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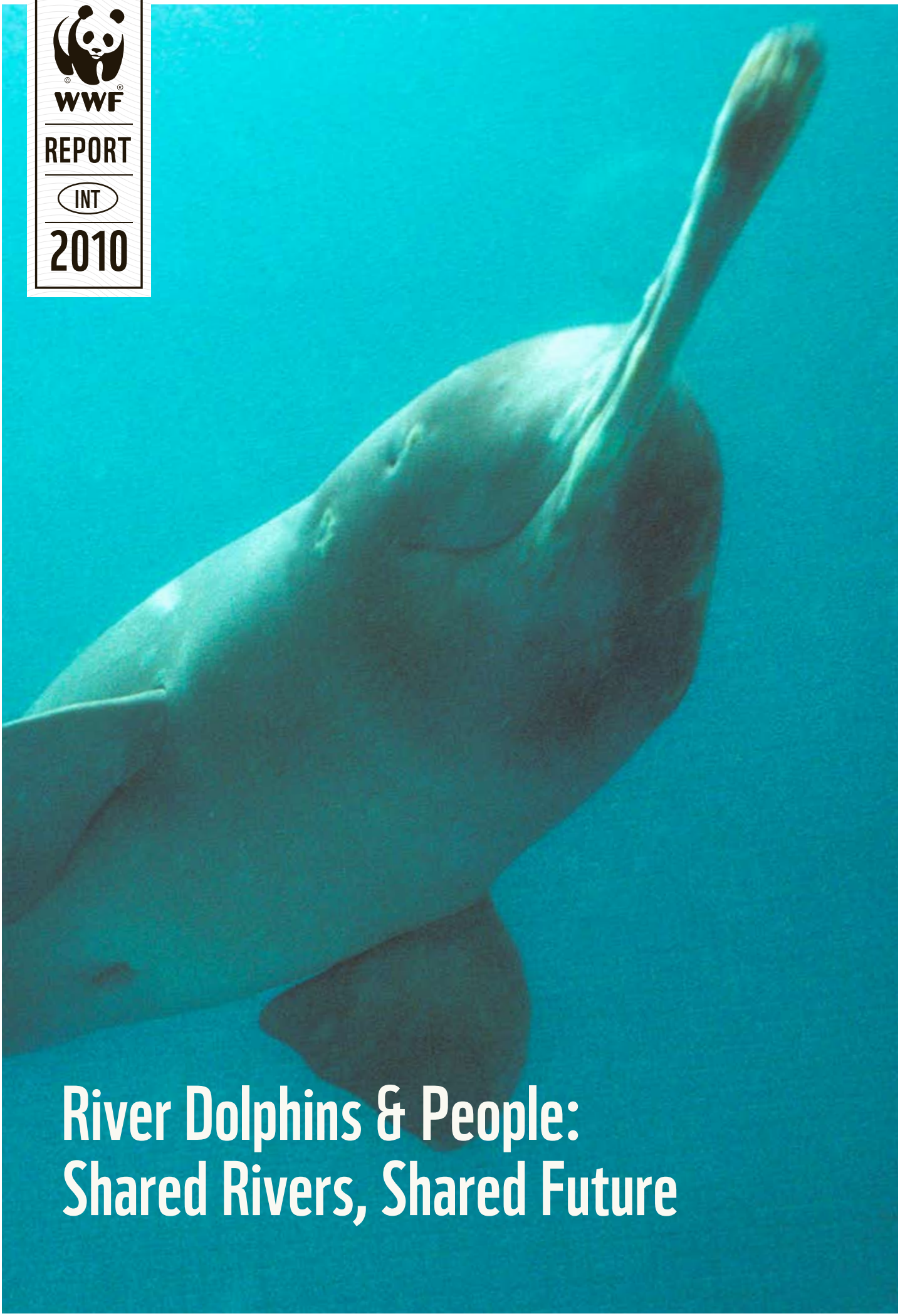

River Dolphins & People: Shared Rivers, Shared Future

The report is a joint effort of the WWF network and its partners. It was written and coordinated by Patricia Schelle (WWF-International). Special thanks to Uzma Khan (WWF-Pakistan), Sandeep Behera (WWF-India), Gordon Congdon (WWF-Greater Mekong Programme), Lei Gang (WWF-China) Lila Sainz (WWF-Bolivia) and Marcella Portocarrero (Fundación Omacha, Colombia) for their contributions. Wendy Elliot, Li Lifeng, Stuart Orr, Gretchen Lyons (WWF International), Anna Forslund (WWF Sweden), Esther Blom (WWF Netherlands), Dave Tickner (WWF-UK) and Petr Obrdlik (WWF-Germany) provided valuable insight and support.

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WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global Network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by: conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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This is a preview version of the report "River Dolphins & People: Shared Rivers, Shared Future," published September 2010. The final report will be available soon. Before citing this publication, please visit ***www.panda.org/freshwater*** to download the final version.

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FOREWORD FROM JIM LEAPE WWF INTERNATIONAL

WWF has a long and proud history in species conservation. Indeed, species are at the heart of much of our work for one simple reason: When we save a species, we save so much more.

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As this report shows, river dolphins embody this truth. This report highlights how uncoordinated efforts to manage our rivers and the impacts of economic development have alread led to the extinction of one river dolphin species. Their well-being is a telltale indicator of river health, and their current decline should be an alarm bell for everyone involved in shaping freshwater policy or managing corporate risk.

We have the knowledge and technology to safeguard the freshwater resources on which both we and dolphins depend. We can grow rice and cotton with less water. We can place dams to minimize impact on endangered species.
We can manage rivers, floodplains and wetlands in ways that help protect our communities from devastating floods.

These are the choices we can make. It's only a question of will. WWF presents the challenges faced by river dolphins as one example of the much broader issues that must be addressed in the world's great river basins. These creatures have captivated diverse cultures throughout history. It's our hope that their current plight will catalyze action to secure their future, as well as our own.

OVERVIEW

River dolphins are elusive creatures. Roaming some of the world's largest rivers and spending much of their time under water, they are difficult to spot - and with their numbers declining, encounters are becoming increasingly rare. One species, the Yangtze river dolphin or baiji, is most likely already extinct and others are in immediate danger of following. This report introduces the seven surviving river dolphin species and examines the reasons why they are disappearing - and how this is linked to our own future.

Travelling from east to west, we first encounter the endangered Yangtze finless porpoise, followed by critically endangered freshwater Irrawaddy dolphin populations in the Mekong, Mahakam, and Irrawaddy rivers. Further west, the Ganges and Indus river dolphins are both endangered, although the latter may be stabilizing and in some places even increasing. In South America, the Amazon river dolphin, or boto, and tucuxi appear to do well in some areas, but little is known about trends across their entire range. Information is also limited for the Bolivian river dolphin, inhabiting part of the upper Amazon basin and only recently recognized as a separate species.

What is clear across the board is that river dolphin populations are under threat – and that the reasons for this are linked to humanity's lifestyle and consumption choices. Pressures on river dolphin habitat arising from fisheries, agricultural practices, and water infrastructure are immense. River dolphin habitat is now fragmented; where deep pools remain, these are often noisy, overfished, and polluted. Such pressures are mostly local, but there are also wider links – cotton grown in Pakistan enters the global commodity market, for example, while catfish from Brazil is popular in the markets of Colombia.

Growing pressure on river basins and freshwater ecosystems not only affects river dolphins, but people too.

Growing pressure on river basins and freshwater ecosystems not only affects river dolphins, but people too. Indeed, people and dolphins have a lot in common: both need plenty of good quality water and share a liking of fish and prawns. Thus the threats to dolphins identified in this report also pose risks to people: unsustainable fishing practices both harm dolphins and erode the basis of fishermen's livelihoods; toxic chemicals used in agriculture and mining affect the health of people and dolphins alike; and loss of natural river flows and habitats decreases the productivity of the freshwater ecosystems that sustain both human societies and river dolphins.

Efforts to protect river dolphins face a number of recurring issues in water management: over-abstraction, infrastructure, pollution. These same issues threaten freshwater ecosystems and the services they provide all over the world – meaning that many of the measures needed to save river dolphins are the same as those needed to ensure water security for people. The good news is that we have the power to create lasting solutions for dolphins and their human neighbours, provided we act immediately and decisively. Saving river dolphins will have positive effects beyond the species, extending to surrounding freshwater ecosystems, international river basins, and ultimately ourselves. This report lists key recommendations for conserving river dolphins, and hence freshwater ecosystems and all the other species that depend on them - and urges all stakeholders to act on these.

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WWF CALLS ON

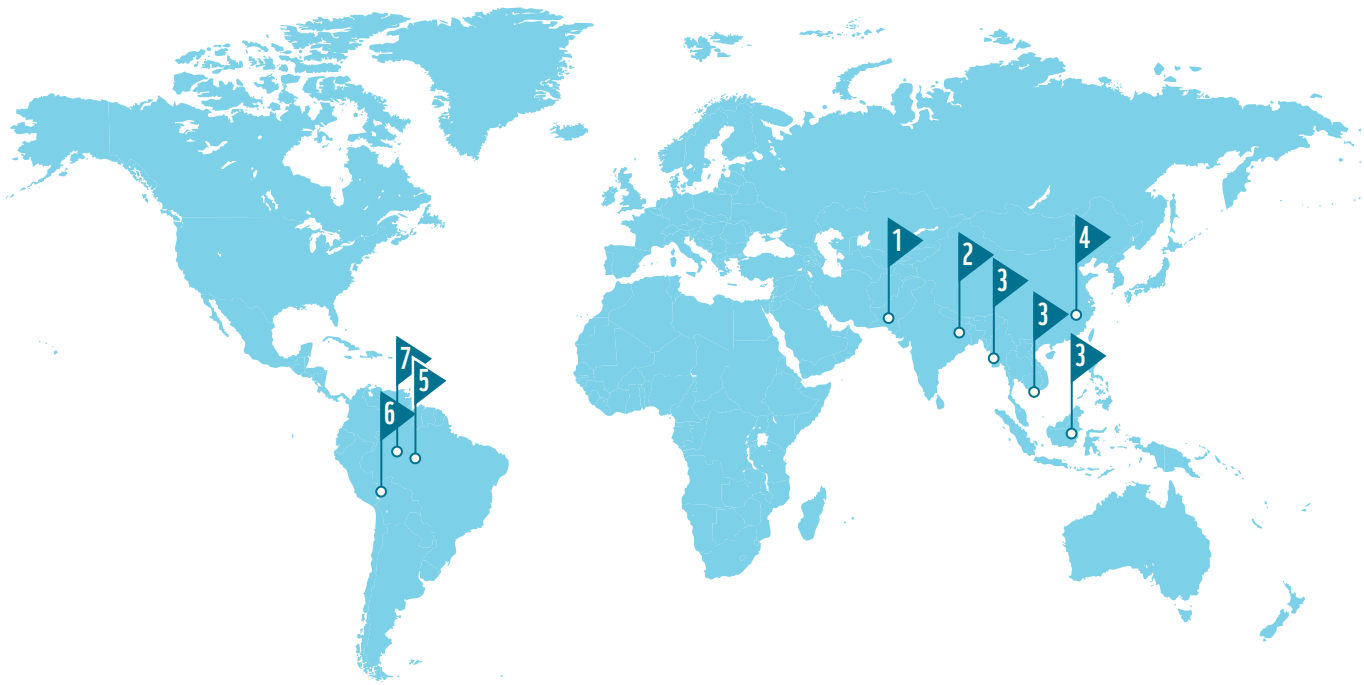
- Governments to take leadership on biodiversity conservation, ensuring sustainable river flows are provided for river dolphins and people and that action is taken to meet our needs and improve living conditions in ways that benefit both river dolphins and people;
- Local stakeholders to adopt better management practices on fishing and farming that will meet demands for food, but reduce the negative impacts on river dolphins;
- Businesses to become water stewards, improving efficiency and reducing pollution in their operations, encouraging their suppliers to do the same, and actively supporting efforts by governments, NGOs, and others to improve water management.

WWF is the world's leading conservation organization, and is committed to continuing our conservation efforts on river dolphins. These species are among our top priorities, and WWF will continue to work in the Ganges, Indus, Yangtze, Mekong and Amazon river basins to support local communities, government and business to implement solutions and adopt best practices.

GETTING TO KNOW RIVER DOLPHINS

Dolphins and people have a long and close relationship, evidenced by records going back as far as Minoan society (Crete, 1500 BC) and the continued appeal of dolphins to people's imagination to this day. Dolphins are credited with intelligence and helpfulness to people, stories and legends abound, and whale- and dolphin-watching tourism activities are increasingly popular - bringing economic and livelihood benefits for the local people living alongside them.

Less well-known than their marine cousins, river dolphins are found in some of the world's largest rivers – and are among the most threatened mammals on the planet. This report examines the relationship between people and river dolphins, examining how our lifestyles affect these elusive creatures and demonstrating how actions to protect river dolphins are of mutual benefit.



RIVER DOLPHINS

1. INDUS RIVER DOLPHIN 2. GANGES RIVER DOLPHIN 3. IRRAWADDY DOLPHIN 4. YANGTZE FINLESS PORPOISE 5. AMAZON RIVER DOLPHIN 6. BOLIVIAN RIVER DOLPHIN 7. TUCUXI

River dolphin myths

River dolphins are surrounded by rich local legends.

Amazon river dolphins, or boto, are said to be shape shifters, turning at night into a handsome man that seduces the local girls.

The Mohannas, fishermen of the Indus River, believed that a saint who lived on the river bank cursed a woman from a nearby village to become a blind Indus dolphin, doomed to cry “poosh poosh” in the water for the rest of her life.

The Yangtze river dolphin, or baiji, was said to be a reincarnation of a beautiful princess thrown into the Yangtze River after she refused to marry a man she did not love.

A legend from the Mahabharata, an ancient Indian epic, describes the descent of the mighty Ganges river ”from heaven to earth” as being followed by a great procession of fish, turtle, frogs, and dolphins.

RIVER DOLPHIN FACTS

River Dolphin Facts

River dolphins can be divided into two groups.

Obligate river dolphins are only found in freshwater, and comprise five species: the Indus dolphin *(Platanista gangetica minor)*, Ganges dolphin *(P. g. gangetica)*, Amazon river dolphin *(Inia geoffrensis)*, Bolivian river dolphin *(I. boliviensis)*, and the now functionally extinct Yangtze river dolphin *(Lipotes vexillifer)*. All share a common morphology, with a characteristic long and narrow rostrum, a low triangular dorsal fin, broad and visibly fingered flippers, and a flexible neck. The Indus and Ganges river dolphins are virtually blind and all species rely on echolocation. It has been suggested that ancestors of these river dolphins colonized the shallow seas that inundated the Amazon, Parana, Yangtze, and Indo-Gangetic river basins during the globally high sea levels of the Middle Miocene. When sea levels lowered, the dolphins stayed behind and adapted to freshwater conditions.[1]

Facultative river dolphins are from taxonomically distinct groups and have both marine and freshwater populations. The Irrawaddy dolphin *(Orcaella brevirostris)* and the tucuxi *(Sotalia fluviatilis)* are part of the Delphinidae family, which consists mostly of ocean-dwelling dolphins. Irrawaddy dolphins have a rounded head, no beak and a flexible neck with high mobility, while tucuxi resemble bottlenose dolphins. Exclusive freshwater populations of Irrawaddy dolphins are found in the Irrawaddy, Mekong, and Mahakam rivers, while freshwater tucuxis are found throughout the Amazon river basin. The Yangtze finless porpoise *(Neophocaena phocaenoides asiaeorientalis)* is a freshwater subspecies of the finless porpoise. It has no dorsal fin at all and is found in the central and lower reaches of the Yangtze River.

Heading to extinction

All river dolphin species are under threat and listed in the IUCN Red List of Threatened Species, the main mechanism for tracking the conservation status of plants and animals at the global level.

IUCN RED LIST CATEGORIES

Extinction & the IUCN Red List Categories

A species is extinct when there is no reasonable doubt that the last individual has died. A species is categorized as "extinct in the wild" if it is known only to survive in cultivation, in captivity, or as a naturalized population outside the past range. Sometimes the term "functionally extinct" is used, meaning that some individuals remain in the wild but these are either too old or too dispersed to revitalize the species.

The IUCN Red List classifications determine the relative risk of extinction based on a series of rigorous criteria[2]. Classifications can be made for a species' entire population, as well as for subspecies and geographical subpopulations, such as the Irrawaddy river dolphin.

The classifications include:

- **Critically endangered:** Extremely high risk of extinction in the wild
- **Endangered:** Very high risk of extinction in the wild
- **Vulnerable:** High risk of endangerment in the wild
- **Near threatened:** Likely to become threatened in the near future, unless threats are addressed

The Yangtze river dolphin, or baiji, is most likely already extinct[3, 4]. Of the remaining obligate river dolphins, the Ganges and Indus dolphins are both classified endangered, although there are reports that Indus dolphin populations are stabilizing and in some places even increasing. The Amazon river dolphin, or boto, was previously listed as vulnerable and is now classed as data deficient.[8] The species appears to do well in some areas, but little is known about trends across its entire range. The Bolivian river dolphin was only recently recognized as a separate species and data is limited.

The facultative river dolphins are not in any better shape, even though some marine populations are doing well. The Yangtze finless porpoise is classified as endangered while the three freshwater populations of the Irrawaddy dolphin are listed as critically endangered.[9, 10, 11] The tucuxi is classified as data deficient.

Further details about the dolphins' status and prospects can be found in the dolphin profiles in part II.

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Baiji

The Yangtze river dolphin, or baiji, was once well-known along much of the central and lower Yangtze River. It was found in Dongting and Poyang lakes as well as in the main stem as far upstream as Yichang, where the rapids of the Three Gorges formed a natural barrier. Today the baiji is considered functionally extinct.

Rapid development in the Yangtze river basin, which is home to more than 400 million people, has put immense pressure on the river's ecosystem - and its unique biodiversity. Rising pollution, fishing practices such as rolling hooks and electrofishing, intensive shipping traffic, and changed water flows due to dams and sluice gates led to baiji numbers quickly declining. By the time the first population estimates were made in the early 1980s, only around 400 individuals were left, and by the early 1990s the population was down to around 100. The last confirmed sightings date from around 2001[12]; an extensive survey in 2006 failed to spot any individuals.[13]

"Losing something as precious as a dolphin was quite a momentous event in the history of the world. There should have been a day of international mourning, some form of tribute to one of the most enigmatic and beguiling animals on earth. But the passing of the Yangtze river dolphin went virtually unnoticed. It slipped away, quietly, while the rest of the world was apparently oblivious or entirely unconcerned".

Mark Carwardine, Last Chance to See (2009)

A sign of river health

The river basins that are home to river dolphins - most notably the Yangtze, Mekong, and Amazon - have some of the world's highest biodiversity, both in terms of species number and endemism.[14, 15] This is hardly surprising considering that river dolphins thrive in conditions that encourage high biodiversity in general. All species prefer the deep pools and counter currents that form downstream of sandbars and mid-channel islands: river features that are only sustained under natural flow conditions. River dolphins rely on the production function of floodplains[16] to sustain their diet of fish and crustaceans and use the river's main stem as a migration corridor to access resources and refugia.

Given their need for natural river flows, good water quality, and abundant fish, the condition of the whole river basin influences the health of river dolphin populations. A thriving river dolphin population can be seen as a sign that the river is in good health. This is for example recognized by the Government of India which has declared the Ganges dolphin as the National Aquatic Animal and an indicator of survival of the Ganges River.

Today however, few – if any – river dolphin populations can be considered as thriving. Instead, most are hanging on to survival by the narrowest of margins.

WHY RIVER DOLPHINS ARE DISAPPEARING

If an abundance of river dolphins is a sign of a healthy river, the opposite is also true: the decline of river dolphin populations over the past few decades is an indication that their river's natural balance is critically disturbed. Dolphin habitats overlap areas of intensive human use, and it is clear that people's need for food and fibre, energy, transport, and other goods and services pose a direct threat to dolphins. The majority of these pressures arise from local demand, but some may, at least partially, be traced to other countries and even other continents.

THE NEED FOR FOOD, FIBRE AND OTHER GOODS

Fisheries

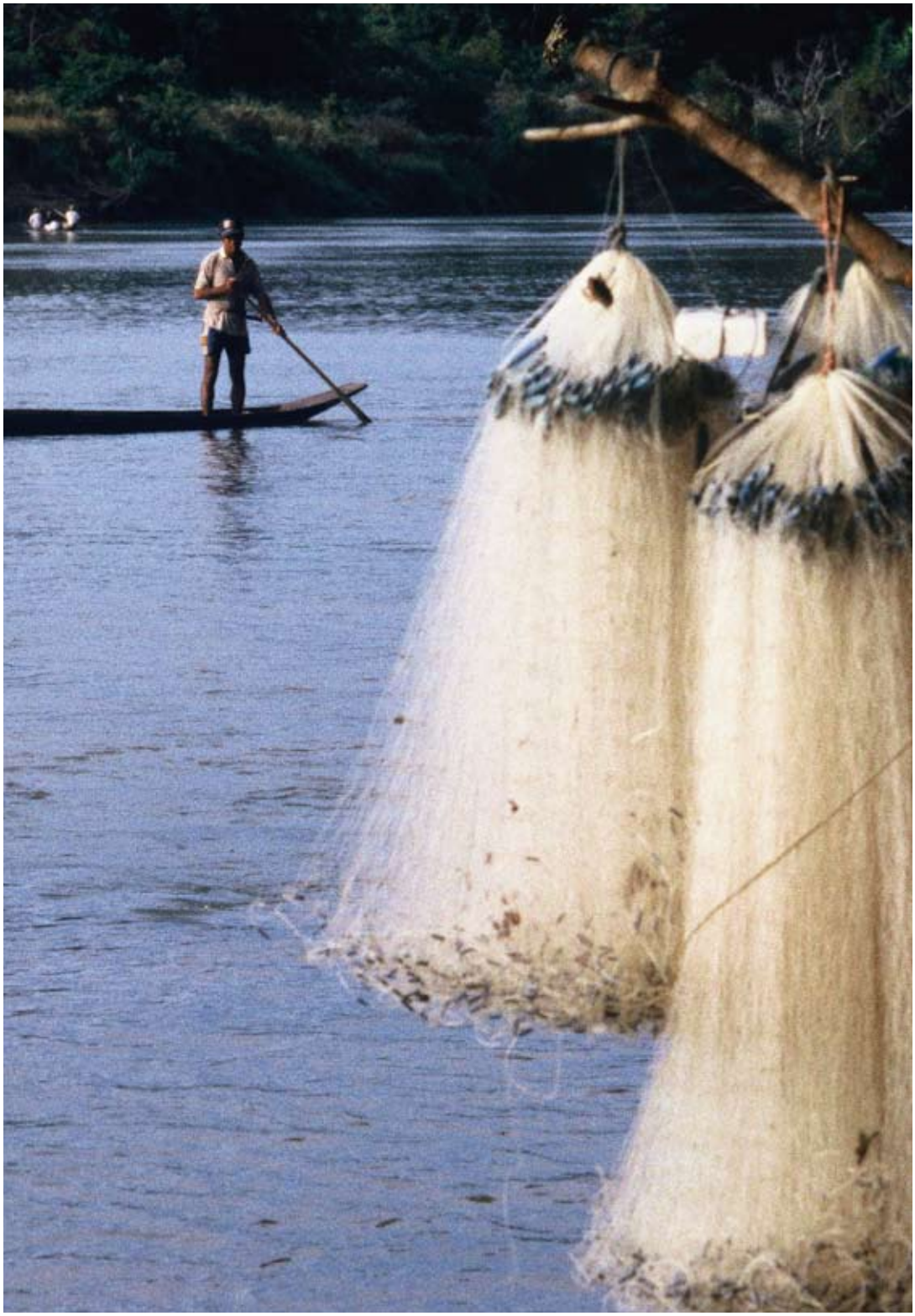
Fisheries sustain vast numbers of people living in the river dolphin basins. For example, more than 60 million people in the Lower Mekong Basin rely on the river system for their livelihoods and for 40–80 per cent of their animal protein[17]. However, it is not necessarily the amount of fish caught that affects river dolphins: although overfishing may contribute to food shortages for dolphins, often it is the fishing practices themselves that form the most immediate danger.

Gill nets, which are widely used around the world, work by allowing the head of fish of a certain size to pass through the mesh, but not the rest of the body. River dolphins can also get entangled in the nets and drown, with such bycatch deaths being reported for all species. One Ganges river dolphin found entangled in a gill net in the Sundarbans, Bangladesh, had both a small-mesh, mono-filament net wrapped around its rostrum, and a larger-mesh, braided-nylon thread gillnet entangled in its teeth that prevented it from feeding.[18]

Rolling hooks, a long line equipped with numerous sharp hooks, were widely used in the Yangtze and are known to have contributed to the demise of the baiji.[19] Their use is now forbidden, but this is not effectively enforced. "Electrofishing", in which fish are stunned indiscriminately, also contributed to the loss of the baiji. Although illegal, the practice continues to threaten the Yangtze finless porpoise. Researchers reported observing illegal fishing practices throughout a two-month river dolphin survey on the Yangtze in 2006.[20]

ONE RIVER DOLPHIN CARCASS CAN YIELD 300 KG OF CATFISH

Whereas bycatch is unintentional, Ganges and Amazon river dolphins are used directly by fishermen as bait for catfish. Although outright killing of Ganges river dolphins is banned, the practice of using dolphin oil as bait continues in India, where fishermen use dolphins accidentally caught in nets rather than release them.[21] The use of river dolphins as bait for the prized catfish 'piracatinga' or 'mota' is spreading in the Amazon and Orinoco rivers, with the practice recorded from below Manaus up to Tabatinga, at the border of Brazil, Colombia, and Peru.[22] According to local fishermen, one boto carcass can catch around 300 kg of catfish.[23]



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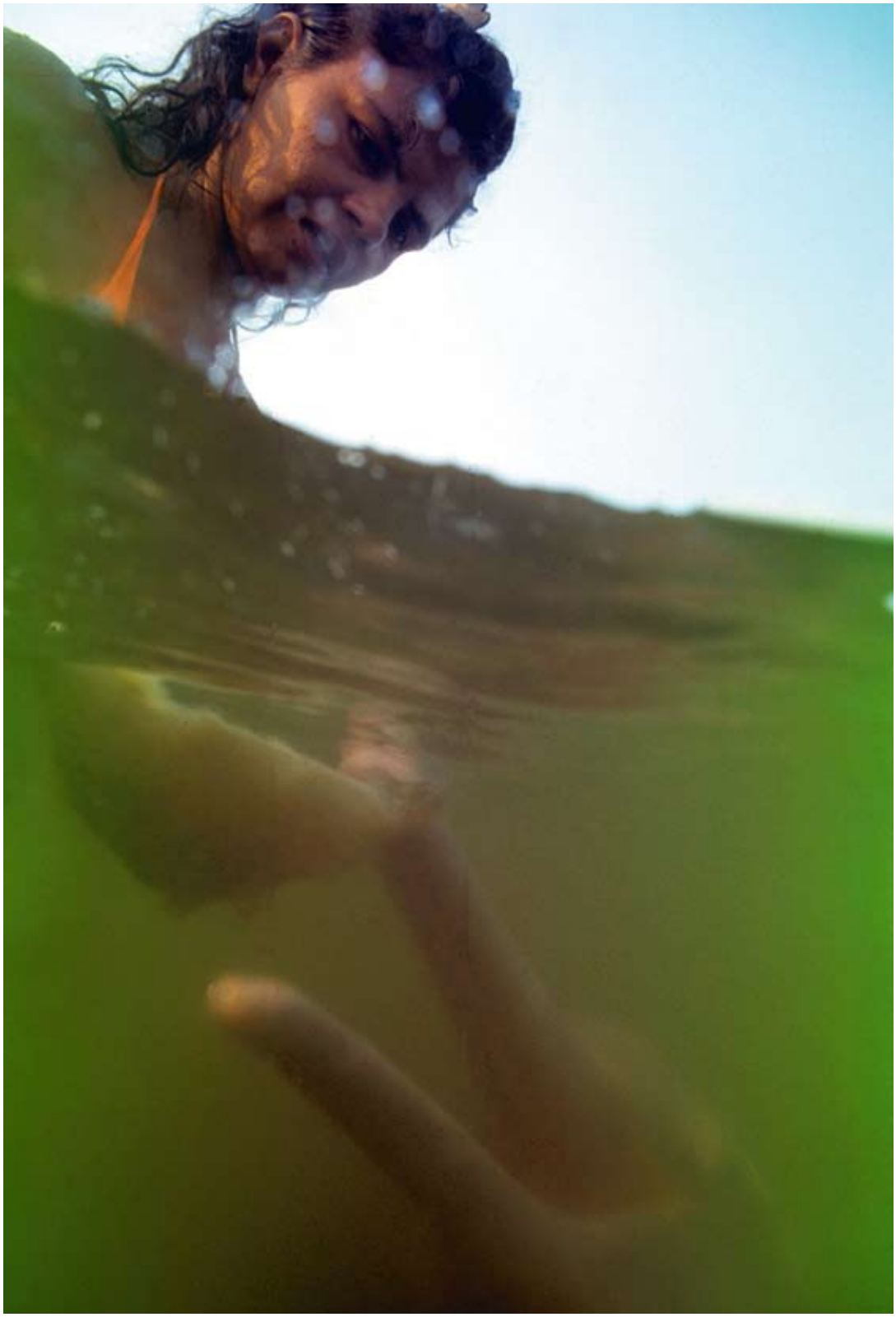

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Fisheries continued

Changes in fish populations, whether through overfishing or introduction of non-native species, are a concern in some rivers. For instance, the average annual fish catch in the Yangtze River declined from 300,000 tonnes in 1950 to less than 100,000 tonnes in 1990s.[24] Such changes may erode the dolphin's food base. A final threat comes from fishermen concerned about having their nets damaged or viewing dolphins as competition for a declining resource, who continue to kill dolphins with poison, guns, and harpoons.[25, 26]

Agriculture

The Indus, Ganges, Yangtze, and Mekong rivers all support intensive agriculture, with crops like rice, cotton, and sugarcane destined for both local and international markets. Agricultural practices affect river dolphins in multiple ways.

The Indus, Ganges, Yangtze, and Mekong rivers all support intensive agriculture, with crops like rice, cotton, and sugarcane destined for both local and international markets.

The agricultural sector is the largest water user, extracting vast volumes from rivers for irrigation – with direct effects on dolphin habitats. Reduced volumes of river flow make it difficult for dolphins to migrate between deep pools. Less water also means higher exposure to toxins, because there is less opportunity for these to be diluted.[27]

Infrastructure associated with agriculture is another direct threat. Dams and barrages form physical barriers that can prevent dolphins from traveling between feeding grounds and contribute to genetic isolation of populations in different parts of a river. Irrigation canals can be a particularly deadly trap, with gates that allow dolphins to pass through but prevent them from traveling back again to the main river.[28]

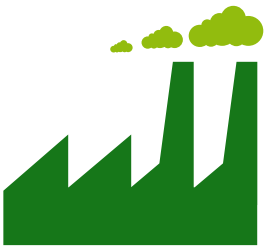
Although further research is needed to clarify links, dolphins may also affected by indirect watershed changes associated with agriculture. Deforestation driven by conversion of land for agriculture, as well as direct harvesting of timber for construction or fuel can lead to erosion and decreased water quality. The rapid expansion of palm oil plantations and associated erosion in Kalimantan, for example, could be an additional threat to river dolphins in the Mahakam River.

River dolphins are high in the food chain and so susceptible to bio-accumulation of toxic chemicals. Agriculture is a major contributor to water pollution, with pesticides and fertilizers eventually running off the land and ending up in rivers. Although largely banned in agriculture today, hexachlorocyclohexanes (HCH) and DDT have been found in dolphins from the Mekong and Ganges[29, 30]. Such toxins could potentially affect dolphin health; however in light of other, more direct threats, it is unlikely that they play a large role in declining in river dolphin numbers.

Mining and industry

Demand for fuel and minerals, and the processing of these into consumption products, also has consequences for river dolphins.

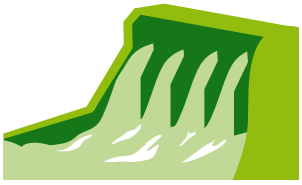
Mining is common in many river basins. Some of the most damaging impacts arise from small-scale gold mining, which is widespread in the Amazon and also occurs in the Mahakam and Mekong river basins. Such activities are often undertaken by poor people, who use rudimentary techniques like mercury amalgamation. Small-scale mining is generally badly managed, discharging considerable amounts of mercury into soil, rivers, and lakes[31, 32] with disastrous effects for both the mining communities and the wider environment. Analysis of dolphin tissues has shown mercury contamination in Amazon river dolphins, tucuxi, and Irrawaddy river dolphins[33, 34]; however as with pesticides, more research is needed on the health implications of this.



Mining of rivers for gravel and sand directly affects dolphin habitat and is also a potential threat. China's Poyang Lake is the site of probably the world's largest sand mining operation; while most activity is currently concentrated away from the lake's biodiversity hotspots, future encroachment into these areas could impact the Yangtze finless porpoise and its prey.[35]

The need for energy

Human demand for energy has spawned an age of dam-building, leaving many of the world's rivers fragmented by hydropower dams. These affect dolphins through their impacts on dolphin movement, prey, and habitats.[36] Even relatively low dams form physical obstructions to river dolphins, preventing them from accessing parts of their natural range. They contribute to genetic isolation as movement between subpopulations is restricted. The Ganges river dolphin in Nepal for example is confined to a few subpopulations as a result of dams constructed along the India-Nepal border.[37] Dams also disrupt migration patterns of fish, resulting in less available prey for river dolphins.



Hydropower is an important source of energy in many countries. In Brazil it meets a staggering 85% of the country's electricity needs.

Although hydropower dams do not take water out of the system, they still change the volume and timing of river flows and affect the relationship between the river and its floodplains. Instead of natural seasonal variation, river flows are regulated by the demand for energy. This can result in levelling of the high and low flows throughout the year, and cause sharp variations in flow throughout the day or seasons when there is a high demand for electricity. These changed patterns affect spawning activities of many fish species. Dams may also cause changes in water temperature, another key factor for fish spawning. The loss of flooding events affects the dolphins' food base and the loss of natural flows affects the dolphins' preferred habitats.

Dams and reservoirs also cause direct habitat destruction during the construction phase and after, turning fast-flowing stretches of a river into a lake-like environment. Dams also trap sediment, reducing the potential for formation of sand bars and islands further downstream.

Meeting people's energy demands through fossil fuels can also affect river dolphin habitat. Coal mining is an important economic activity on Kalimantan, with exports to India, China, and many other countries. Inevitably, large-scale mining will have an impact on freshwater ecosystems while bulk transport of mining products along rivers is an immediate risk for river dolphins (see below). Oil exploitation and production is important in many Amazon countries, sometimes even occurring within natural parks and reserves. The risks for river dolphins mostly derive from oil spills and pollution.[38]

The need for transport

Settlements have developed traditionally near rivers due to their abundant resources and access opportunities to the wider world. Many rivers are now busy transport corridors, ferrying both people and goods. Inland water transport (IWT) is an important economic sector in China, India, and the Mekong countries, and the availability of bulk transport has enabled industrial expansion along rivers. In the Amazon and Orinoco rivers, boats are often the only way to access remote areas.

Dolphins have been reported to change their behaviour in the presence of shipping vessels. Irrawaddy dolphins in the Mahakam river surface less often in the presence of boats, reacting within a maximum distance of 250 m before and 300 m after a speedboat passed[39].

While this would be effective in avoiding the occasional passing vessel, a high density of shipping creates high levels of acoustic pollution which interferes with the dolphins' echolocation abilities. As a result, many dolphins living in today's busy rivers are wounded or die because of ship strikes.

Intensive shipping also contributes to habitat degradation. Although IWT is sometimes billed as an environmentally friendly form of transport[40], in practice the impacts are enormous. Waterways are dredged and deepened to allow the passage of ever-larger vessels, leading to altered flows and deteriorated habitat. High-density shipping also carries considerable risks of pollution, through waste and sewage discharge as well as potential oil spills.

".. perhaps we ought to try to hear what the Yangtze actually sounded like under the surface..

The sound we heard wasn't exactly what I had expected... , and what we were hearing was everything that was happening in the Yangtze for many, many miles around, jumbled cacophonously together. Instead of hearing the roar of each individual's ship propeller, what we heard was a sustained shrieking blast of pure white noise, in which nothing could be distinguished."

Douglas Adams, Last Chance to See (1990)

The need for flood protection

Floods are natural events that create fertile, arable floodplains and coastal plains. They also transfer nutrients and sediments vital for fishery resources to downstream and coastal marine areas. However, growing human populations on floodplains and their need for flood protection have led to water management approaches that rely heavily on canalization, embankments, and flood-control dams and reservoirs. While this infrastructure brings economic benefits to society, it also significantly changes the quality, quantity, and timing of river flows and impacts habitats for river dolphins and their prey. Hundreds of floodplain lakes in the Central Yangtze, for example, have lost their natural connectivity with the main stem due to the construction of the flood prevention embankments and sluice gates. This significantly impacts a large amount of the river's freshwater fish species, e.g. the four major Chinese carps, which migrate between the river and lakes during their life cycles.[41]

The multiplying effect

None of the above-mentioned threats works in isolation: most river dolphin species are affected by multiple pressures that exacerbate one another. The extinction of the baiji, for example, cannot be attributed to a single cause: dams, pollution, and harmful fishing practices all played a role. In order to protect the remaining river dolphins, it is important to understand how individual threats affect river dolphin populations as well as how these threats interact with each other.

This interaction between threats raises a final overarching concern: climate change. Although local and regional impacts may vary considerably, overall average temperatures will rise and the severity and frequency of extreme weather events, such as intense precipitation, droughts, heat waves, and even cold snaps, will increase. Such changes can have direct effects on river dolphins by altering their habitat and food base. In 2008 the Yangtze experienced such low temperatures that parts of the river and its lakes froze over, killing Yangtze finless porpoises. August 2010 the Indus River experienced massive flooding, raising concern that this may lead to more dolphin strandings as the floodwaters subside.

CLIMATE CHANGE

Climate change is happening and will likely increase the pressure on river dolphin habitats

Climate change is very likely to exacerbate existing pressures and threats facing river dolphins. Furthermore, human efforts to mitigate and adapt to climate change may present additional challenges for conservation. For example, less precipitation combined with high demand for water for agriculture may result in increased water abstraction from rivers, which would further alter river flows, as well as the construction of more storage dams or irrigation canals, which would further fragment river systems. Increased demand for low-carbon electricity may result in construction of more hydropower dams, while inland water transport may be intensified to increase fuel efficiency for bulk transport. And increases in extreme weather events may lead to further construction of hard infrastructure for flood prevention.

GROWING PRESSURE AFFECTS US ALL

Growing pressure on river basins and freshwater ecosystems not only affects river dolphins, but people too. Unsustainable fishing practices harm dolphins and erode the basis of fishermen's livelihoods; toxic chemicals used in agriculture and mining affect the health of people and dolphins alike; and loss of natural river flows and habitats decreases the productivity of the freshwater ecosystems that sustain both human societies and river dolphins

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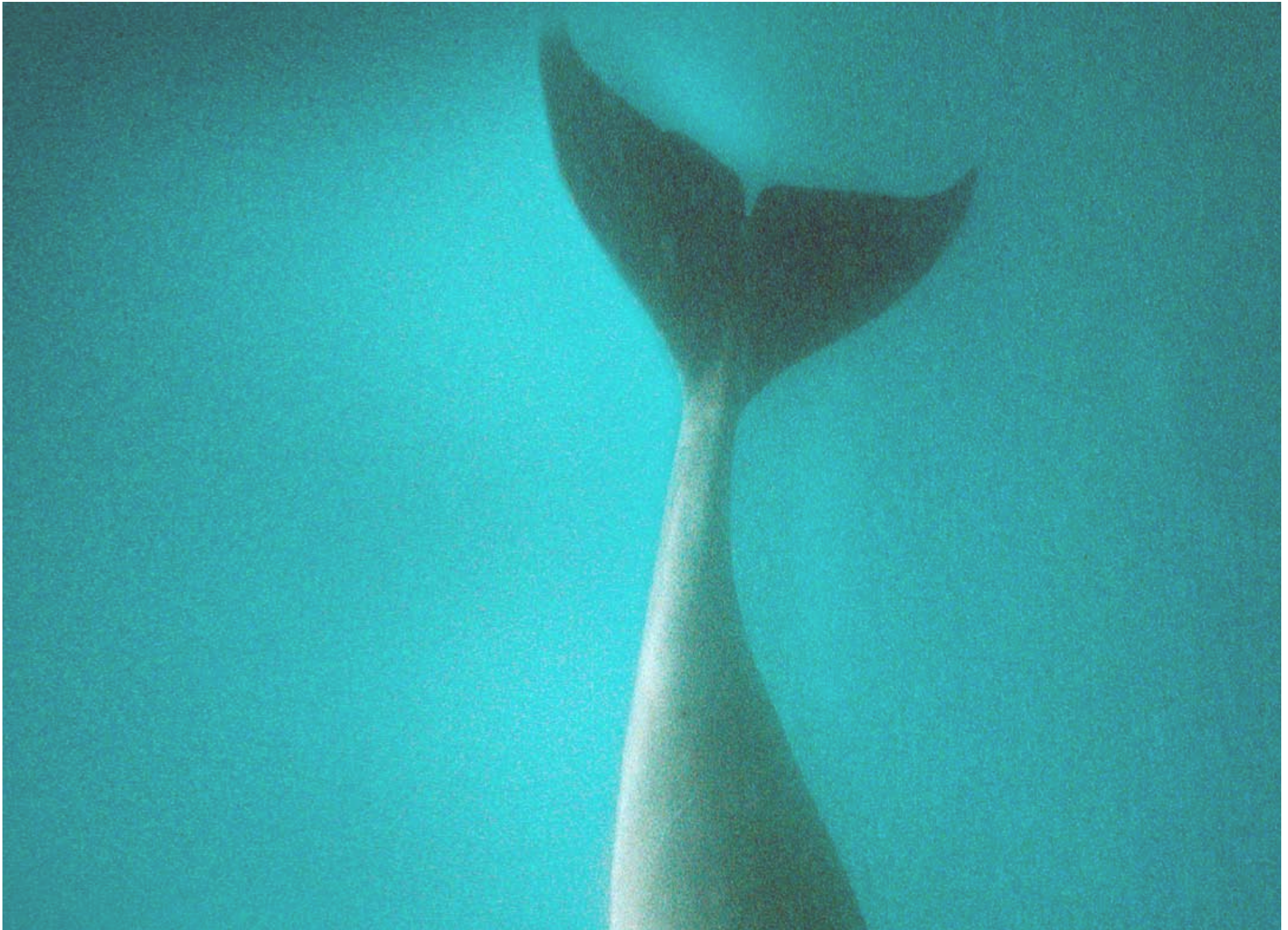


SHARED RISKS & SHARED FUTURE

As discussed, human demands for food, fibre, and other goods and services, energy, and flood control pose various threats to the survival of river dolphins. However, people and dolphins also share a great number of needs: both need good quality water for immediate survival; both need flowing rivers to carry sediments and nutrients downstream; and both share a food base of fish and crustaceans.

Shared needs also mean shared risks: threats to river dolphins also pose threats to people. Unsustainable fishing practices harm dolphins, and also erode the basis of fishermen's livelihoods; pesticides, herbicides and fertilizers used in agriculture affect the health of people and dolphins alike; loss of natural river flows and habitats decreases the productivity of the freshwater ecosystems that sustain both human societies and river dolphins; and mercury used in gold mining is equally toxic to miners and the communities living along polluted waterways as it is to dolphins.

If the extinction of river dolphins could be attributed to one single cause, their protection would be much easier. No government would want to be blamed for, and no business would want to be linked to, such an occurrence because of reputational and associated financial risks. Sadly, the multiple threats and pressures to river dolphins were too often poorly understood by those wishing to conserve them, be they governments, local stakeholders, or conservation organizations. With a fear of conservation failure and a lack of appreciation of the shared risks to dolphins and people, inaction in the past presents great urgency for immediate actions and bold leadership from now on, to save both river dolphins and ourselves.

Protecting the species, protecting the river

Rivers are dynamic ecosystems, and their habitats can be influenced by events happening hundreds of miles away in the same river - as well as events on land and even in the atmosphere. Establishing effective reserves for river dolphins is difficult, and may not be fully effective given that individual dolphins can swim right out of them.

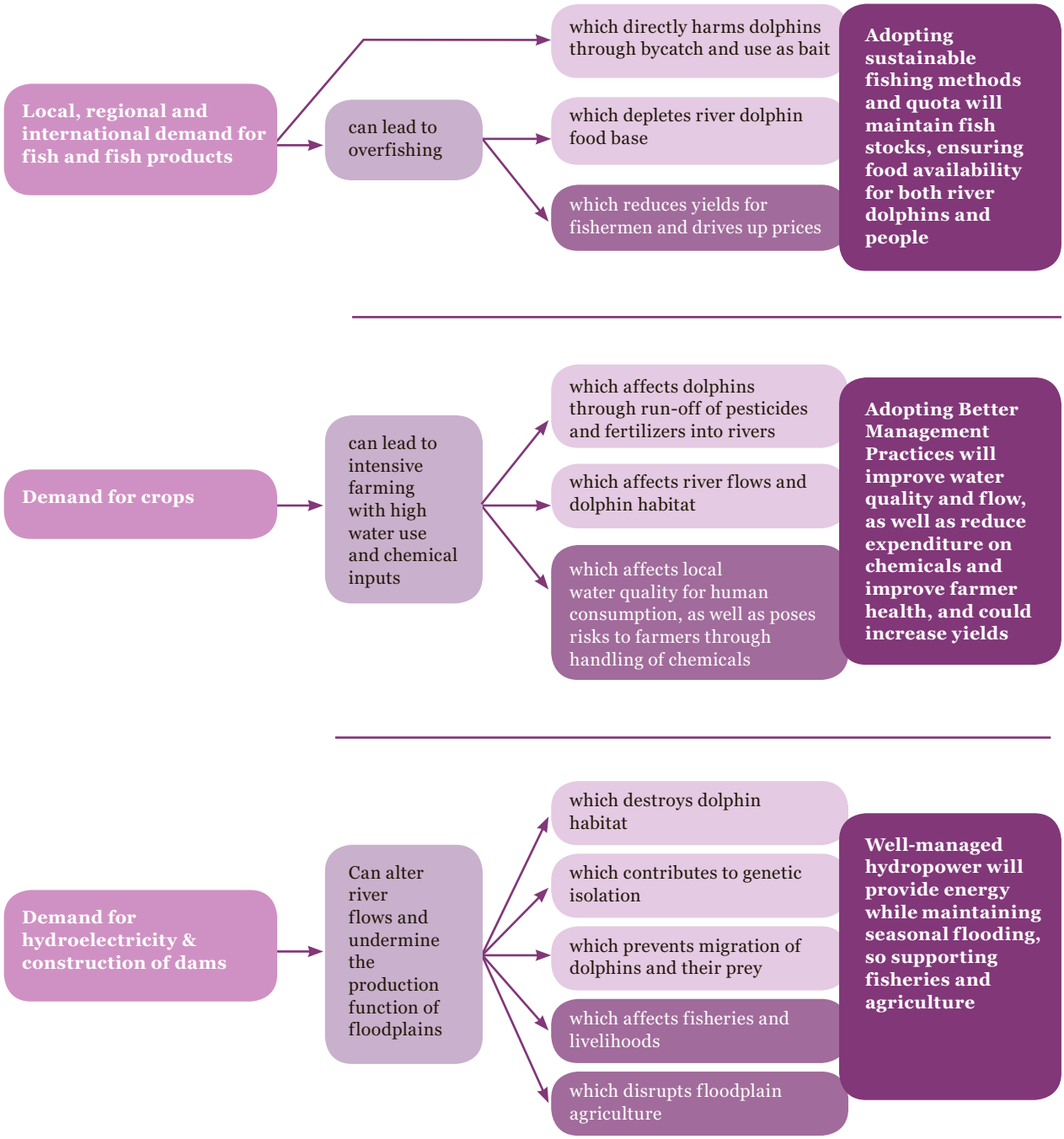
SAVING RIVER DOLPHINS

Saving river dolphins will have positive effects beyond the species, extending to surrounding freshwater ecosystems, international river basins, and ultimately ourselves.

With the challenges of protecting river dolphin habitat, the question arises whether there is a role for *ex situ* conservation. It has been argued that more decisive action and allocation of resources to *ex situ* conservation of the baiji would have given it a better chance of survival.[42] However, at this stage it is not clear if and what role there could be for *ex situ* conservation of the remaining species. Eventually however, any *ex situ* conservation effort is only worthwhile if there is a possibility for maintaining a wild *in situ* population. Protecting river dolphins can thus only be achieved by protecting and restoring the wider river, with *ex situ* options implemented on a case-by-case basis if necessary.

A central reason for pursuing *in situ* conservation is that the benefits of protecting river dolphins extend to many more species - including our own. Indeed, protecting river dolphin habitat can be a cost-effective way of achieving our own goals for human development. For this reason, this report advocates addressing dolphin conservation in the context of river basin management.

The following examples illustrate the shared threats and risks for dolphins and people. As we will see later on, the choice of solutions and measures to address these threats and risks is dependent on the local situation, but the common outcome is a shared benefit for dolphins and people.



A shared future

The world's national economies are based on goods and services derived from ecosystems, and human life itself depends on the continuing capacity of ecosystems to provide their multitude of benefits[43]. However, according to the Millennium Ecosystem Assessment[44], "the use of two ecosystem services - capture fisheries and freshwater - is now well beyond levels that can be sustained even at current demands...."

There is growing awareness of the impacts and implications of these fraying webs of life, and there are emerging efforts to restore them. The Yangtze, Mekong, Ganges, and Indus river basins are densely populated; the need of river dolphins for healthy river ecosystems is shared by the millions of people living here. Solutions that will ensure the survival of river dolphins will also help solve food- and water-security issues. A viable freshwater river dolphin population symbolizes healthy freshwater for people and biodiversity.

People and river dolphins have shared needs, shared risks, shared rivers, and one shared future.

TURNING THE TIDE – SAVING DOLPHINS AND THEIR HOMES

With such a complex web of pressures, there is no single "one size fits all" solution to protect the remaining river dolphins. Effective conservation will require the efforts of all stakeholders, at many different levels, to change the way people live and work. Local actions are paramount, but can only work if supported by effective legislation, regulation, and enforcement. There is a genuine need to improve the lives of the millions of poor people who share space and resources with river dolphins, meaning we need to identify and implement solutions that are pro-dolphin and pro-poor.

This section lists key actions that can be taken by stakeholders for improving fishing practises.

REDUCING THE IMPACT OF OUR NEED FOR FOOD AND OTHER GOODS

Improving fishing practices

WWF's Smart Gear Competition aims to encourage the design of novel, alternative and less damaging fishing gear.

• Where this is lacking, enacting legislation that prohibits damaging fishing practices such as rolling hooks and gill nets, and implementing and enforcing existing policies.[45, 46]

• Identifying and implementing alternative, less damaging fishing practices. Existing options such as circle hooks and 'pingers' (acoustic devices that help river dolphin avoid gill nets) are effective in some fisheries. Pingers reduce damage to fishing gear caused by cetacean entanglements and help reduce the loss of fish caught in nets due to predatory behaviour. There is also a need to design novel, affordable fishing gear and to modify existing fishing gear to specifically reduce freshwater dolphin bycatch. WWF's Smart Gear Competition[47] aims to do just that.

• Establishing permanent no-fishing areas in areas identified as crucial to dolphin conservation. These could be combined with established protected wetland reserves and fishery conservation reserves. In the Yangtze, national bird reserves could be combined with finless porpoise natural reserves and fishery conservation reserves in the Dongting and Poyang lake areas to improve management effectiveness. In the Mekong River, the nine deep pools which are important habitats for the Irrawaddy dolphin could be designated as dolphin protected area where no fishing is allowed. All protected areas will need to be properly monitored and regulations enforced by the relevant authorities.

• Developing alternative livelihoods options for local fishing communities living alongside river dolphins. In addition to the use of less damaging fishing gear, such options include small-scale fish farming and ecotourism activities. Farida, a village on the Ganges, is a good example of what can be achieved. Fishing on the river is forbidden because of the presence of Ganges river dolphins. However, illegal fishing activities were only eradicated after implementation of local conservation initiatives that helped residents to adopt alternative livelihoods and access the resources needed.[48]

• Raising awareness and promoting education. Fishermen are not the only ones who must be educated about threats to dolphins - consumers too must learn what's

at stake. In the Amazon for example, consumer and market pressure could possibly help ensure that fishermen use alternative baits to freshwater dolphin meat in the carrion feeding catfish fishery. However, this presents a great challenge: there are long distribution lines between the Brazilian Amazon where the catfish is caught and the major markets in the cities of Colombia and Brazil, where consumers simply don't know that dolphin carcasses are used to catch the fish they are buying.[49]

Agriculture

30-40%
LESS WATER USED ON RICE CROPS

- Promoting Better Management Practices (BMP) that maintain or increase economic returns for farmers while minimizing the impact on the environment. Such practices can be applied at all levels of agricultural activity and combined to meet the specific needs of a given farm, such as soil health, pest and disease, or drought management. For example, the System of Rice Intensification, a different rice planting method based on single seedlings and wide spacing, increases yields by over 30 per cent while using 40 per cent less water than conventional methods.[50] Similar methods can be applied to other water-intensive crops like cotton and sugar cane.[51] The adoption of BMP by local farmers should be supported by effective legislation on pollution and water quality to ensure that some of the water saved through increased farm-water efficiency goes to maintain and restore aquifer and river levels.

- Promoting industry standards and certification initiatives combined with premiums for good practice. Many high-volume cash crops, like rice and cotton, enter international commodity markets, through which large retailers, manufacturers, traders, and investors can exert influence over the way crops are produced. The Better Cotton Initiative[52], for example, aims to reduce the negative impact of mainstream cotton and engages actors along the cotton supply chain to reduce environmental and social impacts.

- Developing dolphin exclusion devices to prevent entrapment of Indus and Ganges dolphins in irrigation canals. Prevention is the best solution, but as long as this is not effective rescue efforts will need to be made. Rescues already take place- for example WWF-Pakistan reported the rescue of three animals in December 2009[53] – but can be made more efficient by establishing a dedicated network that is equipped and prepared to release entrapped dolphins.

- Raising awareness amongst consumers. Demand from consumers can also influence such initiatives. Many "thirsty" crops such as rice and cotton are grown in water-scarce areas, then exported to and consumed in parts of the world with abundant water. With a lot of so-called virtual water traded over the globe, consumption patterns in one part of the world will in the long run impact on freshwater ecosystems in other parts of the world. For example, of the 31 bath tubs of water that the average Swede uses daily, 51 per cent is dependent on water outside Sweden's borders.[54]

Mining and industry

- Reducing mercury pollution associated with gold mining. This is a particular challenge because such activities are diffuse and barely controlled. Alternatives to mercury exist, but are often out of reach of the poorest miners. Given that the use of mercury will likely persist, efforts should focus on managing and reducing its use, through measures such as licensing mine operators to buy and use mercury and setting minimum distances between mining sites and water bodies.[55] All measures should go together with awareness-raising and education of small-scale miners. It is often not clear where gold mining takes place, so it is important that the relevant authorities work with stakeholders to identify existing and planned gold mining projects and assess their impacts on freshwater dolphins.

- Regulation and enforcement of pollution control measures for industry.

Managing the impacts of hydropower dams

Hydropower can be an attractive option to solve energy needs; but the impacts of hydropower plants on the environment can vary considerably, and care needs to be taken with respect to planning, design, and operation. Good practice includes:

- Minimizing biodiversity and invasive species risks through alternative siting and design.
- Establishing environmental flow regimes.
- Managing affected species through measures such as creation of reserves, habitat conservation, species management plans, translocations, habitat rehabilitation, and new habitat creation.
- Allowing the passage of aquatic species to sustain the dolphin food base. Options include fish ladders, fish elevators, catch and release programs, fish hatcheries, re-stocking programs, mechanisms for diversion away from turbines for downstream passage, assisted cues (water chemistry, operational conditions), and choice of turbine design.

Some of these approaches are internalized in the Sustainability Assessment Protocol[56] and Sustainability Guidelines[57], developed by the International Hydropower Association, an industry body. However, industry self-regulation is unlikely to be sufficient; robust government policies also need to be in place to ensure that existing dams are operated in a way that minimizes impacts on the natural flow regime, as well as to ensure that planning and construction of new dams is done in a way that considers the wider river basin and is based on a good understanding of the full costs and benefits. For river dolphins in particular, this should include establishing no-go zones for dam development in dolphin habitat.

Managing river navigation

River transport is often the most cost-effective way to transport large volumes of goods over long distances, and in most places a reduction in volume of river traffic is unlikely. Measures that can be implemented to reduce the potential for dolphin–ship collisions include:

- Establishing speed rules in selected dolphin areas and reserves and enforcing these. Speeds as low as 10km/h have been suggested[58].
- Managing shipping lanes to reduce impacts on river dolphins, particularly avoiding activities such as blasting and widening of channels.
- Exploring the use of technologies that can assist river dolphins in avoiding ship strikes.

Living with floods

Floods are natural phenomena that play an important ecological role. Yet in recent years, floods are increasingly becoming disasters - partly because so many more people live in floodplains, but also because of human mismanagement and misuse of land and rivers, and an over-reliance on water engineering that is supposed to provide protection. As climate change fuels more extreme weather events, the potential consequences of mismanagement grow.[59] A new paradigm is needed that shifts away from engineered flood defenses to ecologically sustainable flood management that makes use of the natural capacity of floodplains and wetlands to store water. Key actions include:

- Maintaining floodplains and connectivity, allowing them to act as natural sponges that can store large volumes of water and safely release this into rivers and aquifers.
- Avoiding further river channelization and restore natural courses. Where river courses have been straightened and constricted into artificially narrow channels, water flows faster over a much smaller area. When water levels rise, the water has nowhere to go and is more likely to burst river banks.

• Managing river basins from source to sea. Land-use practices throughout the river basin influence the threat of flooding downstream. Overgrazing, deforestation, wetland drainage, and an increase in areas with impermeable surfacing, such as tarmac and concrete, can increase flood risk.

Maintaining river flows

At the root of many water management problems lies the idea that freshwater exists solely for use by people. Thankfully the old adage that "water allowed to drain into the sea has been wasted" is losing popularity; however there are still many misconceptions about the role of river flows, and water allocation issues are still rife in large basins. Transboundary river basins pose a particular challenge in this respect. Actions related to river flow include:

• Recognizing that river flow is a "master variable" that influences other key environmental factors such water chemistry, physical habitat, biological composition, and interactions.[60] River flows, with right temperature and right levels of sediment and nutrients, are the main drivers of biodiversity in rivers and their estuaries. These flows shape the different in-stream habitats, floodplains, and estuaries, where abundant species including fishes and river dolphins thrive. River flow is also the main determinant of the goods and services that rivers provide to people.

• Prioritizing allocation of water rights in water policy and legislation, in order to maintain an environmental reserve flow and so ensure continued provision of ecosystem services. This is already happening in places such as South Africa, Tanzania, and the EU. Implementation of such policy and legislation will, by definition, help to conserve river dolphin habitat.

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WORKING TOGHETHER SAVING THE DOLPHINS

TAKING RESPONSIBILITY & MOBILIZING RESOURCES

The loss of the Yangtze river dolphin has raised questions about who carries the responsibility for protecting endangered species, and who ultimately bears responsibility for their loss. As over 600 mammal species are currently listed as endangered or critically endangered[61] - what are the factors that determine whether such species are successfully brought back from the brink of extinction?

Resources are finite and governments, scientists, and conservation organizations need to make difficult decisions on conservation priorities. WWF is focusing efforts on a select group of priority species that are especially important, either for their ecosystem or for people, as well as on a number of priority places that are home to irreplaceable and threatened biodiversity or that represent an opportunity to conserve the largest and most intact representative of their ecosystem. River dolphins are included amongst the priority species, and the Amazon, Mekong and Yangtze are all priority places.

Working together

Clothes sold in Europe are made from cotton grown in the Indus and coal from Kalimantan is burned in Chinese and Indian power stations. Thus, taking action to save river dolphins is not only the responsibility of the people who live with the dolphins - it's a mandate for all of us who consume food and other resources produced in or near their habitats.

Saving river dolphins will require a concerted effort by multiple stakeholders at all levels: fishermen, farmers, miners, and water transporters working in and along rivers; the hydropower industry and businesses who derive their livelihoods or profits directly from the rivers; governments; scientists, and conservationists; and consumers worldwide.

Business concerns over water scarcity and pollution risks, including impacts on operations, supply chains, and communities, are rising rapidly. Companies are well aware of the strategic risk and reputational damage that can arise from poorly managed water resources. If they are to manage these risks, companies need to become good water stewards, addressing efficiency and pollution in their operations, encouraging their suppliers to do the same, and actively supporting efforts by governments, NGOs, and others to improve water management at the river basin scale.

Actions by different stakeholders need to be supported by government and guided by demand for sustainable goods and services. Conservation organizations and scientists in particular can play an important role in bringing stakeholders together, providing the knowledge needed and galvanizing diverse players into action. The table on page 28 provides an overview of action that can and needs to be taken by each and every one of us whose livelihoods and lifestyles impact on river dolphins and their habitat.

A final word

River dolphin populations are being lost at an alarming rate. Across the world, the threats are almost exclusively man-made and current trends show few signs of improvement. Several dolphin species and subpopulations are now endangered or critically endangered and urgent action is needed.

The good news is that we have the power to create lasting solutions for dolphins and their human neighbours. Saving river dolphins will have positive effects beyond the species, extending to local freshwater ecosystems, international river basins, and ultimately ourselves. WWF urges key stakeholders to take the immediate actions outlined in this report - and so conserve freshwater ecosystems and all the species that depend on them.

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STAKEHOLDER SOLUTIONS

The solutions outlined in this report depend on stakeholders working together. This table summarises the key actions that need to be taken, showing the lead stakeholder in the column on the left, and supporting stakeholders at the top

	FISHERMEN	FARMERS	BUSINESS & INDUSTRY	HYDROPOWER INDUSTRY
FISHERMEN	Phase out unsustainable fishing practices; support measures to increase fish stocks; adopt alternative livelihoods where appropriate		Demand business support for sustainable practices	Advocate for hydropower impacts on riverine biodiversity such as fish stocks to be minimized
FARMERS		Implement Better Management Practices (BMPs) to reduce use of water, fertiliser and pesticides	Implement sustainable farming initiatives and demand business support for sustainable farming	
BUSINESS & INDUSTRY	Support certification and labelling of sustainable fisheries	Ensure supply chains of products are well understood and managed to reduce environmental impacts	Adopt proactive attitude to improving business standards and certification for sustainable products	
HYDROPOWER INDUSTRY				Avoid new plants with significant impacts on river dolphins; adapt operations to ensure environmental flows
SHIPPING			Work with business and industry to optimize bulk transport (avoid empty ships/ unnecessary noise)	
CONSUMERS	Demand dolphin friendly fish products	Demand sustainable agricultural products (e.g., cotton, sugar, rice)	Demand labelling/ certification schemes	Save energy; demand sustainable hydropower
CONSERVATION	Promote BMPs that benefit fishermen and minimize impacts	Promote BMPs that benefit farmers and minimize impacts	Work with B&I to improve sustainability of supply chain; raise awareness of river dolphin conservation with relevant B&I stakeholders	Promote sustainable hydropower that minimizes impacts on river dolphin habitat
SCIENTISTS		Develop BMPs for farming		Sensitize hydropower industry on its impacts on river dolphins and their prey
GOVERNMENT	Legislate against unsustainable fisheries; enforce legislation; encourage dolphin friendly fishing practices through policies and incentives; support uptake of alternative livelihoods	Improve legislation on water quality and pollution; allow for minimum environmental flows in water allocation; remove incentives for unsustainable farming practices	Support and enforce good policy; monitor and supervise systems on pollution control	Use government instruments for sustainable hydropower, e.g., energy saving plan, exploring all the other alternatives, good practices on dam sitting, design and operation

	SHIPPING	CONSUMERS	CONSERVATION	SCIENTISTS	GOVERNMENT
			Support conservation initiatives; take part in rescue efforts	Participate in scientific processes by training alternative fishing methods and bycatch mitigation devices	
			Support conservation initiatives and BMPs (e.g., Better Cotton, Better Sugarcane, Better Rice)		
	Explore alternative transport options to reduce impact of shipping bulk goods through dolphin habitat	Promote consumer awareness of sustainable production and consumption	Provide input on conservation initiatives such as Better Cotton, Better Sugarcane, Better Rice		Provide input and support on relevant public policy; form partnerships with government for sustainability
			Reduce impacts on freshwater ecosystems and river dolphin habitat; make use of local conservation knowledge	Invest in research on impact assessment, mitigation measures, adaptive management and improved technology	Support public policy on sustainable hydropower planning, design and operation
	Obey speed rules; reduce waste discharges into river; ensure ships are well maintained and run efficiently				Support public polices on sustainable shipping
		Adjust lifestyles where possible to reduce demand for unsustainable goods and services	Be aware of impacts of products consumed, support conservation initiatives		
	Promote sustainable shipping that minimizes impacts	Promote sustainable consumption	Work in partnership and support complementary conservation initiatives; cooperate to build broad support for conservation initiatives	Demand scientific support on conservation	Encourage government to take action on river dolphin conservation; help facilitate and deliver action where needed
				Plan and conduct research to improve river dolphin conservation, in particular on population dynamics and dolphin abundance, as well as people-dolphin interactions	
	Plan and regulate shipping and navigation to minimize impacts; avoid further deepening/dredging of shipping channels		Develop conservation plan for dolphins and rivers, and ensure related conditions (investment, policies, etc.) are in place	Fund regular river dolphin status surveys	Take leadership for dolphin conservation and strengthen coordination among governments for international rivers

POPULATIONS LOST AT AN ALARMING RATE

River dolphin populations are being lost at an alarming rate. Several dolphin species and subpopulations are now endangered or critically endangered and urgent action is needed. The good news is that we have the power to create lasting solutions for dolphins and their human neighbours, provided we act immediately and decisively. Saving river dolphins will have positive effects beyond the species, extending to surrounding freshwater ecosystems, international river basins, and ultimately ourselves.

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GANGES RIVER DOLPHIN

(Platanista gangetica gangetica)
Local name: susu

Physique: A flexible body, with large flippers and a low triangular dorsal fin. Long thin snout with sharp teeth. Females are slightly larger than males, reaching up to 2.6 m and weighing up to 150 kg. Calves are chocolate brown, turning greyish brown as they mature.

Habitat: Prefers deep waters in and around the confluence of rivers. Shares its habitat with crocodiles, freshwater turtles, and wetland birds. Lives in small groups of up to 10 animals, but mostly seen alone or in pairs.

Feeding: Normally chases small, surface-dwelling fish; also forages for mud-dwelling fish with its long snout.

Did you know? The susu must surface every 30–120 seconds to breathe. Its local name derives from the sound it produces when breathing.

Range and status

The historic range encompassed the Ganges-Brahmaputra-Megna and Karnaphuli-Sangu river systems, from the deltas upstream to where rocky barriers, shallow water, or fast currents prevented further movement. At present the population is fragmented, with isolated subpopulations found in small pockets of the main Ganges and Brahmaputra rivers and a few tributaries in India and Nepal, as well as in the Meghna river system in Bangladesh. The subpopulation in the Karnali River in Nepal only numbers in the tens of animals.

Estimates on the Ganges dolphin metapopulation are difficult to come. Estimates ranged from 4000-5000 animals in 1982 to fewer than 2000 in 1997.[1] There are probably at least 1200-1800 animals left, but that number could be higher. Where timelines exist it is clear that the species is declining in numbers, and its range continues to shrink.

IUCN Red List status: Endangered[2]

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Threats & action priorities

Habitat destruction and fragmentation due to water infrastructure for irrigation, hydropower, and flood prevention pose a major threat. Industrial and agricultural pollution is likely to increase and cause further problems. Entanglement in fishing gear remains a big problem.

Key conservation actions include:

- Establishing of protected areas and community reserves
- Preventing, mitigating, and restoring dolphin habitat impacts from water infrastructure
- Community involvement in river dolphin conservation and management

WWF in the field

WWF-India is involved in dolphin monitoring activities in most areas where river dolphins are found in the country. Its river dolphin conservation programme conducts regular monitoring in a 165-km stretch of the upper reaches of the Ganges River in Uttar Pradesh, where 56 dolphins were reported in 2010.[3]

In the same area, WWF is working with communities to conserve the dolphins and improve livelihoods. For example in Farida, villagers are more aware of their environment and the effects of their actions. They now take less fish overall, have ceased fishing in designated dolphin habitat, are taking part in riverbank re-vegetation, and are monitoring the pollution of upstream industry and considering how to bring their collective voice to bear on the issue.

The work in Farida, which included education and awareness, capacity building programmes, resource mapping, tree planting along river banks, and preparation of village development plans emphasizing environment issues, is contributing to improved livelihoods and reduced poverty[4].

WWF-India is also involved in drafting a government action plan for river dolphin conservation.

INDUS RIVER DOLPHIN

(Platanista gangetica minor)
Local name: Bhulan

Physique: A long beak, rounded belly, and stocky body, with a very small dorsal fin and large flippers. The eye has no lens, but can differentiate between light and dark. Weighs 70–110 kg and reaches a maximum length of 2.5m, with males smaller than females.

Habitat: Found in silt-laden turbid water. Shares its habitat with freshwater turtles, otters, and a variety of waterfowl.

Feeding: Uses echolocation and its long snout to forage for bottom-dwelling animals, particularly freshwater prawns.

Did you know? Calves stay close to their mother for the first six months of their life. The Indus river dolphin sometimes carries its young on its back, above the surface of the water.

Range and status

The species once inhabited nearly the entire lower Indus river system in Pakistan, but is now restricted to five subpopulations in an approximately 1300-km stretch of the river, separated by irrigation barrages. The species' abundance generally increases going downstream.[5]

According to a 2006 survey carried out by WWF-Pakistan and the Pakistan Wetlands Programme together with the government wildlife department, the population is currently between 1,600 and 1,750 individuals[6]. This is an increase on estimates of a metapopulation of around 1200 animals in 2001[7], which would make it the only river dolphin species which is increasing in number. The river section between the Guddu and Sukkur barrages has the highest encounter rate of any river dolphin species, with 1,293 dolphins sighted in the 2006 survey.

IUCN Red List status: Endangered

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Threats & action priorities

The main threats to the species are derived from agriculture. The Indus irrigation system has fragmented their habitat and water extractions affect river flow. One of the most visible threats is entrapment in canals: once a dolphin has passed the gates out of the river it cannot return. Unsustainable fishing practices continue to pose a threat, particularly the use of illegal gill nets.

Key conservation actions include:

- Establishing effective rescue and release systems from irrigation canals
- Working with local farmers to improve farming practices
- Awareness raising and livelihood support for fishermen

WWF in the field

WWF-Pakistan, together with the Sindh Agriculture Extension Department, is improving agricultural practices near dolphin habitat to reduce pollution in the Indus. Farmer Field Schools are a key tool in creating widespread awareness amongst farming communities of the impact of inappropriate irrigation practices and indiscriminate use of toxic chemicals on dolphin habitat, and measures to mitigate these impacts.

Since 2000 the Sindh Wildlife Department and WWF-Pakistan have rescued 80 dolphins from the possible death in irrigation canals, including three that were successfully rescued and released into the main Indus River at Rohri near Sukkur Barrage in December 2009.[8] WWF also works with fishermen, who are engaged in promoting ecotourism activities, particularly the dolphin watch. WWF regularly monitors the Indus river dolphin population and recently tracked their movement using radio tags. This demonstrated for the first time that the dolphins can cross the barrage gates in both upstream and downstream directions.

Footnote

As this report goes to press in August 2010, the Indus river basin is experiencing unprecedented flooding. All barrages and canal gates in the Indus' extensive irrigation system have been opened, allowing large volumes of water into areas that normally receive only low flow. While it is difficult to predict the effects of this on Indus river dolphins, it is likely that populations will move to the lower sections of the river. This could pose major problems when water levels fall and the dolphins find themselves in areas where there is not sufficient water. WWF expects that when the floods recede there will be an increase in the number of strandings in irrigation canals and is preparing to deal with numerous rescues.

IRRAWADDY DOLPHIN

(Orcaella brevirostris)

Physique: A round forehead and no beak, with 12-19 teeth on each side of each jaw. The pectoral fin is broadly triangular, and there is a small dorsal fin at the posterior end.

Habitat: Prefers deep pools in large rivers, sheltered inshore marine environments with substantial freshwater inputs, and partially isolated brackish or freshwater bodies.

Feeding: Hunts fish, cephalopods, and crustaceans. Individuals have been seen spitting water from their mouths, which is thought to help them hunt by confusing and herding schools of fish.

Did you know? Fishermen in the Irrawaddy River in Myanmar fish in cooperation with Irrawaddy dolphins, relying on the dolphins to herd fish near their boats. Fishermen benefit as this reduces the frequency of empty catches, and dolphins appear to be feeding alongside the nets.

Range and status

© DAVID DOVE / WWF GREATER MEKONG

Freshwater subpopulations are found in the Mekong River, the Mahakam River (Kalimantan, Indonesian Borneo), and the upper reaches of the Irrawaddy River (Myanmar) north of Mandalay.

In the Mekong, the species' historical range ran from the Mekong delta up to southern Laos and into the Tonle Sap. Today the effective range is a 190-km segment from Kratie (about 500 km upstream of the river mouth in Vietnam) to slightly upstream of the Laos/Cambodia border at Khone Falls. A 2007 survey identified 61 individuals and estimated a population abundance of 71 individuals.[10]

The most recent surveys estimate the Mahakam subpopulation at 70 individuals and the Irrawaddy subpopulation at 58–72 individuals.

IUCN Red List status

Mekong subpopulation: Critically endangered[11]

Mahakam subpopulation: Critically endangered[12]

Irrawaddy subpopulation: Critically endangered[13]

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Threats & action priorities

The most acute threat to the Mekong subpopulation comes from fisheries, particularly the use of gill nets. Ninety-two animals died in fishing nets between 2003 and 2009, over half of which were calves. If not addressed, this high rate of mortality will very likely lead to extinction of the subpopulation.

A future threat is the construction of dams on the lower Mekong main stem. Two proposed dams in Cambodia, plus one in Laos, would inundate most of the remaining dolphin habitat and likely lead to the extirpation of the species in the Mekong.

Entanglement in gill nets is also the major cause of direct mortality in the Mahakam subpopulation, accounting for around four dead dolphins per year between 1996 and 2007.[14] Other threats are: habitat degradation through sedimentation, which is reducing the depth of lakes and reducing fish resources; noise pollution as a result of shipping, including coal transport; chemical pollution from coal and gold mining; and prey depletion due to illegal and unsustainable fishing methods.

Threats & action priorities continued

In the Irrawaddy River main threats to the freshwater population include destructive fishing methods, such as gill nets, electrofishing, poison and dynamite. Gold mining has also been observed in the upper basin and could pose a threat through mercury pollution.

Key conservation actions include:

- Establishment of protected areas around the main dolphin pools in the Mekong
- Regulation of fisheries to reduce use of gill nets and fishing pressures
- No building of dams on the lower Mekong main stem
- Proper management of dolphin watching activities

WWF in the field

Work on Irrawaddy dolphin conservation centres on the Mekong. WWF-Cambodia is working closely with the Fisheries Administration in Cambodia, and WWF-Cambodia and WWF-Laos are working with the governments of Cambodia and Lao PDR to develop a Trans-Boundary Committee to protect dolphins and fisheries. A population of about nine dolphins inhabits the border area and appears to be isolated from the other dolphins downstream in Cambodia.

YANGTZE FINLESS PORPOISE

(Neophocaena phocaenoides asiaeorientalis)

Physique: A rounded forehead, no beak, and no dorsal fin. Soft very dark grey, nearly black, body with a very flexible neck. Relatively small, measuring up to 1.9 meters.

Habitat: Prefers deep freshwater rivers and lakes, as well as brackish estuaries-

Feeding: Mostly hunts fish and shrimp.

Range and status

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A freshwater of the finless porpoise is found in the lower and middle reaches of the Yangtze River, as well as in Poyang and Dongting lake. A 2006 survey estimated the population at around 1000–1200 animals in the river's main stem, with another 600 or so in the two lakes.[16]

In contrast with the now extinct Yangtze river dolphin, dedicated conservation efforts over the past decade have had some success in preserving this subpopulation. Around 30 individuals live ex situ in the protected Tian'e-Zhou reserve, an old Yangtze oxbow that became disconnected from the main stem in 1972. In 1990, five Yangtze finless porpoises were captured and transferred to the oxbow, and the population has been growing, both with introductions from other captured or rescued animals as well as through natural reproduction. 31 calves have been born in the reserve so far, averaging at 3–4 calves per year.[17]

IUCN Red List status: Endangered[18]

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Threats & action priorities

The freshwater subpopulation faces the same threats as those that contributed to the extinction of the Yangtze river dolphin. These include prey depletion due to overfishing and habitat loss, bycatch in unsustainable fisheries, boat collisions, habitat loss and degradation as a result of water infrastructure, and pollution.

Key in situ conservation actions include:

• Banning fishing year-round in key reserves for at least 10 years, instead of an annual 3-month ban as at present

• Reconnecting Yangtze main stem to surrounding lake systems

• Ending the practice of widening and deepening the river for navigation

• Enforcing a maximum speed limit for ships passing through dolphin nature reserves.[19]

WWF in the field

WWF has been working in the Yangtze river basin since 1999, starting with wetlands conservation in the Dongting Lake area. Since 2002, WWF and partners, with the support of HSBC, have reconnected more than 40 floodplain lakes with the main stem of the Yangtze to increase flood retention capacity, restore seasonal flows, and allow migration of aquatic species between the lakes and the river. This is helping to secure the food base for the Yangtze finless porpoise and improve aquatic biodiversity in general.

WWF also works closely with the Chinese Ministry of Agriculture and the Institute of Hydrobiology, (Chinese Academy of Science) on ex situ conservation in the Tian-ezhou oxbow nature reserve, the establishment of new nature reserves, and supporting the Yangtze Dolphin Conservation Network, which aims to improve the management of existing dolphin nature reserves. So far the six dolphin nature reserves have joined the network and a number of training workshops on rescue skills and monitoring techniques have been organized.

AMAZON RIVER DOLPHIN

(Inia geoffrensis)
Local name: Boto

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Physique: A long beak, steep bulbous forehead that is capable of changing shape, and small eyes, with a low and wide dorsal ridge and large triangular flippers. Males are larger than females, reaching up to 2.8 m in length and weighing up to 160 kg. Calves are dark grey when born, becoming light grey and sometimes pink on maturity. Often referred to as "pink dolphin" due to its distinctive adult colour.

Habitat: Found in a variety of riverine habitat types, including rivers, small channels, confluences, and lakes. Prefers river mouths, areas below rapids, and smaller channels running parallel to the main river; avoids estuaries, strong rapids, and waterfalls. Also swims into flooded forests in the high-water season and often searches for prey among the roots and trunks of partially submerged trees.

Feeding: Hunts a large variety of fish, generally near the river bottom. Some prey species have hard outer shells, and dolphins have been observed breaking up larger prey before swallowing. Sometimes feeds in a cooperative manner. Usually seen as single individuals or couples, but groups of around 12 animals can sometimes be found while feeding in confluences.

Did you know? Botos are often seen swimming upside down. This could be because of their chubby cheeks that block downward vision.

Range and status

The species is widely distributed along the Orinoco and Amazon River Basins, in Venezuela, Colombia, Ecuador, Peru, Brazil, Suriname, and Guyana.

IUCN Red List status: Data deficient[20];

Considered vulnerable in Colombia, Peru, and Brazil and endangered in Ecuador[21]

Threats & action priorities

The three South American river dolphin species all face similar dangers, with the major threats deriving from fishing activities. The Amazon river dolphin in particular is seen as a competitor for falling fish stocks, and is often killed or injured in efforts to chase them away. In the Brazilian Amazon, river dolphins are often deliberately killed for use as bait in the "mota" catfish fishery. This scavenging catfish commands high prices in big cities, with around 200,000 tonnes traded from Brazil to Colombia every year.

Mercury pollution from small-scale gold mining activities is considered to be the main risk to the Bolivian river dolphin.

Other threats include hydropower development, particularly in the Brazilian part of the Amazon basin, where many large dams have destroyed dolphin habitats. Many more new dams are planned in the basin, including two large dams on the Madeira River, the principal tributary of the Amazon.

Boat traffic along the Amazon River and tributaries is heavy in places. In Bolivia, increased shipping density is fuelling plans for the Madeira Hidrovia, a series of waterways in the Madeira, Mamoré, and Iténez rivers to facilitate shipping, whose construction would impact on river dolphin habitat.

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Key conservation actions include:

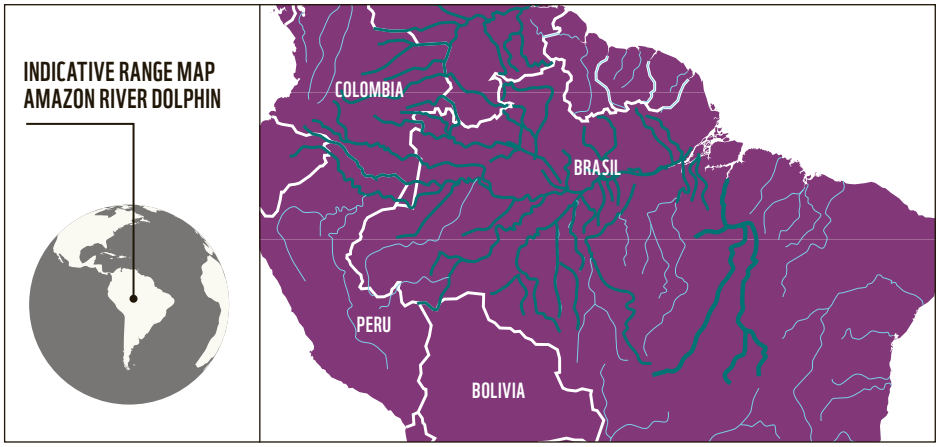
• Regulating fishing activities by enforcing laws and regulations, in order to reduce bycatch and accidental killing and prevent overfishing

• Working with fishermen and communities to find livelihood alternatives that reduce competition between fishermen and dolphins for the same resource

• Finding alternative baits for the mota fishery and raising awareness with consumers

• Working with stakeholders to ensure agricultural, land use, and alternative energy initiatives are conducted according to river management policies and conservation initiatives, in order to reduce habitat degradation due to agriculture, oil exploration and exploitation, hydropower generation, human migration, establishment of new settlements, and logging

• Regulating dolphin-watching activities through education of tour guides, agencies, and tourists about the importance of the species, their habitats, and the proper conduct of tourist activities



WWF in the field

WWF together with Fundación Omacha and other partners conducted the first regional census of the South American river dolphin species in Colombia, Venezuela, Ecuador, Peru, and Bolivia. The census provided important information on dolphin abundance, density, and population size, and paved the way for the development of an Action Plan for the South American River Dolphins for 2010-2020 — which is unique in bringing recommendations from and consensus between scientists and organizations on priority actions to save river dolphins in South America. The plan summarizes the status of the species, threats, and freshwater protected areas and their role for river dolphin conservation.

BOLIVIAN RIVER DOLPHIN

(Inia boliviensis)
Common name: Bufeo

Physique: Relatively small face with raised cheeks and an elongated snout that is slightly curved downwards. Eyes are small and functional. Very flexible body as cervical vertebrae are not fused, with broad flippers. Reaches around 2 meters in length. Colour varies from pink to dark grey, depending on age, water clarity, and temperature.

Habitat: Found in a variety of habitats, including both white water and clear water flood plains, lakes, and flooded forests.

Feeding: Little specific information known, but likely to be similar to Amazon river dolphins. The flexible body allows penetration into seasonally flooded forests.

Did you know? The species was formerly considered a subspecies of the Amazon river dolphin, and was only recently recognized as being a separate species. The two species are separated by the Madeira rapids, situated along the Bolivian-Brazilian border[22].

Range and status

The species is endemic to Bolivia, distributed in the Mamore and Itenez river basins.

IUCN Red List status: Species not yet individually assessed, so for the time being its status corresponds to that of the Amazon river dolphin, data deficient

Considered vulnerable in Bolivia[23]

Threats & action priorities

The three South American river dolphin species all face similar dangers, with the major threats deriving from fishing activities. The Amazon river dolphin in particular is seen as a competitor for falling fish stocks, and is often killed or injured in efforts to chase them away. In the Brazilian Amazon, river dolphins are often deliberately killed for use as bait in the “mota” catfish fishery. This scavenging catfish commands high prices in big cities, with around 200,000 tonnes traded from Brazil to Colombia every year.

Mercury pollution from small-scale gold mining activities is considered to be the main risk to the Bolivian river dolphin.

Other threats include hydropower development, particularly in the Brazilian part of the Amazon basin, where many large dams have destroyed dolphin habitats. Many more new dams are planned in the basin, including two large dams on the Madeira River, the principal tributary of the Amazon.

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Boat traffic along the Amazon River and tributaries is heavy in places. In Bolivia, increased shipping density is fuelling plans for the Madeira Hidrovia, a series of waterways in the Madeira, Mamoré, and Iténez rivers to facilitate shipping, whose construction would impact on river dolphin habitat.

Key conservation actions include:

• Regulating fishing activities by enforcing laws and regulations, in order to reduce bycatch and accidental killing and prevent overfishing

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TUCUXI

(Sotalia fluviatilis)

Physique: Resembles the bottlenose dolphin, but with a longer snout, broader flippers, and a shorter and more triangular dorsal fin. Dark bluish or brownish grey in colour, fading to light grey or white on the belly, sometimes with a pink tinge. Reaches up to 1.6 m in length and weighs upwards of 40 kg.

Habitat: Found in both marine and freshwater environments; in the latter has a preference for river confluences, lakes, and channels. Mostly stays in the main river stem and does not enter flooded forest.

Feeding: Feeds on a wide variety of fishes, mostly small schooling species.

Did you know? Although the tucuxi mostly avoid rapids and fast-moving turbulent waters, they have been seen playing in such waters, appearing to enjoy jumping in and out of fast currents.[25]

Range and status

Freshwater populations are found in the Amazon, excluding Bolivia and as far inland as southeastern Colombia, eastern Ecuador, and Southern Peru, as well as in Venezuelan stretches of the Orinoco.

IUCN Red list: data deficient

Considered vulnerable in Colombia and endangered in Ecuador.

Threats & action priorities

The three South American river dolphin species all face similar dangers, with the major threats deriving from fishing activities. The Amazon river dolphin in particular is seen as a competitor for falling fish stocks, and is often killed or injured in efforts to chase them away. In the Brazilian Amazon, river dolphins are often deliberately killed for use as bait in the "mota" catfish fishery. This scavenging catfish commands high prices in big cities, with around 200,000 tonnes traded from Brazil to Colombia every year.[26]

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Key conservation actions include:[28]

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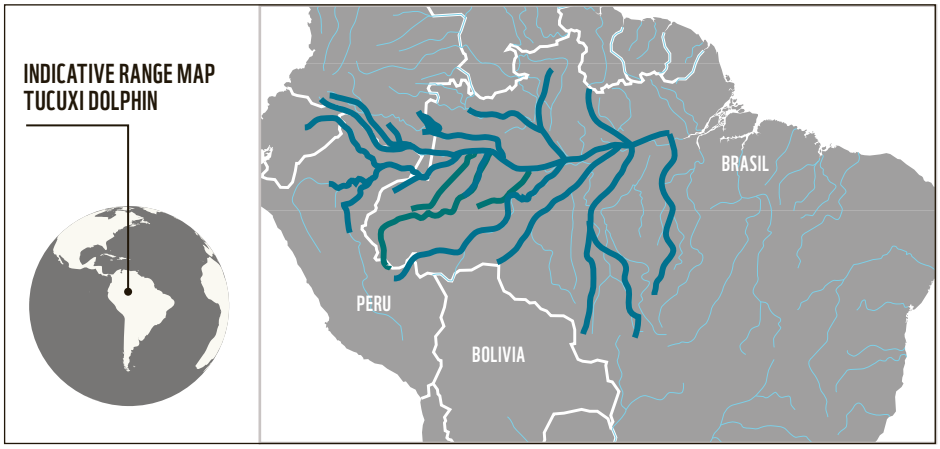

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WWF in numbers

1961

WWF was founded in 1961

+100

WWF is in over 100 countries, on 5 continents

+ 5M

WWF has over 5 million supporters

+ 5,000

WWF has over 5,000 staff worldwide

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To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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