (Bhulan)	Indus dolphin (India)	Finless Porpoise China
	Management and Protection Zones” 3. The proclamation on “ the Measure to Protect an Endangered Fisheries Products” 4. The Sub-decree on “ the Determination of Fisheries and Endangered Fisheries Products” 5. The Guideline to Manage Dolphin Ecotourism at Kampi Dolphin Viewing Site	ETJEN/KUM.1/12/2018 and National cetacean action plan: <i>No. 79/KEPMEN-KP/2018</i> Dolphin Protected Area in Kutai Kartanegara District: 49/KEPMEN-KP/2022 PA Management Plan: 2023_Kepdirjen PKRL Nomor 61	Ayeyarwady Dolphin Managment Plan (2008)	Biological Diversity Act 2002.	Protection Act 1960 (amendment in '98) Environment management plan		(Amendment) act 2020 , Sindh Fisheries 2020 The Punjab Wildlife (Protection, Preservation, Conservation and Management) (Amendment) Act 2007 Khyber Pakhtunkhwa Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015; The Balochistan (Wildlife Protection, Preservation, Conservation and Management) Act, 2014.		Republic of China, China Wildlife Protection Law (third revision in 2020, Yangtze finless porpoise rescue action plan 2016-2025, Yangtze River Protection Law Monitoring station, drones and cameras to monitor illegal fishing activities.
What is the penalty for killing a dolphin?	5 years imprisonment. Money fined is 3 times of a price at a market for a threatened fish species; however, no information on money fined for Irrawaddy dolphin as no single case of dolphin sold at a market	5 years imprisonment and 100 million Indonesian Rupiah Fine	3month -2 years imprisonment or fines	3-7 years imprisonment and fine.	It varies based on scenario (jail to penalty or combination of both; see the above-mentioned act		5 years imprisonment or PKRs. 0.2-3 million Fine or with both (Sindh); 2 years imprisonment or PKRs. 10,000-15,000/ or with both (Punjab); 1.5 month to 2 years imprisonment or PKRs. 10,000-45,000/ or with both (KPK); 1.5 to 3 months imprisonment or PKRs. 20,000-50,000/ or with both (KPK);	3-7 years imprisonment and fine.	5 -10 years imprisonment and penalty
Is the respective dolphin species also protected under the fisheries law? So a person penalized under fisheries law for killing a dolphin?		No to avoid jurisdictional overlap dolphins are only protected under the Ministry of Environment and Forestry	Ayeyarwady Dolphin Management Plan (2008)		No (there is no adequate fishery law)	1990 (old) Fisheries Ordinance, Not protected under fisheries law	Yes in Sindh Province only (new Sindh Fisheries Ordinance 2020 Not in Punjab yet		
What is the predominant system of fishing in the dolphins' rivers? (contract	Community	open access	Cooperative fishing but illegal electrofishing is problem and dolphins approach				Sindh: Contractual and recently ban has been put in the place, however this will be monitored to see the impact.		

National Laws pertaining to river dolphins	Irrawaddy Mekong	Irrawaddy Mahakam (Pesut)	Irrawaddy Myanmar	Ganges dolphin, India (Susu)	Ganges dolphin Nepal	Ganges dolphin, Bangladesh	Indus dolphin Pakistan (Bhulan)	Indus dolphin (India)	Finless Porpoise China
fishing/auctioning of fishing contracts, community fisheries through agreements/open access?			electrofishing to eat fish				Contract system in KP		
Are data on fish catches maintained and are accessible?	Yes (MRC)	yes (district fisheries departments)	Yes		No		in Punjab: Commercially valuable species otherwise not available		
Is there a problem of exotic fish species?		yes, channa micropeltes is considered to reduce native fish species			Fish farming with carp				
Is fish stocking (breeding and releasing in a lake/river) a common practice?		yes in fish reserves			Fish breeding is common/PES can be important		28 fish hatcheries in Punjab and release these in Indus in Punjab, of these four completely release and others release 50% of stock in the river and rest to communities for aquaculture.		
What is the legal mesh size of a fishing net?	1. According to the valid law on fisheries, a legal mesh size is between 1.5 and 15 cm 2. According to the valid sub-decree that was issued in 2012, the legal mesh size is less than 4 cm. This legal net can be used in the dry season buffer zone that requires an owner of the net to stay with the net	2-4cm (gillnet mesh size); large mesh size > 4cm declared illegal according to PA management plan 100-500 meters of net is allowed (should also be changed) - main threat to the dolphins are the 30-100 meter nets and mesh sizes larger than 7 cm, one side. small mesh size are problem too as dolphins eat parts of nest when they eat fish from these nets and get accumulated in stomachs		Gillnet above 25 mm/2.5cm size Castnet – no particular mesh size is given. However, mesh size > 1 cm should be allowed for fishing	Within the protected area, seasonal closure and only cast net (if locally defined) is allowed but beyond the park, I don't think we have rules that regulate mesh size. In practice, I guess we don't have this mesh sized based rules in policy but local community can develop.		2-4 sq inch	Fishing is banned in the Beas Conservation Reserve	Fish ban in whole Yangtze, and its adjacently lakes and main tributary for 10 years from 2021

National Laws pertaining to river dolphins	Irrawaddy Mekong	Irrawaddy Mahakam (Pesut)	Irrawaddy Myanmar	Ganges dolphin, India (Susu)	Ganges dolphin Nepal	Ganges dolphin, Bangladesh	Indus dolphin Pakistan (Bhulan)	Indus dolphin (India)	Finless Porpoise China
		Material requirements Net exchange should be compensated collaboratively by gov and ngo							
Does the law specifically state the monofilament nets are illegal?	No	No	No	Yes, Bangladesh (The Protection and Conservation of Fish Act, 1950)	No	Magic net is becoming a challenge (thin)	No	No	Yes
Is it legal to place the net across the river?	No	No		Yes (Use of gillnets more than 24 mm is allowed)*	Not clearly mentioned in law.		No	No	No
Can a fishing net be left unattended overnight?	No	Yes		Yes, outside PA	Yes, particularly in outside the park.		No (yes in Punjab)	No	No
Is there a provision in your fisheries legislation to set community managed fisheries reserves?	Yes	The existing fisheries reserves are government protected and managed. The core zones within the dolphin PA are under ministerial decree. The management of the PA (officially decreed now) may provide opportunities for community involvement/ mandate in supervision/ community patrols of core areas and implementation of safe dolphin watching activities. some local village regulations exist to manage local fisheries and ban		Yes (some states has traditional rights to manage their fish as reserves e.g. Kerala, Meghalaya)	Not specified in policy but locally certain segments are declared as fish conservation area.		There is provision to establish FR, not community managed reserved specifically mentioned, but can be established through MoA/MoU. Punjab Protected Areas Act, 2020 includes role of communities in the management plans and has provision of co-management agreements with the communities.	Yes	No (all fish PA managed by government)

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		certain gear considered to monopolize fish resources							
Is there a fishing season/closure timings? If yes please specify	The closing season starts from 1st June to 1st October. However, the Separate Deka (letter of Decision) of Stung Treng Provincial governor bans fishing activities from 1st of May to 1st of October. This province is one of the two provinces located along the dolphins' range.	No		Yes (15 July-15 Sept for Uttar Pradesh; 15 June-15 Aug-Bihar; 1 May-15 July-Assam)	Breeding season particularly focused to closure, focusing fish species. Peak dry season (Dec-March) protected for fish and other species conservation in protected areas/depends on local rules and procedure. But not outside the protected area.		1st June – 31st July	Fishing is banned in the Beas Conservation Reserve.	From 2002, no fishing season from April to June in the central and lower Yangtze. From 2015, no fishing season from March to June in the central and lower Yangtze. From 2021, fish ban in whole Yangtze, and its adjacent lakes and main tributary for ten years.
Do the protected areas for river dolphins allow fishing activities?	Yes, for the traditional fishing gears including cast net, hook, drop-door trap, horizontal cylinder trap, brush bundle basket, big bamboo vertical cylinder trap and circular scoop bag	Yes, sustainable fishing activities are allowed except for the core zones	Yes	No	Yes		Yes	No	No

National Laws pertaining to river dolphins	Irrawaddy Mekong	Irrawaddy Mahakam (Pesut)	Irrawaddy Myanmar	Ganges dolphin, India (Susu)	Ganges dolphin Nepal	Ganges dolphin, Bangladesh	Indus dolphin Pakistan (Bhulan)	Indus dolphin (India)	Finless Porpoise China
Do the fisheries laws have provision for fish sanctuary etc		yes there are 30 protected fish core area inside the PA and 3 fish reserves outside the PA					Yes in Punjab		
Is the fisheries department listed as a revenue generating department?		?					Yes in Punjab		
	Update of the fisheries law is needed. Fisheries law and PA-law contradict (no gill nets allowed vs specific mesh size allowed)		Collaborative fishing between dolphins and community fishermen!		Some fish species have a closed season/ can not be caught (3 species)				
Challenges		dealing with the increased traffic of coal barges likely putting a lot of stress on the dolphins.		Lack of flows (e-flows needed)	Law enforcement lack of awareness for example recently a dolphin was up for sale labelled as 'dolphin like fish', Riverbank communities (poor) need to be motivated for fish and dolphin conservation		No central institution to monitor stocks/gear so there are plans to establish a research institution. Different rules and regulations, we need national action plan (agreed strategy) Fines are min so usually the contractors are willing to pay! Provinces aren't talking to each other MAB is a good option to way forward.		

The Islamabad Recommendations*

We, the Asian river dolphin range states and supporters, represented at the workshop 5-7th October 2022 in Islamabad, Pakistan, will collaborate to promote and develop a fisheries focused IWC-Conservation Management Plan for our river dolphins"

Recommend to develop a CMP on solutions to reduce the impact of fishing and other threats to the conservation of river dolphins, including the following elements:

1. **INTER- and INTRA-GOVERNMENTAL COLLABORATION:** Alignment of departments/ ministries, research organisations, academia, communities and other organisations working on river dolphins and fisheries. This can include different fishing systems, conservation initiatives, protected areas, Other Effective area-based Conservation Measures (OECMs) and transboundary coordination.
2. **LAWS AND ENFORCEMENT:** Update laws and harmonisation of contradictory laws and regulations. Strengthen law enforcement of existing laws and regulations.
3. **ADEQUATE KNOWLEDGE BASE:** Addressing the gaps in monitoring data and capacity on river dolphins, fish stocks and their respective habitats as well as capturing indigenous knowledge
4. **COMMUNITY ENGAGEMENT:** Promotion of co-management of fisheries, diversification of livelihoods and area based conservation; community based monitoring and controls through recognized participatory principles
5. **RIVER HEALTH:** Addressing the various challenges that threaten healthy river systems, and therefore river dolphins and fisheries

Signed by all participants: [name], signature

* All intentions and recommendations contained in this document were collaboratively developed by the participants; this is not a legally binding document and all further actions from governmental side are subject to the approval of the respective country's authorities

(Md. Rezaul Karim Chowdhury) Phay Somany Eam Samlha Danielle Ures