



Conservation Assured River Dolphins Standards: CA|RDS September 2021



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Glossary of terms used in CA|RDS

Term	Explanation of use in CA RDS
Defined border	A border to a site, which is understood and mapped, and which may or may not be identified on the ground/water. It is theoretically possible that defining the border might be part of the CA RDS implementation process, but a border is needed for CA RDS to work, because it is applied to a designated site where understanding governance is a key part of management. Note that the physical location/borders of some protected and conserved areas may shift slightly, for instance if a river marks the border and its course changes over time, e.g., due to flood pulses.
Equipment	Used here to denote smaller items: computers, GPS, range finders, cameras, tools, etc.
Freshwater	Inland waters, in this case including rivers, seasonal side channels and linked lakes and lagoons used by river dolphins. We are not including estuarine habitat in CA RDS.
Indigenous peoples	<p>The definition in the International Labour Organisation’s (ILO) Convention on Indigenous and Tribal Peoples in Independent Countries includes:</p> <ol style="list-style-type: none"> 1. <i>peoples who identify themselves as ‘indigenous’</i> 2. <i>tribal peoples whose social, cultural, and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws or regulations</i> 3. <i>traditional peoples not necessarily called indigenous or tribal but who share the same characteristics of social, cultural, and economic conditions that distinguish them from other sections of the national community, whose status is regulated wholly or partially by their own customs or traditions, and whose livelihoods are closely connected to ecosystems and their goods and services</i>
Indigenous territory	An area of land set aside for the use of Indigenous peoples in a country that is largely populated by colonists from another region. International Law recognizes Indigenous peoples rights even if they are not formally recognized by their States. There is no definition of indigenous territory in the ILO Convention, but the Convention clarifies that this term can be interpreted as: <i>“the total environment of the areas which the</i>

Term	Explanation of use in CA RDS
	<i>peoples concerned occupy or otherwise use</i> ". The Declaration on the rights of indigenous peoples, when referring to the right to lands, territories or resources uses the following formulation: "have the right to the lands, territories and resources <i>which they have traditionally owned, occupied or otherwise used or acquired</i> ".
Infrastructure	Used here to describe dams, barrages, irrigation canals, navigation, water, chutes, weirs, hydro-electric systems, bunds, ditches and levees, buildings, industrial premises and similar built structures.
Local community	Literally the people or community who live in an area or space. They may not have particular ethnic, historical or cultural homogeneity, but all have a direct interest in the area. The term is usually used to describe groups other than Indigenous peoples.
Management plan/system	A document or series of documents which outline the interventions undertaken to manage the site. The plan/system should be developed with reference to national and regional river dolphin conservation strategies. It should clearly elaborate the site's goal, objectives and activities. Management plans/systems are usually implemented through annual operational plans.
Other effective area-based conservation mechanism (OECM)	Defined by the Convention on Biological Diversity as: " <i>a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values</i> ". Likely in the future to be mapped nationally and internationally.
Protected area	Defined nationally and internationally by IUCN as: " <i>A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values</i> ".
Protected and conserved areas	The term is often used to refer to the total amount of protected areas and OECMs but may sometimes be expanded to include additional areas that also have an effective conservation function. UNESCO World Heritage sites and UNESCO biosphere reserves are included in protected and conserved areas. Many

Term	Explanation of use in CA RDS
	countries regard all their Ramsar sites as protected areas, others do not; however all Ramsar sites should offer significant benefits for river dolphins. Key Biodiversity Areas (KBAs) usually include some area-based conservation, but it is seldom the case that the entire area of a KBA is under conservation management. In this context we include any area-based approach that leads to effective river dolphin conservation under area-based conservation .
Resource users	In this context people using resources that impact on river dolphin territory, particularly natural resources such as fish, timber, plant foods and traditional medicines.
Rightsholders	People socially endowed with legal or customary rights including with respect to land, water and natural resources.
River basin	Although CA RDS is a site-based approach, river dolphin conservation is clearly impacted by activities beyond the borders of the site; thus, some standards are directed at areas that influence the site within the entire river basin level.
River dolphin	The CA RDS system considers only obligate and facultative river dolphin and porpoise species that are restricted to freshwater habitat and does not look at other cetaceans or at aquatic species such as the manatee.
Service providers	In this context used to describe all those that use the river to provide services including for tourism and transport.
Site	Site is defined here as a protected area, OECM or possibly other effective and delimited conservation area. CA RDS is a site-based approach rather than something that describes measures, for instance, at national policy level.
Stakeholders	People who possess direct or indirect interests and concerns about a site (e.g., local communities, businesses/industries using water resources, researchers, NGOs, service providers), but do not necessarily enjoy a legally or socially recognised entitlement to them. In the context of CA RDS, we use “stakeholders” to include both stakeholders and rightsholders.

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As members of the Expert Group, they were responsible for advising on the:

- Scientific quality of the CA|RDS
- Applicability of the Standards on a global scale
- Ensuring a smooth implementation of CA|RDS across Asia and South America

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Introduction

Why river dolphins?

River dolphins, the Irrawaddy (*Orcaella brevirostris*), Ganges (*Platanista gangetica gangetica*), Indus (*Platanista gangetica minor*), Yangtze Finless porpoise (*Neophocaena asiaorientalis asiaorientalis*), Amazon (*Inia geoffrensis*) and Tucuxi (*Sotalia fluviatilis*), are found in Asia and South America. All river dolphins face severe threats; and are listed on the IUCN Red List as either endangered or critically endangered. Globally, there are at least 60 protected areas where we know river dolphins are found in Asia and South America; these sites range from 40 to 400 km² (see appendix 1). Under current policies to conserve all cetaceans, river dolphins do not receive as much attention as their marine relatives. To be successful, efforts to conserve them and associated freshwater ecosystems will require a collaborative process and more integration within the policy framework at a global scale.

Why Conservation Assured?

Conservation Assured provides a platform for achieving excellence in site-based conservation. It does this by developing shared standards for specific conservation objectives, which site managers can use to gauge and demonstrate their contribution to collaborative conservation efforts through an independent review or auditing process.

Conservation assured aims to:

- Involve a wide group of experts to guide and mentor site-based approaches;
- Describe management needs in concise and, where appropriate, quantitative ways;
- Guide management actions where they are needed most and streamline investments;
- Compile site documentation and history using bespoke software;
- Track progress in management effectiveness over time;
- Measure conservation outcomes through an evidence-based system;
- Build confidence of stakeholders, donors and policy makers that managers are working towards conservation and social goals;
- Help attract funding directed to management actions needed to reach the standards; and
- Celebrate conservation success.

Box 1: Key benefits of Conservation Assured

Conservation Assured (CA) provides a wide range of incentives and guidance that make it an effective vehicle for achieving broader conservation impact. Important incentives are listed below:

- **How Conservation Assured contributes broadly to conservation:** CA provides independent, professional standards and verification systems for managers of sites with important biodiversity and natural heritage values.
- **How CA addresses framework conditions for conservation:** CA's framework serves as a verifier and indicator of best practices and the success of integrated conservation efforts at the local and global level. These help to develop long-term models for species and biodiversity conservation across varied landscapes and seascapes.
- **How CA helps in boosting financial incentives for conservation:** The Conservation Assured Tiger Standards (CA|TS), implemented across the tiger range countries in over 100 sites, have already demonstrated this benefit. Species and sites meeting the CA framework demonstrate clear, focused and shared roles that conservation partners, financial institutions, donor agencies, corporates, and civil society collectively can play in strengthening and enhancing conservation. These strategies also provide confidence to donors that their funding will not be wasted. CA thus provides a generic framework for general auditing and a yardstick to gauge the success of conservation investments by financial institutions investing in conservation sites.
- **How CA addresses global policy or international conventions:** Site- and species-specific CA helps to achieve commitments and targets agreed under international treaties and conventions, such as targets of the Strategic Plan for Biodiversity Conservation under the Convention on Biological Diversity (CBD), and various climate change targets (e.g., Article 17 of the Kyoto Protocol). CA contributes to the progress of SDG goals linked to protected and conserved areas (PCAs) and OECMs. CA will also provide a universal platform of standards to ensure effective and equitable management of PCAs and OECMs globally.

What is CA|RDS?

CA|RDS stands for Conservation Assured | River Dolphin Standards and consists of the Conservation Assured Framework adapted for river dolphin management and conservation.

Vision statement for CA|RDS

A well-managed global network of freshwater protected and conserved areas provides safe havens for river dolphins as a vital component of broader, comprehensive conservation strategies.

CA|RDS goal

CA|RDS demonstrates, guides, promotes and incentivises good site-based management practices to secure a network of well-managed freshwater protected and conserved areas for river dolphins.

CA|RDS objectives

- Develop and maintain innovative, expert-led CA|RDS standards and criteria, which are credible and scientifically sound, relevant to conservation management and practically applicable in the field and linked with associated conservation standards (e.g., IUCN's Green List Initiative).
- Implement CA|RDS assessments in freshwater protected and conserved areas supporting river dolphins and develop programmes which mobilize support and capacity for management to help these sites meet the CA|RDS criteria.
- Increase the recognition of the conservation needs of river dolphins.

Scope of CA|RDS

CA|RDS can be applied to sites with a defined border, which includes river dolphin habitat and adjacent terrestrial areas critical to river dolphins.

These sites are likely to mainly be protected areas – where nature conservation is a primary management *objective*, or other effective area-based conservation measures (OECMs), where biodiversity conservation is an *outcome* but may or may not be an objective. CA|RDS can also be implemented in defined sites with other forms of conservation controls, such as bylaws protecting river dolphins.

Although a site-based system, river dolphin sites are sometimes connected or connected by corridors, in these cases it makes sense for CA|RDS to be implemented at a basin or population level across multiple sites.

CA|RDS acknowledges that effective dolphin conservation management at the site level very often depends on many external factors out of the control of the site management team. CA|RDS therefore includes standards and criteria around river basin management planning and coordination, although it is understood that impacts from activities beyond the site are often hard to manage; however, impacts should at least be understood and mitigation actions taken where possible.

Box 2: CA|RDS targets from WWF River Dolphin Strategy 2018 – 2030

- By 2022 CA|RDS assessments have been implemented in at least half the existing freshwater protected areas with river dolphins.
- By 2026 assessments CA|RDS have been implemented in all freshwater protected areas inhabited by river dolphins.

Note that the primary aim of CA|RDS is to get as many sites effectively managed as possible, and in particular to increase the effectiveness of sites that are currently failing: raising the bottom while also celebrating the top. Conservation Assured has two stages: *registration* of interest and a *review or auditing process* once a certain standard has been reached.

Many of the standards will be beyond the capability of some sites taking part in CA|RDS in the short or medium term. This is not necessarily a problem; standards are aspirational and should provide a framework for improvement, including providing governments and donors with clear guidance of where investment is needed. The fact that a site will not immediately meet all the standards in CA|RDS is not a reason to avoid getting involved, in fact quite the reverse.

We recognise that different levels of management will be needed in different places. A small and critically endangered river dolphin population will require different responses than a large and healthy population with abundant space to move about. Guidance, including where appropriate thresholds for action, will provide this more nuanced approach. Priorities in different countries and regions will vary from conserving and rebuilding highly threatened populations to ensuring that currently healthy populations do not slip into crisis. Both should be addressed within the basic framework of the standards.

Introduction to the standards

Around half of the major sites which support river dolphin populations have undertaken some form of protected area management effectiveness (PAME) assessments (see appendix 1). These identify an individual site's management objectives and assess strengths and weaknesses in management in terms of these objectives.

Conservation standards differ from PAME assessments in that they assess the site against agreed management standards, ideally developed by experts across a species' range or with expert knowledge of a specific habitat, with the aim of achieving a specific outcome.

Although processes vary, PAME systems are self-assessments; where they include verification processes these tend to be project-based and do not involve accreditation or certification. Standards however usually involve some kind of formal review or auditing process with multiple steps to ensure compliance to the standards, often in accordance with industry wide protocols such as those developed by International Social and Environmental Accreditation and Labelling - ISEAL¹.

CA|RDS has been drawn up in association with some of the world's most experienced river dolphin conservation experts and represents a collective view of the conditions needed for effective river dolphin management. CA|RDS sets a high standard and fully recognises that these will not be immediately within reach of many, probably most, dolphin conservation areas today. Building management to meet these standards will take many area-based conservation initiatives years or even decades. But by describing what is necessary, the standards provide a framework for making and measuring progress and a clear set of needs to help direct governmental, intergovernmental and private support for river dolphin conservation.

Overview of CA|RDS

CA|RDS is not a hierarchical system but is organised around overarching themes (pillars); a series of elements which describe the main management issues under these themes and then a set of standards and criteria against which to assess management along with guidance on the type of evidence that can be used to show the standards and criteria have been met and additional guidance and resources.

- **Pillars:** Overarching themes covered by the standards. There are eight pillars in total:
 - A: Importance and status
 - B: Site design
 - C: Management capacity and systems
 - D: Stakeholders

¹ CA|RDS is developed following the ISEAL Credibility Principles: <https://www.isealalliance.org/defining-credible-practice/iseal-credibility-principles>

E: Threat management

F: Tourism

G: Habitat

H: Populations

- **Elements:** Organised under each pillar related to specific management issues. There are twenty elements:
 - 1: Significance of river dolphins
 - 2: Legal status, regulation and compliance
 3. River basin management planning and coordination
 - 4: River basin level coordination of river dolphin conservation
 - 5: Site design
 6. Management processes and capacity
 7. Financial resources
 8. Stakeholder engagement and participation
 9. Stakeholder rights and support
 - 10: Governance
 - 11: Benefit Sharing
 12. Fisheries and multiple-use management
 13. Human– wildlife coexistence (including fishing)
 - 14: Threat management
 15. Enforcement
 16. Tourism management
 17. Habitat management
 18. River dolphin population management and monitoring
 19. Prey population, management and monitoring
 - 20: River dolphin health and mortality management

- **Standards:** Under each element, standards articulate a good management practice. There are 46 standards.

- **Criteria:** Each standard has a number of criteria, which outline in more detail the types of actions needed to meet the standard; **the criteria represent the part of the structure of CA|RDS that the assessment of a site’s management is made against.** There are 113 criteria. There is inevitably some overlap of criteria within different standards; the criteria are numbered and are thus cross-referenced. **This overlap acts as a useful cross check when reviewing assessment results to check consistency of responses from the site.**

- **Evidence base:** The assessment of criteria is made by producing evidence of management meeting the criteria; guidance on the how to assess each criterion is thus a vital part of CA|RDS.

- **Guidance:** The information provided in the guidance comes in three main types:
 1. Guidance written for this manual.
 2. References to sections of a major review of global best practices for river dolphin management carried out by WWF commissioned by the World Bank (Willems, D.,

Walkington, D., Braulik, G., Khan, U., Frias, M., Minton, G., Hoyland, I., Melo-Santos, G. (2021). *River dolphin conservation & management; best practices from around the world*. WWF. Commissioned by the World Bank). These sections usually have additional references and case studies.

3. Other references from research articles and practical manuals, all those selected are available free of charge online and links are provided.

There is a considerable body of experience around river dolphin conservation and management, and CA|RDS tries to distil this. There are however still major gaps in understanding and guidance that will be updated as new information becomes available.

CA|RDS: Pillars, elements, standards, criteria, evidence base and guidance notes

Pillar	Element	Standard	Criteria	Evidence base	Guidance
A: IMPORTANCE AND STATUS	Element 1: Significance of river dolphins	Standard 1.1: River dolphin conservation is an important target and value for the site	<p>Criterion 1.1.1: River dolphin conservation is recognised as important in site management plans/ systems/policies/strategies</p> <p>Criterion 1.1.2: National and regional river dolphin conservation strategies are known and considered in the management of the site (see 3.1.1)</p> <p>Criterion 1.1.3 The economic, cultural, environmental and social value of the river dolphins is understood and reflected in the site's management plan/system</p>	<p>Evidence base: Management plans/systems and/or policies/strategies; national conservation strategies; legislation and biodiversity action plans; valuation studies</p>	<p>Best practices See World Bank report (Willems et al., 2021), section 4.7.3 (<i>National species action plans</i>), and to a lesser extent 4.7.4 (<i>International conservation initiatives</i>).</p>
		Standard 1.2: The relevant conservation status of the river dolphin population at the site is well understood	<p>Criterion 1.2.1 The relevant status of, and threat to, the river dolphin population at the site is clearly understood and reflected in the management plans/system (see also pillar E on threats)</p>		

					<p>the importance of the local population within the survival and recovery of that species. An extremely high conservation status would be, for example, the last remaining population of a single species or subspecies. Whereas an example of a population with a lower conservation status may be a small number of dolphins within a larger global population of a less threatened species. It should be noted that all populations of river dolphins have a relatively high conservation status compared to most other species. Also there may be other factors that increase the conservation status of the species such as importance to local communities, use as an indicator of river health, unique behaviour, flagship for river conservation etc. What is important is that the site managers should be fully aware of and have described the status of the population of river dolphins at the site. This should be known before any assessment against the CA RDS is undertaken. Further guidance on assessing the relative conservation status of the population can be sought from the river dolphin expert group.</p> <p>Best practices See World Bank report (Willems et al., 2021), section 4.1.1 (<i>Understanding distribution and range decline</i>) and 4.1.5 (<i>Understanding population structure</i>).</p>
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	Element 2: Legal status, regulation and compliance	Standard 2.1: Legal frameworks and regulations meet the requirements of river dolphin conservation	Criterion 2.1.1: Legal frameworks support the site’s river dolphin conservation	Evidence base: Up-to-date legal documents and regulations; community customary law / taboos; community conservation agreements; annual review of law enforcement monitoring results	Best practices See World Bank report (Willems et al., 2021), section 4.3.3 (<i>Government fisheries management</i>).
			Criterion 2.1.2: Legal frameworks supporting the site are effective in dealing with current levels of illegal activity that threaten river dolphins and their habitat, and any gaps are understood		
			Criterion 2.1.3: Where necessary, interventions to mitigate lack of effective legal frameworks are in place		
	Standard 2.2: The site can rely on a system of law enforcement which ensures legal compliance and effective prosecution rates	Criterion 2.2.1: Staff have a up-to-date knowledge of relevant national and international legal instruments, including human rights and the specific rights of Indigenous peoples and local communities in the area	Evidence base: Legal documents and regulations available at site; training in law enforcement; records of legal experts available at the site and of experts being deployed when necessary; wildlife crime database including case record book, register of infringements and follow up actions and outcomes; numbers of arrests, prosecution, repeat convictions; guidance on role of different agencies in law enforcement and role in prevention of wildlife crimes		
		Criterion 2.2.2: Legal instruments empower staff to take action against illegal activities (see Pillar E)			
		Criterion 2.2.3: The site management team has access to legal expertise			
		Criterion 2.2.4: There are systems in place to investigate crimes and prepare court documentation			
		Criterion 2.2.5: The site management engages with judiciary to create awareness about river dolphin conservation and consequences of illegal activity			
		Criterion 2.2.6: Prosecutions and convictions related to wildlife crime affecting river dolphins are monitored			

	<p>Element 3. River basin management planning and coordination</p>	<p>Standard 3.1: River basin scale planning is undertaken across the entire river catchment</p>	<p>Criterion 3.1.1: Effective river basin management planning is undertaken to balance needs across the entire river catchment and specifically references river dolphin conservation (see 1.1.2)</p> <p>Criterion 3.1.2: Relevant agencies and stakeholders are identified and engaged in river basin management planning to integrate river dolphin conservation (see 4.1.2, 8.1.1 and 10.1)</p> <p>Criterion 3.1.3: River basin management plans assess current and potential cumulative infrastructure development impacts on river dolphin populations and all possible mitigation actions are planned and implemented where necessary (see 14.5)</p> <p>Criterion 3.1.4: Water regulation and environmental flows, pollution, sand mining and gravel extraction/load, river transport use and other potential alterations to the natural river systems are known and actions to reduce/mitigate impacts on river dolphins, their habitats and their prey base are implemented (see 14.1 and 14.3)</p> <p>Criterion 3.1.5: Fisheries management in the river basin is managed to ensure the food security of the river dolphins (see also 12.1.2)</p> <p>Criterion 3.1.6: Mechanisms are in place to assess impacts of large-scale hydropower, other dams (large and small), barrages and irrigation canals and to mitigate impacts</p> <p>Criterion 3.1.7 Environmental and Social Impact Assessments (ESIA) are conducted for all significant developments in the river basin and impacts to river dolphins are effectively</p>	<p>Evidence base: National framework / law for integrated river basin management (IRBM) and where appropriate transboundary planning instruments; stakeholder analysis, evidence of meetings and other liaison between agencies and stakeholders, engagement with entities working on river dolphin conservation; processes to assess impacts of infrastructure development on dolphin populations; linkages between basin management plans and river dolphin conservation strategies; monitoring of impacts, including cumulative impacts, on river dolphins of water availability and quality, extractive and dredging activities, sediment loads, navigation, transport; management plans/system; fisheries management activities and implementation; plans to mitigate by-catch (see also 12.3);</p>	<p>Best practices See World Bank report (Willems et al., 2021), section 4.5.1 (<i>National water quality policies and regulations</i>), section in integrated river basin management; section 4.4.1 (<i>Water infrastructure, dams and barrages</i>); and section 4.4.4 (<i>Strategic (social and) environmental impact assessments</i>).</p> <p>Resources Campese, J. et al. (2016) <i>Natural Resource Governance Framework Assessment Guide</i>. IUCN. IFC (2013) <i>Cumulative Impact Assessment and Management: Guidance for the private sector in emerging markets</i>. Washington DC. The Brisbane Declaration on environmental flows and Arthington, A.H., Bhaduri, A., Bunn, S.E., et al. 2018. The Brisbane Declaration and Global Action Agenda on Environmental Flows. <i>Frontiers in Environmental Science</i>. UNEP (2019) Sand and Sustainability: Finding new solutions for environmental governance of global sand. GRD Geneva, United Nations Environment Programme, Geneva Switzerland.</p>
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			considered in the assessments and adequately addressed in the Environment Management Plans (EMPs).	monitoring of impacts on river dolphins (see also 14.1 and 14.3), any measures taken to mitigate impacts; effective ESIA processes and implementation of findings in relation to river dolphins, including evidence of engagement of dolphin scientific experts in ESIA assessments; documents related to dam construction (e.g., ESIA, pre-feasibility studies, construction licenses, etc.)	
Element 4: River basin level coordination of river dolphin conservation	Standard 4.1: Conservation action for the entire river basin level population of river dolphins is co-ordinated	Criterion 4.1.1. A dolphin conservation vision exists and is reflected in a single conservation plan for the river dolphins in the catchment area (see also 1.1)	Evidence base: Conservation strategies and action plans and river basin strategies and action plans; records of effective river dolphin conservation, e.g., planning documents, media reports, research studies, monitoring, including citizen science; meetings, agreements (e.g., memorandums of understanding), joint activities, management committees; evidence of shared intelligence and	Guidance note Not all sites will have connectivity; this criterion aims to stop further fragmentation. Best practices See World Bank report (Willems et al., 2021), section 4.7.4 (<i>International conservation initiatives</i>); section 4.4.5 (<i>System based water resource planning</i>). Resources Hilty, J., Worboys, G.L., Keeley, A., et al. (2020). Guidelines for conserving connectivity through ecological networks and corridors . BP Protected Area Guidelines Series No. 30. IUCN. Gland, Switzerland.	
		Criterion 4.1.2. Agencies responsible for river dolphin populations and regulation of water at the river catchment level are working together in a coordinated and planned manner (see 3.1.2)			
		Criterion 4.1.3: Existing functional corridors and connectivity exist to support river dolphin movement and habitat contiguity and corridors are mapped, maintained and monitored			

			Criterion 4.1.4: Habitats suitable for restoration of river dolphin populations, if necessary, have been identified and options discussed with stakeholders (see also 17.3)	cooperating on enforcement actions (see 15); joint monitoring and research, strategy documents, policy documents, river basin river dolphin visioning and up-to-date action plans, maps, satellite imagery, photo ID.	Keenleyside, K., Dudley, N., Cairns, S., Hall, C. and Stolton, S. (eds.) 2012. Ecological Restoration for protected Areas: Principles, guidelines and best practice . BP Protected Area Guidelines number 18. IUCN, Gland, Switzerland.
B: SITE DESIGN	Element 5: Site design	Standard 5.1: Critical areas for river dolphins are recognized, acknowledged, managed, maintained and monitored in site planning processes and in management	Criterion 5.1.1: Critical areas for river dolphins are defined and mapped and gazetted (where appropriate)	Evidence base: Research, citizen science, management plans/systems/policies/strategies, maps, annual operation plans, action plans; zoning system used for dolphins/river systems.	Guidance note Site planning may need to identify core areas for river dolphins and distinguish these from important surrounding areas (buffer zones); the two may require different types of management and levels of protection. Best practices See World Bank report (Willems et al., 2021), sections 4.4.1 (<i>Water infrastructure: dams and barrages</i>) and 4.4.5 (<i>System based water resource planning</i>) for information on flow. Also see the South American dashboard and the Bangladesh Atlas as best practice examples.
			Criterion 5.1.2: Integrity of critical areas for river dolphin conservation within the site are managed, monitored and maintained		
		Standard 5.2: The river dolphin conservation site is recognised as a protected area or other type of	Criterion 5.2.1: The site has legal status or other effective area-based conservation designation (see glossary), that supports effective river dolphin conservation	Evidence base: Enabling documentation / PA designation / regulation for conservation of dolphins;	Resources Dudley, N. (ed.) 2008/2013. IUCN WCPA Best Practice Guidance on Recognising Protected Areas and Assigning Management Categories and Governance Types . BP Protected Area Guidelines Series No. 21, Gland, Switzerland.
		other type of	Criterion 5.2.2: The physical boundaries of the site and any legal zonation are defined, mapped and gazetted		

		conservation area (e.g., Ramsar site)	Criterion 5.3.3: Social impacts of boundaries have been considered in a participatory manner and have been mitigated, including tenure and legal boundary disputes		Borrini-Feyerabend, G., Dudley, N., Lassen, B., Pathak, N. and Sandwith, T. 2012. Governance of Protected Areas: From Understanding to Action . IUCN, CBD and GIZ, Gland, Switzerland.
C: MANAGEMENT CAPACITY AND SYSTEMS	Element 6. Management processes and capacity	Standard 6.1: Management systems aid effective river dolphin conservation	Criterion 6.1.1: The site has an up-to-date management plan/system (see glossary)	Evidence base: Management plans /systems and associated work programmes; river dolphin plans or targets, monitoring results, annual plans/reports, budgets, work programmes	
			Criterion 6.1.2: The management plan/system sets realistic priorities, strategies and actions that facilitate river dolphin conservation (see 18.2.1 and 18.3.1)		
		Standard 6.2: There is physical capacity (staff, volunteers, community members) to implement river dolphin conservation	Criterion 6.2.1: Capacity needs are assessed according to the strategies and actions laid out in the management plan system (see also 6.2.2. and 15.1.5)	Evidence base: Management plan/system, capacity needs assessment, budgets, terms of reference, contracts, projects and agreements with external partners (e.g.), work programmes, staff training	
Criterion 6.2.2: Technical expertise and assistance is available to maximise engagement in river dolphin ecology, behaviour and conservation					
Standard 6.3: There is sufficient equipment and infrastructure to implement river dolphin conservation	Criterion 6.3.1: Facilities, equipment and any necessary infrastructure are sufficient to undertake effective river dolphin management as outlined in the management plan / system	Evidence base: Needs assessments; infrastructure, equipment, facilities inventories, maintenance of equipment, training to use equipment etc			

		Standard 6.4: Monitoring and research related to river dolphins is conducted according to the priorities detailed in the management plan/system	Criterion 6.4.1 The management plan/system outlines the priorities for monitoring and research (see also 9.2.2, 17.1.2, 17.4.3, 18.1.1) Criterion 6.4.2: Capacity is available to conduct regular monitoring and research (see 6.2.2) Criterion 6.4.3: Results of the monitoring and research are accessible internally and externally and used for adaptive management and progress assessments (see 18.1.3)	Evidence base: Monitoring protocols and results, research priorities and results, links with research institutions, evidence that results are reviewed and fed back in management plan/system and actions	Best practices See World Bank report, section 4.2 on use of citizen scientists. Resources And information on fish monitoring app . Hodgson, J.C., Baylis, S.M., Mott, R., et al. (2016). Precision wildlife monitoring using unmanned aerial vehicles . <i>Scientific Reports</i> 6 : 22574. Hockings, M., Adams, W., Brooks, T.M., et al. (2013). A draft code of practice for research and monitoring in protected areas . <i>PARKS</i> 19 (2): 85-94.
		Standard 6.5: Systems for assessing management effectiveness are in place	Criterion 6.5.1: Management includes planned management effectiveness assessments, e.g., regular assessments following an agreed methodology	Evidence base: Assessment reports, evidence of adaptive management using the assessment results	Resources For information on Protected Area Management Effectiveness (PAME) see https://www.protectedplanet.net/en/thematic-areas/protected-areas-management-effectiveness-pame?tab=Methodologies
			Criterion 6.5.2: Management effectiveness assessments include consideration of river dolphin conservation		
	Element 7. Financial resources	Standard 7.1: There is financial capacity to implement river dolphin conservation as outlined in the management plan/system	Criterion 7.1.1: Efficient systems (e.g., budget management systems, procurement, reporting, project management and assessments) are in place for receiving and utilizing funds for river dolphin conservation linked to the management plan/system	Evidence base: Budget and financial systems, fundraising proposals and reports, business plans, monitoring results	Resources UNDP. (2010). Financial Sustainability Scorecard for National Systems of Protected Areas . New York.
			Criterion 7.1.2: River dolphin funding is adequate and sustainable to allow implementation of effective conservation as outlined in the management plan/system		

D: STAKEHOLDERS	Element 8. Stakeholder engagement and participation	<p>Standard 8.1: River dolphin conservation and management is developed with stakeholder involvement and support</p>	<p>Criterion 8.1.1: All relevant stakeholders living in, impacting or being impacted by management of the site have been identified and actively invited to engage with management</p> <p>Criterion 8.1.2: Stakeholder consultation and involvement in river dolphin conservation is clearly planned, implemented, monitored and assessed, (see also 8.2.1)</p>	<p>Evidence base: Stakeholder analysis, including a list of stakeholders; mechanisms for engagement for different genders, ages, ethnic groups etc. in management processes; evidence of consultation with stakeholders; stakeholder committees or working groups formed to assist with related plans/assessments; community contacts, meetings, strategies/policies for local communication</p>	<p>Best practices See World Bank report (Willems et al., 2021), section 4.2 (<i>Best practice in community engagement, governance and awareness</i>).</p> <p>Resources Chambwera et al (2013). <i>Stakeholder-focused cost-benefit analysis in the water sector</i>. IIED, London. Van Ingen, T. (2010). <i>Report on Stakeholder Analysis and Strategies for Stakeholder Engagement</i>. Wetwin. Kennedy, T., Martin, T., Lee, M., (2012). <i>The Practice of FPIC: Insights from the FPIC Solutions Dialogue</i>, RESOLVE. https://fpicdialogue.org/wp-content/uploads/FPICGuide_English.pdf Dovers, S. et al. (2015). Engagement and participation in protected area management: who, why, how and when? In: Worboys, G. et al. (eds.) <i>Protected Area Governance and Management</i>. ANU Press and IUCN.</p>
		<p>Standard 8.2: Processes are in place to coordinate and cooperate with stakeholders who may impact river dolphin management at the site</p>	<p>Criterion 8.2.1: Coordination and cooperation with stakeholders includes consultation meetings; shared work programmes; cooperation in management planning; cooperative working relationships (e.g., sharing activities, work programming, resource allocation) (see 4.1.2)</p>	<p>Evidence base: Agreements, meetings, shared work programmes etc</p>	<p>Guidance note Mechanisms should be in place to ensure the meaningful participation of Indigenous peoples and local communities in river dolphin conservation decisions that may impact them, including through Free Prior and Informed Consent</p>

		Standard 8.3: Cultural identity and rights are not compromised by site management	Criterion 8.3.1: Cultural values (e.g., local traditions, traditional rights and laws, cultural and religious uses of sites, etc.) are supported wherever possible (e.g., when not in contradiction with national laws)	Evidence base: Meetings, pictures, ethnobiological studies, maps of cultural values	Resources Verschuuren B., Mallarach J-M., Bernbaum, E., et al. (2021). Cultural and spiritual significance of nature. Guidance for protected and conserved area governance and management . BP Protected Area Guidelines Series No. 32. IUCN, Gland, Switzerland.	
Element 9. Stakeholder rights and support	Standard 9.1: Stakeholder rights of tenure, access and use of resources, customary rights are not compromised by site management	Criterion 9.1.1: Indigenous peoples rights of tenure, access and use of resources, customary rights, etc. are known, understood and respected in site management (see also 12.1.2)	Criterion 9.1.2: Local community's rights of tenure, access and use of resources, customary rights, etc. are known, understood and respected in site management (see also 12.1.2)	Evidence base: Studies, plans, maps of tenure and access, studies of customary use	Resources Hill, C., Lillywhite, S. and Simon, L. (2010). Guide to Free, Prior and Informed Consent . Oxfam Australia, Victoria. And Ward, T. (2011) The Right to Free, Prior, and Informed Consent: Indigenous Peoples' Participation Rights within International Law , <i>Northwestern Journal of International Human Rights</i> 10 2). RRI (2017) Securing Community Land Rights . Washington DC.	
		Standard 9.2: Mechanisms for increasing and sustaining immediate and intergenerational support for river dolphin conservation are in place				Criterion 9.2.1: Efforts to explain, describe and profile river dolphins and their conservation such as outreach and education activities are carried out with stakeholders

				fishing gear, targeted dolphin killing; development of community projects such as aquaculture, training in tourism (see pillar 16)	
Element 10: Governance	Standard 10.1: Different governance bodies work together to ensure effective and equitable site management	Criterion 10.1.1 A clear system of coordinating between different responsible agencies is in place and is working effectively to aid site management (see also 3.1.2)	Evidence base: Joint plans, agreements, evidence of meetings, coordination of management processes (e.g. conservation committees and /or steering groups developed); responsibilities of different departments clearly defined and agreed	Best practices See World Bank report (Willems et al., 2021), section 4.5.2 (<i>Integrated basin wide planning</i>).	
		Criterion 10.1.2 A governance system exists that holds the appropriate agencies accountable to the joint management agreements for the site			
Criterion 10.1.3 Where transboundary sites exist, or where a single dolphin population uses more than one protected or conserved area, governance is coordinated between the agencies and the river dolphin population is managed as one unit as far as possible (see 3.1.2)					
	Standard 10.2: Conservation management is inclusive, transparent and accountable	Criterion 10.2.1: Governance structures and decision-making processes in the site are transparent, and involve all relevant stakeholders	Evidence base: Local communication processes, complaints procedures and records, employment records; environmental and social safeguard frameworks	Guidance note The IUCN <i>Green List of Protected Areas</i> states that governance structures and key documents on management should be readily accessible to civil society in an easily understandable format; along with outcomes of discussions by decision-making bodies or decision-makers in relation to issues raised by civil society. Resources WWF (2019). WWF Environmental and Social Safeguards Framework . WWF US, Washington DC.	
Criterion 10.2.2: Systems are in place to ensure timely dissemination of information on management decisions and actions to local communities and other stakeholders who could be impacted by river dolphin conservation interventions (see also 8.1.2)					
Criterion 10.2.3: Transparent and equitable systems are in place for handling complaints and comments about conservation management in the site					

	Element 11: Benefit Sharing	Standard 11.1: Benefit-sharing mechanisms are in place and monitored	<p>Criterion 11.1.1: Policy on benefit sharing is based on best practice and is implemented, monitored and assessed</p> <p>Criterion 11.1.2: Approaches undertaken for sharing benefits with local stakeholders are linked to river dolphin conservation (e.g., tourism revenue generated and shared - see 16) are clearly planned, implemented, monitored, assessed, adapted and documented</p>	Evidence base: Implementation of best practice protocols, benefit-sharing policies and strategies are up-to-date, implemented, evidence of payments, monitoring	Resources Greiber, T., Peña Moreno, S., Åhrén, M. et al. (2012). An Explanatory Guide to the Naqoya Protocol on Access and Benefit-sharing . IUCN, Gland, Switzerland.
	Element 12. Fisheries and multiple-use management	Standard 12.1: Any resource use at the site is managed to balance river dolphin conservation objectives with local user needs	<p>Criterion 12.1.1: The needs of resource users, including the specific needs of women, are known and management respects and accommodates these needs insofar as this is compatible with the achievement of the site's conservation objectives (see also 9.1.1 and 9.1.2)</p> <p>Criterion 12.1.2: The types and levels of activities permitted at the site are clearly described and use and access are managed to minimise harm to river dolphin conservation (see also 3.1.5, 9.1.1 and 9.1.2)</p> <p>Criterion 12.1.3: Alternatives to wild fishing, where wild fishing is a significant threat to the dolphin population, such as low technology aquaculture using indigenous species, have been considered and are managed to best standards, with an awareness of the social and economic impacts (see 9.2.3)</p>	Evidence base: Participatory management plans, minutes of consultation meetings, planning applications, memorandum of understanding, permit systems and regulations, zoning maps, fishing practices which limit harmful river dolphin impact (including killing of dolphins for fishing bait), deployment of deterrents to keep dolphins away from potential harmful activities	<p>Best practices See World Bank report (Willems et al., 2021), section 4.3 (<i>Threat reduction: fisheries</i>), including section 4.3.2 (<i>Use of dolphin as bait</i>) and 4.3.5 (<i>Aquaculture</i>)</p> <p>Resources Ivanić, K-Z., Stolton, S., Figueroa Arango, C. and Dudley, N. (2020). Protected Areas Benefits Assessment Tool + (PA-BAT+): A tool to assess local stakeholder perceptions of the flow of benefits from protected areas. Gland, Switzerland. Aquaculture Stewardship Council.</p>

		<p>Standard 12.2: Any fisheries, including aquaculture, within the site are managed in a sustainable manner</p>	<p>Criterion 12.2.1: Local fisheries are known, documented and impacts considered</p> <p>Criterion 12.2.2: Fishing regulations support sustainable and productive fisheries (zoning, open and closed periods, minimum fish size, maximum yield, etc)</p>	<p>Evidence base: Inventories of local fishers (e.g. where they fish and the practices they use); by-catch records; conflict records and socio-economic analysis of fisheries; local or national and / or regional fishing regulations; national fishing policy/ laws</p>	<p>Best Practices See World Bank report (Willems et al., 2021), section 4.3.4 (<i>Community fisheries management</i>).</p>
		<p>Standard 12.3: Management practices within the site ensure no fisheries bycatch</p>	<p>Criterion 12.3.1: Fishing regulations halt or mitigate destructive fishing practices particularly gill nets</p> <p>Criterion 12.3.2: Mechanisms are in place to achieve zero bycatch or to reduce the bycatch to a minimum</p> <p>Criterion 12.3.3: Understanding and monitoring the impact of and solutions to bycatch and results are shared widely</p>	<p>Evidence base: Local or national and / or regional fishing regulations/ policy/ laws; evidence that regulations are enforced (see also 15); evidence of compliance with regulations by local fishers; evidence that regulations are supporting river dolphin conservation (see also element H); bycatch is monitored and database maintained</p>	<p>Best Practices See World Bank report (Willems et al., 2021), section 4.3.1 (<i>Bycatch</i>).</p> <p>Resources Dawson, S., Northridge, S., Waples, D. and Read, A.J. (2013). To ping or not to ping: The use of active acoustic devices in mitigating interactions between small cetaceans and gillnet fisheries. <i>Endangered Species Research</i> 19: 201–221. Leaper, R. and Calderan, S. (2018). Review of methods used to reduce risks of cetacean bycatch and entanglements. UNEP/CMS Secretariat, Bonn, Germany.</p>
		<p>Standard 12.4: Navigation management in and through the site ensures minimum impact on river dolphin populations</p>	<p>Criterion 12.4.1 Regulations are in place to minimise the impacts of river transport including noise reduction and navigational infrastructure and maintenance (ports, canalisation, dredging)</p>	<p>Evidence base: Appropriate regulation/s and evidence of implementation, e.g., speed regulation, propeller modification, no-go zones.</p>	<p>Best Practices See World Bank report (Willems et al., 2021), section 4.4.3 (<i>Governmental fisheries management</i>).</p>

	Element 13. Human–wildlife coexistence (including fishing)	Standard 13.1: Traditional practices and management encouraging coexistence between humans and river dolphins are supported	Criterion 13.1.1: Traditional practices and management which achieve coexistence between humans and river dolphins are known, monitored and supported (see also 8.3.1)	Evidence base: Documentation of traditional cooperative fishing practices; any resource use such as reed cutting etc	Best Practices See World Bank report (Willems et al., 2021), section 4.3.3 (<i>Governmental fisheries management</i>).
		Standard 13.2: Effective mechanisms for dealing with human-wildlife conflict (HWC) impacting river dolphins are in place	Criterion 13.2.1: HWC is monitored and understood	Evidence base: Management plan/system; stakeholder evidence; conflict incident records; plans for minimizing HWC; research into prevention, mitigation and reporting strategies; existence of prevention activities; alternative livelihood strategies; replication of successful strategies	Best Practices See World Bank report (Willems et al., 2021), section 4.2 (<i>best practices in community engagement, governance and awareness</i>) Resources Hodgson, I.D., Redpath, S.M., Sandström, C. and Biggs, D. 2020. <i>The State of Knowledge and Practice on Human-Wildlife Conflicts</i> . Luc Hoffmann Institute, Gland, Switzerland.
Criterion 13.2.2: Appropriate management strategies (e.g., policy, prevention, mitigation, management responses and understanding the conflict) to encourage co-existence and discourage HWC are planned and implemented (see also 12.1.3)					
Criterion 13.2.3: Monitoring and assessment of HWC and mitigation management strategies is ongoing, and strategies are adapted according to monitoring results					
			Criterion 13.2.4: Stakeholder involvement occurs at all stages in the development and implementation of co-existence and HWC policies and strategies		
E: THREAT MANAGEMENT	Element 14: Threat management	Standard 14.1: Factors that are potentially harmful to dolphin conservation are known and negative impacts are eliminated, managed and/or mitigated	Criterion 14.1.1: Assessments and monitoring of current and potential threats are undertaken and regularly reviewed for a wide range of threats e.g., water availability, fisheries (see 12.2 and 12.3), pollution (see also 14.3 below), riverbed dredging, boulder/sand-mining, sediment extraction, noise, river traffic, gold mining and mercury contamination Criterion 14.1.2: Current impacts from threats are mitigated where possible	Evidence base: Regular threat assessments (e.g., as part of a management effectiveness assessment), management plan/system and annual work plans, monitoring and assessment records, replication of successful mitigation strategies For	Guidance notes Thresholds are best be set for birth and death rate. In stressed populations, animals breed earlier but generally have lower survival. Number of young produced by a female over her lifetime can be determined by placental scars on necropsy. Thresholds of species longevity can measured by the age- and sex-specific death rate, using necropsy on dead dolphins, e.g., high death rates of young females is a sign of trouble.

		<p>Criterion 14.1.3. Thresholds for potential threats are developed, early warning systems for when a potential threat becomes a current threat are in place, and mitigation strategies are developed where possible and ready to be implemented if a threat passes the agreed threshold</p> <p>Criterion 14.1.4. Intractable threats which require long-term, and usually national/international level policy change (e.g., changing agricultural policies towards commodities such as oil palm) are understood and efforts are made to engage with high-level decision making to safeguard river dolphins in the long-term (see also 3.1 and 4.1)</p> <p>Criterion 14.1.5. The current and potential impacts of climate change at the site are understood and where possible action is taken to mitigate any negative impacts</p>	<p>industrial pollution there are clear EPA as implementing agencies and whether national quality standards are met, records are maintained and the industries around a site have water treatment facilities should be in the knowledge of the site staff.</p>	<p>Individual survivorship rates can also be measured using tagged or easily recognisable individuals. Overall population abundance can be found by systematic counts, either visually or by underwater microphones. However, this may hide critical trends, at least for a while, in things like high death rate in breeding females.</p> <p>Best Practices See World Bank report (Willems et al., 2021), section 4.4.2 (<i>water infrastructure</i>), 4.5.3 (<i>land use change and agriculture</i>), 4.5.4 (<i>industrial wastewater</i>), 4.6.1 (<i>mining</i>) and 4.6.2 (<i>sand and gravel extraction</i>).</p> <p>Resources Habersack H., Baranya S., Holubova K. et al. (2019). Sediment Manual for Stakeholders. Interreg Danube Transnational Project DanubeSediment co-funded by the European Commission, Vienna. Belokurov A., Baskinas L., Biyo R., et al. (2016). Climate Adaptation Methodology for Protected Areas (CAMPA): Coastal and Marine. WWF, Gland, Switzerland.</p>
	<p>Standard 14.2: Threats related to illegal trade and poaching of river dolphins are known and assessed</p>	<p>Criterion 14.2.1 All incidents or potential threats from the deliberate capture or killing of river dolphins are known and understood and mechanisms are taken to halt any illegal loss of individuals from the population</p>	<p>Evidence base: Documentation of illegal killings; penalty systems in place and awareness campaigns to highlight dolphin related crime</p>	

		<p>Standard 14.3 Pollution (including the use of mercury in gold mining) and other changes to water quality do not pose a threat to the river dolphin population</p>	<p>Criterion 14.3.1: Water quality at the site (and within critical river dolphin areas of the river basin, see 17.3) is periodically monitored (together with the relevant environmental protection agency) and results fed back into the adaptive management system (see also 17.7.2)</p> <p>Criterion 14.3.2: Water pollution from within the site and upstream that cause or may cause a dramatic decline in the quality of water along the river basin are known and action is taken to halt or mitigate the impacts where possible (see also 17.4.3)</p>	<p>Evidence base: Research and monitoring; management planning related to water quality and pollution mitigation plans</p>	<p>Best Practices See World Bank report (Willems et al., 2021), section 4.5 (<i>Water quality</i>)</p> <p>Resources Barclay, H., Gray, C.L., Luke, S.H., Nainar, A., Snaddon, J.L., and Turner, E.C. (2017). RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves.</p>
		<p>Standard 14.4: A disaster mitigation strategy is in place and the possible impacts of significant irregular disturbance regimes, disasters and disease to river dolphins monitored and managed</p>	<p>Criterion 14.4.1: An analysis of potential disturbance regimes and disasters (e.g., flood, drought, chemical spill or disease – see also 20.1) has been conducted and mitigation plans developed where necessary</p> <p>Criterion 14.4.2: Impacts of disturbance regimes and disasters are mapped, monitored and managed</p>	<p>Evidence base: Research and monitoring; assessments, including policy and research into land-use and water-use planning; management plan and/or specific mitigation plans for disturbance regimes and disasters (e.g., for flood, drought, disease); reports on success of intervention.</p>	<p>Guidance notes Impacts include both local, site-level disturbance (erosion of banks, channel movement across the river corridor, sediment build-up that can increase flooding, riverbed dumping with debris that can increase pollution) and larger-scale impacts within the watershed (upstream pollution, water hydrology and hydraulics, land use change influencing regularity of water flow and sediment load). Responses include engineering approaches (e.g., stabilising riverbanks) and ecological disaster risk reduction (e.g., revegetating slopes, restoring mangroves and riparian vegetation); the latter are much preferred.</p> <p>Resources Booth, C. G., Sinclair, R.R. and Harwood, J. (2020). Methods for Monitoring for the Population Consequences of Disturbance in Marine Mammals: A Review. <i>Frontiers in</i></p>

					<i>Marine Science 7 (115):</i> 10.3389/fmars.2020.00115
		Standard 14.5: Major water regulation related management and operational activities do not adversely impact river dolphin or river dolphin prey population and conservation	Criterion 14.5.1: Infrastructure or other operational processes for water regulation or water use is planned and designed with full consideration to minimise adverse impacts for both the river dolphin and dolphin prey populations for their long-term conservation and where existing structures already exist, management interventions are in place to mitigate impacts (see also 3.1.6 and 3.1.7).	Evidence base: Water use agreements, water allocation regulations/laws, water holding and release protocols, river basin management plan, management plan.	
	Element 15. Enforcement	Standard 15.1: An effective enforcement strategy for river dolphins is in place	Criterion 15.1.1: Requirements for protection of river dolphins, their habitat and prey have been assessed and strategies developed	Evidence base: Protection strategy and quantitative monitoring data showing status and trends coming from law enforcement monitoring system; threat assessment; law enforcement monitoring system (e.g., patrol reports, standard operating procedures, training reports, use of SMART programmes, arrest and prosecution reports); employment records; staff training and capacity development	Guidance note Law enforcement capacity does not just have to site based and can be complimented by local, provincial, national, regional enforcement agencies (e.g. INTERPOL). Law enforcement can also be community based, for example, Yayasan Konservasi RASI in Indonesia has five community rangers teams; each team includes two local community rangers who monitor the dolphins and illegal fishing activities three times per week using android phone and cybertracker and GPS tracker software on mobile phones. All patrol tracks are verified with locations and times of illegal activities as well as dolphin positions. A team of 72 river guards control illegal fishing activities in the Mekong river. Similarly in China, almost every county along the middle and lower reaches of the Yangtze and around Poyang and Dongting lakes have established social organizations to protect the porpoise. Each has a network
Criterion 15.2.2: Software-based law enforcement monitoring systems (e.g., SMART) are understood and implemented					
Criterion 15.1.3: Threats are monitored using a law enforcement monitoring system (e.g., SMART)					
Criterion 15.1.4: Monitoring protocols include details of river dolphin fatalities and negative impacts on dolphin populations, prey, habitat and water quality from illegal activities (see also 20.1)					
			Criterion 15.1.5: There is sufficient capacity to deal with enforcement related activities to safeguard river dolphin population and habitat (see also 6.2.1)		

					<p>of rangers most of whom used to be fisherfolk.</p> <p>Best Practices See World Bank report (Willems et al., 2021), section 4.3.6 (<i>Surveillance and enforcement strategies</i>), section 4.3.6 (<i>Surveillance and enforcement strategies</i>) and section 4.1.2, part 3 (<i>Monitoring mortality, birth and death rates</i>).</p> <p>Resources SMART website World Bank report (Willems et al., 2021) Ranger's code of conduct</p>
F: TOURISM	Element 16. Tourism management	Standards 16.1: Tourism and visitors do not conflict with river dolphin conservation objectives	<p>Criterion 16.1.1: Tourism/visitor facilities (e.g., boat trips) and infrastructure development that could impact river dolphin conservation have been assessed and impacts are avoided where possible</p> <p>Criterion 16.1.2: Tourism certification, accreditation or award schemes which promote best practice management are known and where appropriate implemented</p> <p>Criterion 16.1.3: Tourism benefits local communities, through employing local tourist guides, homestay providers etc and benefits from tourism are shared with local communities (see also element 11)</p>	Evidence base: Tourism management system/plan, certification records, tourism related capacity development plans and implementation	<p>Best Practices See World Bank report (Willems et al., 2021), section 4.2, (<i>Community engagement, governance and awareness</i>).</p> <p>Resources Leung, Y.F., Spenceley, A., Hvenegaard, G., and Buckley, R. (eds.) (2018). Tourism and visitor management in protected areas: Guidelines for sustainability. BP Protected Area Guidelines Series No. 27. IUCN, Gland, Switzerland. Australian National Guidelines for Whale and Dolphin Watching (2005) (see adaptation by Pesut Mahakam Conservation Program Appendix 2 Observación responsable de delfines de río</p>

G: HABITAT	Element 17. Habitat management	<p>Standard 17.1: Habitat management considers the needs of river dolphins and their prey</p>	<p>Criterion 17.1.1: River dolphin habitat management requirements are identified and used to inform management (see also 17.2, 17.3 and 17.4)</p> <p>Criterion 17.1.2: Habitats are mapped and monitored, and trend and status data are known (see 5.1.1)</p>	<p>Evidence base: Maps, management plans/systems, monitoring systems, research</p>	<p>Guidance note Habitat management could relate to a range of issues including environmental flow (eFlows), seasonal movements, prey utilisation, connectivity and invasive species.</p> <p>Best practices See World Bank report (Willems et al., 2021), section 4.1.3 (<i>Understanding dolphin habitat use and movements</i>).</p>		
		<p>Standard 17.2: Critical habitat for river dolphins is given the highest priority for protection and management where possible</p>	<p>Criterion 17.2.1. All habitats that are considered critical for dolphin breeding, feeding and security are identified and action has been initiated to include in the most protected or intensively managed zones of the site such as core areas</p> <p>Criterion 17.2.2 Water quality is recognised as a critical habitat component in itself and is given specific attention in the management plan/systems (see 14.3)</p>			<p>Evidence base: Management plans, zonation mapping, local legislation</p>	<p>Best practices See World Bank report (Willems et al., 2021), section 4.7 (<i>Conservation planning</i>), including 4.7.1 (<i>Protected areas</i>).</p> <p>Resources Jones, T. et al. (2006). <i>Applying the principles of integrated water resource and river basin management: an introduction</i>. WWF UK, Godalming; World Bank Institute. (2006). <i>Integrated River Basin Management: From concepts to good practice. Briefing Note 2. Creating and Empowering a River Basin Organization</i>. Washington DC. Aither (2018). <i>A Guide to Managing Water for the Environment</i> (a framing paper for the High-Level Panel on Water). Australian Water Partnership, Canberra.</p>
		<p>Standard 17.3: Habitats critical to dolphin conservation immediately adjacent to the</p>	<p>Criterion 17.3.1 Adjacent habitats which have a direct influence on the site through their influence on water quality, additional habitat, prey numbers etc. are identified, mapped, their influence recognised, and efforts are made to ensure beneficial management</p>				

		site are considered in the management plan/systems for the site	Criterion 17.3.2 Habitats outside the site that may become critical to the dolphin population in the future are identified and where possible given legal protection and/or active management if necessary (see also 3.1)	waterway/ navigation policy	
		Standard 17.4: Freshwater systems support river dolphin conservation	Criterion 17.4.1: Freshwater systems have not been altered or are restored to as close to natural as possible unless alterations are for the benefit of river dolphins, their prey or other high priority conservation targets	Evidence base: Water use agreements/allocation policy; fishing policy; water holding and release protocols; river basin management plan; waterway/ navigation policy; monitoring of invasive species	
	Criterion 17.4.2 Where freshwater systems have been altered, any adverse impacts have been compensated or offset to other locations where possible within the site or other suitable locations				
	Criterion 17.4.3: Water quality is monitored in accordance with national and regional quality standards, where appropriate, and includes where necessary issues such as seasonal changes and fluctuations in pollutants etc. (see 14.3.2 and 17.2.2)				
	Criterion 17.4.4: Where river dolphins are impacted by invasive species, monitoring and management processes are in place				
H: POPULATIONS	Element 18. River dolphin population management and monitoring	Standard 18.1: River dolphin populations are well understood and periodically monitored, analysed and mapped	Criterion 18.1.1: Population monitoring protocols for river dolphins (scientifically rigorous and replicable) are in place and where necessary individual counts are up-to-date and populations are periodically analysed and mapped	Evidence base: Monitoring protocols; results of field work and peer reviewed results; management plan/system, monitoring map; abundance estimation protocols; databases	Guidance notes River dolphin monitoring usually involves visual survey (from bank, boats or aerial survey) sometimes combined by an acoustic survey. Best Practices See World Bank report (Willems et al., 2021), section 4.1.3 (<i>part 2 satellite tagging</i>) and 4.1.4 (<i>behaviour</i>) and section
	Criterion 18.1.2: Monitoring reviews population trends including, as necessary, density, survival, recruitment and dispersal, age structure and mortalities				

			Criterion 18.1.3: Monitoring results are reflected in decision making, management and management systems, and disseminated as appropriate (see also 6.4.3)		4.1.2 (<i>Understanding how many dolphins there are</i>). Resources Richman, N.I. et al. (2014). To see or not to see: investigating detectability of Ganges river dolphins using a combined visual-acoustic survey . <i>PLOS One</i> 9 (5): e96811, Fürstenau Oliviera, J.S. et al. (2017). Improving river dolphin monitoring using aerial surveys . <i>Ecosphere</i> 8 (8): e01902
		Standard 18.2: Targets for river dolphin conservation are agreed and implemented	Criterion 18.2.1: Targets encompassing status and trends for river dolphin conservation (e.g., population increase, reduced mortality, birth-rate), are developed with scientists and other relevant stakeholders (see 18.1)	Evidence base: Research papers, management plans, related documents and annual reports,	
		Standard 18.3: River dolphin populations are managed as part of broader species and metapopulation management	Criterion 18.3.1: The status and trends of the dolphins within the site relative to the wider metapopulation and species is considered within the management, monitoring, target setting and reporting of population dynamics	Evidence base: Site monitoring protocols, systems, reports and other publications	Guidance notes Metapopulation management includes ensuring that river dolphin populations are genetically diverse. Note that this does not include bringing distant populations together in an inappropriate manner.
	Element 19. Prey population, management and monitoring	Standard 19.1: Prey population is sufficient to sustain river dolphin populations	Criterion 19.1.1: Prey populations, density and distribution are monitored and mapped, and river dolphin management considers prey availability in strategies and targets	Evidence base: Management plans; maps; prey population levels	Guidance note It is understandably difficult to monitor prey populations and many terrestrial methods are inapplicable. Local fisherfolk can often make a rough assessment of the health of populations from catch data. Dolphins are generally unfussy feeders and if overall fish populations are high enough the exact species mix is less important. However, it may be important to ensure spawning areas
Criterion 19.1.2: Any prey management and/or supplementation should follow best practices					

					are secured, migration patterns are known, fish stocks are sustainable and where necessary managed for human and wildlife requirements (see element 12).
Element 20: River dolphin health and mortality management	Standard 20.1: Health and mortality in river dolphins is managed and monitored	Criterion 20.1.1: River dolphin mortality is monitored	Evidence base: Health monitoring, associated databases and post-mortem procedures; processes for sample analysis/investigation of dead specimens; protocols / guidelines for rescue and release of river dolphins	Guidance notes Monitoring mortality is an important to establish thresholds above which management actions are needed. However, this will often be beyond the capacity of an individual site and outside expertise may be required.	
		Criterion 20.1.2: Health monitoring and/or health assessments are undertaken as required			
		Criterion 20.1.3: The capacity to implement standard operating procedures to manage health risk to river dolphin population is available			Best practices See World Bank report (Willems et al., 2021), section 4.1.2, part 3 (<i>Monitoring mortality, birth and death rates</i>) and section 4.4.1 (section on <i>River dolphin rescues</i>).
		Criterion 20.1.4: The capacity to implement standard operating procedures to manage rescue and release of river dolphins is available			Resources Aliaga-Rossel, E. and Escobar-Ww, M. (2020). Translocation of trapped Bolivian river dolphins (<i>Inia boliviensis</i>) . <i>Journal of Cetacean Research and Management</i> 21 : 17-23.

Appendix 1: Major River Dolphin Sites and PAME Status

Country	Species	No	Protected Area	Size (km ² or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
China	Yangtze Finless Porpoise	1	Hubei Yangtze Tian-e-zhou Baiji National Reserve (in situ and translocation)	110 sq km, 90 sq km with 89km in Yangtze stem and 2000 ha with 20.9km in the oxbow						About 80 in oxbow	No
		2	Hubei Jianli He wang miao Provincial Yangtze finless porpoise Reserve (ex situ)	47 sq km, 32km in oxbow (with central line of river as the boundary, Hubei and Hunan share common management)						15-17	No
		3	Hunan Huarong Ji-cheng Provincial Yangtze finless porpoise reserve Reserve(ex situ)								
		4	Hunan Dongting Lake Municipal Yangtze finless porpoise reserve	About 300 sq km in dry and floodwater seasons of East Dongting lake					GL: https://iucngreenlist.org/sites/eastern-dongting-lake-national-nature-reserve/	About 110	Yes

Country	Species	No	Protected Area	Size (km2 or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
		5	Hubei Yangtze Xinluo Section Baiji National Reserve	17800 ha, 135.5km in stem							No
		6	Jiangxi Poyang Lake Yangtze finless porpoise Provincial reserve	68 km ²						457	Yes, partial area
		7	Anhui Anqing Yangtze finless porpoise Provincial Reserve	About 300 km ² , 243km in stem						About 15 porpoises in the Xijiang translocation site	No
		8	Anhui Tongling Yangtze freshwater dolphin National Reserve	315 km ² , 58km in mainstem and a semi translocation site with 2 km length, 0.4 sq km							No
		9	Jiangsu Nanjing Yangtze finless porpoise Provincial Nature Reserve	87 sq km						semi-translocation site, 10 porpoise	No
		10	Jiangsu Zhenjiang Yangtze dolphins Provincial Nature Reserve	5730 ha							No
Cambodia	Irrawaddy	11	the Mekong Dolphin Protection and Management Zones	776.36 km ²	not on WDPA			Government with the support from WWF	METT and COPS, 2016	89	No
		12	Mekong Fishery Biodiversity Management and Conservation Zone	372.7 km ²	not on WDPA			Government with the support from WWF	METT and COPS, 2016		No
		13	Steung Treng Ramsar Site	148.9 km ²	https://www.protectedplanet.net/198316	-	la	Government		Range but haven't used this stretch since 2005	Yes

Country	Species	No	Protected Area	Size (km2 or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
Myanmar	Irrawaddy	14	Ayeyarwady Dolphin Protected Area	74 km with additional 100 km as buffer zone	Not on WDPA	IUCN repot (1) states Established by Department of Fisheries in December 2006. However not on official list of PAs we received when doing METT in Myanmar in 2018				1-3 individuals	No
Indonesia		15	Mahakam Protected Area (NOTE: this in IWC list but not in strategy doc)	43,117 ha	https://www.protectedplanet.net/17841	PROPOSED on WDPA although IUCN report (1) states Formal decision on establishment and protected status taken by regent: SK: 522.5.51/K. 471/2009.				76	No
Pakistan	Indus dolphin	16	Indus dolphin reserve	190 km	https://www.protectedplanet.net/900608	-	NR	NR		1075	Yes
India	Indus	17	Beas Conservation Reserve, Punjab	185 km	not on WDPA					6 - 8. Both protected areas are connected to	Yes

Country	Species	No	Protected Area	Size (km2 or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
		18	Harike Wildlife Sanctuary, Punjab	84 sq km	https://www.protectedplanet.net/9962					each other and 6-8 is common population of Harike wildlife sanctuary and Beas Conservation Reserve.	Yes
	Ganges River	19	Hastinapur Wildlife Sanctuary, Uttar Pradesh (Ganga River Bijnor barrage to Brijghat)	95 km	https://www.protectedplanet.net/12257		IV	Government		35 for the two sites	No
		20	Narora Ramsar Site, Uttar Pradesh / Ganga River Bijnore to Narora barrage	85 km	not on WDPA						Yes: called: Upper Ganga River (Brijghat to Narora Stretch)
		21	National Chambal Sanctuary (tri state)	5400 km2	https://www.protectedplanet.net/1796		IV	Government	MEE of National Parks and Wildlife Sanctuaries 2007	116, only 356 km surveyed in Uttar Pradesh state	
		22	Katerniaghat Wildlife Sanctuary, Uttar Pradesh	400.6 km2	not on WDPA					45, only 36 km stretch surveyed	
		23	Vikramshila Gangetic Dolphin Sanctuary Bihar	50km	https://www.protectedplanet.net/142995	-	IV	Government			

Country	Species	No	Protected Area	Size (km ² or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site	
Brazil	<i>Inia spp</i>	24	Mamiraua Sustainable Development Reserve	11, 137 km ²	https://www.protectedplanet.net/19769		VI	Government	RAPPAM 2015		Yes	
		25	Amanã Sustainable Development Reserve (AM)	23,500 km ²	https://www.protectedplanet.net/352134		VI	Government	RAPPAM 2015		No	
		26	Piagaçu-Purus Sustainable Development Reserve	10, 082 km ²	https://www.protectedplanet.net/352136		VI	Government	RAPPAM 2015		No	
		27	Jaú National Park	23,673 km ²	https://www.protectedplanet.net/53		II	Government	RAPPAM 2015, SAMGe 2016		No	
		28	Juruena National Park	19,582 km ²	https://www.protectedplanet.net/351839		II	Government	RAPPAM 2015, SAMGe 2016		No	
		29	Vuruá National Park	2,4195 km ²	https://www.protectedplanet.net/198281		II	Government	RAPPAM 2015, SAMGe 2016		Yes	
		30	Anavihanas National Park	3,505 km ²	https://www.protectedplanet.net/2215		II	Government	RAPPAM 2015, SAMGe 2016		No	
		31	Lago Piratuba Biological Reserve	3,925 km ²	https://www.protectedplanet.net/42		Ia	Government	RAPPAM 2015, SAMGe 2016		No	
		32	Medio Juruá Extractive Reserve	2,516 km ²	Not listed							No
		33	Cabo Orange National Park	6,190 km ²	https://www.protectedplanet.net/57		II	Government	RAPPAM 2015, SAMGe 2016		Yes	

Country	Species	No	Protected Area	Size (km ² or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
		34	Serra do Divisor National park	8,376 km ²	https://www.protectedplanet.net/19275		II	Government	RAPPAM 2015, SAMGe 2016		No
		35	Bararati Sustainable Development Reserve	1,136 km ²	https://www.protectedplanet.net/352154		VI	Government			No
		36	Sucunduri State park	7,960 km ²	https://www.protectedplanet.net/352156		II	Government			No
		37	Alto Juruá Extractive Reserve	5,379 km ²	https://www.protectedplanet.net/31774		VI	Government	RAPPAM 2015, SAMGe 2016		No
		38	Araguaia National Park	5,555 km ²	https://www.protectedplanet.net/58		II	Government			Yes: name Ilha do Bananal
		39	Cantão State Park	900 km ²	https://www.protectedplanet.net/352013		II	Government	RAPPAM 2015		No
Ecuador	Inia and Tucuxi	40	Cuyabeno-Wildlife Reserve	603,380 ha		Two possible sites on WDPA: Complejo de Humedales Cuyabeno Lagartococha Yasuní or Cuyabeno Fauna Production Reserve					Yes, partially

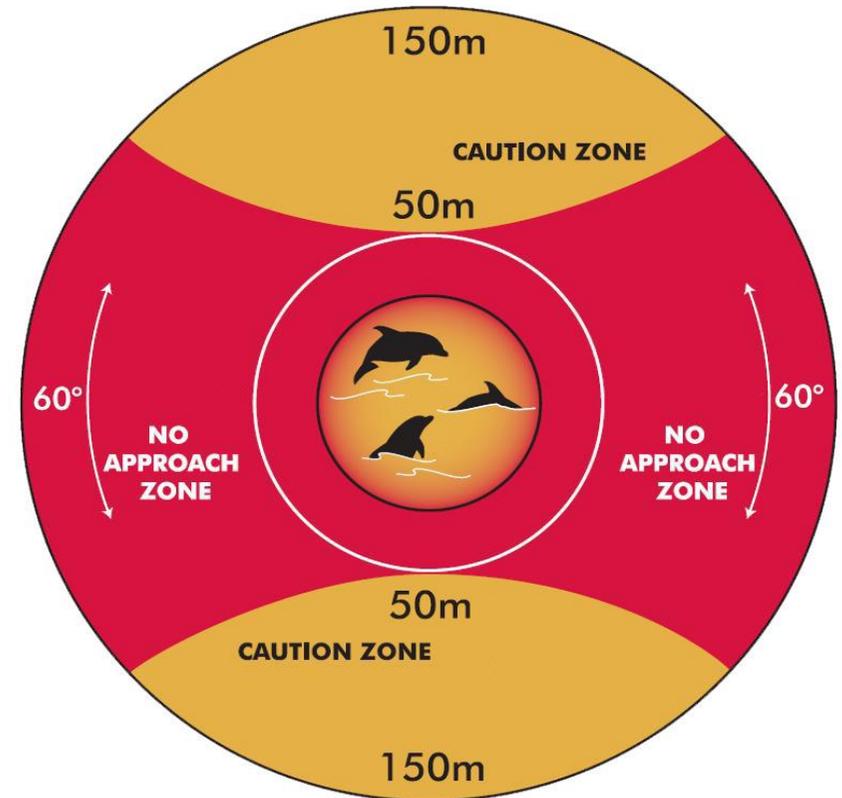
Country	Species	No	Protected Area	Size (km ² or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
		41	Yasuní National Park	10300.7 km ²	https://www.protectedplanet.net/186			Government	Birdlife IBA 1990; Ecuador MEE 1999; GOBI Survey 2006		Yes, partially
Peru	<i>Inia and tucuxi</i>	42	Pacaya Samiria National Park	208,000 sq km	https://www.protectedplanet.net/249		VI	Government	METT, 2016	441 (<i>Inia</i>) and 377 <i>Sotalia</i>	No
	<i>Inia and tucuxi</i>	43	Pucacuro National Reserve	6379.54 sq km	https://www.protectedplanet.net/98228		VI	Government	METT, 2016		No
	<i>Inia and tucuxi</i>	44	Güeppi-Sekime National Park	2,036 sq km	https://www.protectedplanet.net/55555616		II	Government	METT, 2016		No
	<i>Inia and tucuxi</i>	45	Communal Reserve Airo Pai	24,788 sq km	https://www.protectedplanet.net/55555618		VI	Government-delegated management (co-management ?)	METT, 2016		No
	<i>Inia and tucuxi</i>	46	Communal Reserve Huimeki	1,412.34 km ²	https://www.protectedplanet.net/55555617		VI	Government	METT, 2016		No
	<i>Inia and tucuxi</i>	47	Sierra del Divisor National Park	13,544.85 km ²	https://www.protectedplanet.net/555623628		II	Government	METT, 2016		No
	<i>Inia</i>	48	Alto Purús National Park	25,106.94 km ²	https://www.protectedplanet.net/303316		II	Government	METT, 2016		No

Country	Species	No	Protected Area	Size (km2 or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
	<i>Inia</i>	49	Alpahuayo Mishana National Reserve	580.7 km ²	https://www.protectedplanet.net/168276		VI	Government	METT, 2016		No
Bolivia	<i>Inia</i>	50	Llanos de Moxos	6.900.000 ha	Not on WDPA						Yes
		51	Parque Departamental y Área Natural de Manejo Integrado Iténez	1389025 (ha??)	Not on WDPA						Yes, overlaps with one
		52	Parque Nacional Noel Kempff Mercado	16467.56 km ²	https://www.protectedplanet.net/31			Government	Lots of PiP, METT and RAPPAM but all about 20 years old		No
		53	Reserva de la Biósfera Estación Biológica del Beni	1,350.15 km ²	https://www.protectedplanet.net/9308			Government	As above		Yes, overlaps with one
		54	Territorio Indígena y Parque Nacional Isiboro Sécure	13,036.59 km ²	https://www.protectedplanet.net/30			Government	As above		No
		55	Refugio de Vida Silvestre Estancias Elsner Espiritu	1,001.01 km ²	https://www.protectedplanet.net/342482		IV	Government			No
		56	Reserva de Vida Silvestre Rios Blanco y Negro	13,987.64 km ²	https://www.protectedplanet.net/342483			Government			No

Country	Species	No	Protected Area	Size (km ² or km if a river stretch)	WDPA code	Protected status	IUCN Category	Governance	PAME	Approximate population within the PA	Ramsar site
		57	Área Protegida Muicipal Ibare-Mamoré	75.28 km ²	https://www.protectedplanet.net/555592646			Government			No
Colombia	<i>Inia and tucuxi</i>	58	PNN La Paya	4,401.2 km ²	https://www.protectedplanet.net/9400		II	Government	AEMAPPS 2016		No
	<i>Inia and tucuxi</i>	59	Lagos de Tarapoto	454.64 km ²	https://www.protectedplanet.net/555637342		II				Yes
	<i>Inia</i>	60	Inirida Fluvial Star	253.000 ha	not on WDPA						Yes
		61	Bitá River	825.000 ha	not on WDPA						Yes
References											
(1). Krieb, D., Reeves, R.R., Thomas, P.O., Braulik, G.T. and Smith, B.D. (Editors). 2010. Establishing protected areas for Asian freshwater cetaceans: Freshwater cetaceans as flagship species for integrated river conservation management, Samarinda, 19-24 October 2009. Final Workshop Report. Yayasan Konservasi RASI, Samarinda, Indonesia, 166 pp. ISBN: 978-602-97677-0-4											

Appendix 2: Protocol for Mahakam dolphin watching

- Follow the dolphin from aside at wake speed
- Do not suddenly change direction or reduce or increase speed suddenly.
- Keep a distance of 50m of individuals and 150m if there is a calf while the engine is running.
- Do not approach dolphins from behind or chase them.
- If a dolphin approaches the boat, keep a steady direction and speed.
- Never cut a dolphin's swimming path of separate individuals by moving the boat in between them.
- Only 2 observation boats are allowed to follow the dolphins with a distance of 50-150m at one time while the engine runs. If there are more than 2 boats, they may change every 20 minutes but still only 2 boats max allowed with 50-150m distance if the engine runs.
- If there are two boats, they should both stay on the same side.
- Do no try to feed dolphins or swim with them
- Do not litter anything in the river (even small items such as cigarette butts)



Code of Practice taken from the Australian National Guidelines for Whale and Dolphin Watching (2005)